

ARAZPA 2008

Year of the Frog Campaign

Information pack



Australasian Regional
Association of Zoological Parks & Aquaria



amphibian ark
2008 YEAR OF THE FROG

ARAZPA 2008

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Information pack



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ARAZPA 2008 Year of the Frog Campaign

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Foreword

Almost everyone can recognise frogs and toads. They are those extraordinary vertebrate animals which change from egg to adult by undergoing metamorphosis. This remarkable process played a crucial part in these animals' pioneering invasion of the land. It demonstrates evolution compressed into just a few weeks and it sparks our imagination.

Today amphibians can be found in enormous variety and occupy a wide range of water and land habitats – except for the oceans and the frozen polar regions. They are so familiar to most people that they have become part of the myths, legends, and folk tales of many cultures. And there is still much more for us to learn about them for new species are being discovered even today. Yet their habitats are being destroyed at such a speed that now many species may disappear before we even discover that they exist. Infections of chytrid fungus, for which there is no known cure, are today spreading rapidly and threatening entire amphibian communities. There is thus the real possibility that much of an entire category of animals may become extinct worldwide – unless we prepare to act quickly. Captive breeding has been shown by the scientific community to be one of the most important and appropriate ways to slow down the effects of this crisis. Selected species, bred in favourable *ex situ* conditions, can multiply and prosper to such an extent that populations can be released into secure environments in the wild. The IUCN/SSC Amphibian and Conservation Breeding Specialist Groups and the World Association of Zoos and Aquariums have therefore launched The Amphibian Ark to support such *ex situ* projects around the world. The global zoo and aquarium community has taken on this challenge with enthusiasm and is providing appropriate facilities and breeding grounds within their institutions. But implementation calls for financial and political support from all parts of the world.

I therefore extend a warm invitation to all of you to join the 2008 Year of the Frog global campaign.

Its main goal is to generate public awareness and understanding of the amphibian extinction crisis. The funds raised from this worldwide campaign will help support Amphibian Ark coordination activities and finance regional initiatives such as rescues, training workshops, and cooperatively managed centres. It will also ensure the sustainability of surviving populations by creating a cash fund that will extend far beyond 2008. Without an immediate and sustained conservation effort to support captive management, hundreds of species of these wonderful creatures could become extinct in our own lifetime.



Sir David Attenborough
Patron, Amphibian Ark 2008 Year of the Frog
Copyright © BBC



Foreword – Part II

Of the almost 6,000 known species of amphibians we are seeing dramatic declines and extinctions all over the globe.

This is a potentially catastrophic situation for the world's amphibians and as a result of this impending disaster, the World Conservation Union (or IUCN) has for the first time turned to us, as zoos, aquariums and captive breeding facilities, to assist in addressing this extinction crisis.



Australia has one of the most diverse frog assemblages in the world - with 219 species. Almost a third of Australian frog species are threatened and seven species are believed to have become extinct in the last 30 years. All four New Zealand species are considered threatened, with two species listed as 'nationally critical'. The two native species in Fiji are also threatened.

Our region has become an active player in the **Year of the Frog in 2008** and I urge all zoos, aquariums, botanic gardens and other organisations to participate in this global campaign to raise awareness about amphibians and to actively raise funds for amphibian conservation.

I suppose we could all behave like the Sandhill Frog, (*Arenophryne rotunda*) and burrow head first into the sand to ignore what is happening to the world's amphibians. However this would not help these animals whose planet we are both sharing and destroying.

Even in the isolation of Western Australia we have been affected by the decline of amphibian species. As we have become involved here at Perth Zoo in an amphibian research program I have become aware and entranced by our local frogs.

- *Spicospina flammocaerulea* (Endangered) was only discovered in 1994 and lives in small patches of peat bog which are thought to be relics of an earlier subtropical wet climate. About 5 to 6 million years ago the climate changed to a seasonally arid one – will the current climate change we are seeing occurring now be the end for this amazing species?
- The Water-holding Frog (*Cyclorana platycephala*) is adapted to life in the desert. It burrows into the soil as protection from heat and to avoid dehydration. They form an external, almost waterproof cocoon, which reduces water loss. These frogs spend most of the year underground and are usually only seen or heard after heavy rains – but how long will our Water-holding Frogs have to wait for their next rain event? How long can they wait?

What a sad world it would be if our future did not contain frogs. Our grandchildren would not have the fun of “talking” to a competitively quacking Red-legged Froglet (*Crinia georgiana*).

Our Australasian frog fauna contains some of the real wonders of the world. *Rheobatrachus vitellinus* and *Rheobatrachus silus*. for example swallowed their eggs and brooded them in their stomachs. Known as ‘Gastric Brooding Frogs’– neither of these species have been seen since the early 1980s. Are they the first of many of our species to succumb to chytrid fungus? Assa

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darlingtoni, the Pocket Frog, do not need water to breed. The female lays her eggs on the ground and both male and female guard them. When the tadpoles hatch out the male climbs amongst the eggs and coats himself in the jelly. The tadpoles then slide over the male's back and wriggle into the skin pockets along his sides. The tadpoles leave the pouch when they are fully developed frogs. Will these little wonders go the same way as the Gastric Brooding Frogs?

From the White-bellied Frog (*Geocrinia alba*) (Critically Endangered) in the west of Australia to Hochstetter's Frog (*Leiopelma hochstetteri*) (Vulnerable) in New Zealand, and the Fiji Ground Frog (*Platymantis vitiana*) (Endangered) in Fiji, our frogs need our assistance as never before.



This is a great responsibility and opportunity for zoos and aquariums to become involved in this global campaign to save the world's frogs. I urge you to use this excellent information pack to develop a campaign that works in your local community. Please be active in this campaign and demonstrate the difference that zoos, aquariums and the wider *ex situ* community can make to global conservation.

A handwritten signature in black ink that reads "Susan Hunt".

Susan Hunt

President, ARAZPA



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Introduction

Amphibians are declining rapidly; species, genera, are going extinct at an unprecedented rate. One third to one half of all amphibian species are threatened with extinction, with probably more than 120 already extinct in recent years. Habitat loss is the major threat in terms of number of species affected, but the rapid dispersal of amphibian chytrid fungus is of major and urgent concern because of its tendency to drive species to extinction quickly. Scientists believe many more species may be extinct before we are able to act. But there is one option currently available which can save hundreds or even thousands of species if we act rapidly: captive survival assurance populations. Zoos, aquaria, and botanical gardens play a crucial role in this solution, as they can provide *ex situ* breeding grounds for the immediate conservation action needed before hundreds of species disappear.

IUCN has called upon zoos and aquaria to help save the amphibians. In 2005, during the Amphibian Conservation Summit in Washington, D.C., the Amphibian Conservation Action Plan (ACAP) was developed and the IUCN/SSC Conservation Breeding Specialist Group (CBSG) was commissioned with the implementation of the *ex situ* aspects of the ACAP. In 2006, CBSG, the IUCN/SSC Amphibian Specialist Group (ASG) and the World Association of Zoos and Aquariums (WAZA) set up a collaborative program called the Amphibian Ark (AArk) to develop, promote, and guide short-term *ex situ* management, thus making possible long-term survival of amphibians for which adequate protection in the wild is not currently feasible.

The global zoo and aquarium community has taken on this challenge. But implementation costs money and requires political support from all corners of the world. Faced with this challenge, the Amphibian Ark is launching this global Amphibian Ark campaign – **2008 The Year of the Frog**, and ARAZPA and its member institutions are proud to be involved in this initiative.

This ARAZPA Year of the Frog Campaign Info Pack will provide information on what is planned on the global and regional levels in terms of communications and fundraising. In addition, we hope it provides all the information you need to participate successfully in the Amphibian Ark Year of the Frog campaign. If you need a more specialised piece of information or advice, please contact any of the regional contacts listed on page 22.

In light of the seriousness of the threat to amphibian survival, we sincerely hope that all ARAZPA zoos and aquaria will join in what we are confident will be an informative and successful campaign.



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Section 1

Why a Campaign?

The Connection Between Man and Nature

Humans have connections to nature. Experiences in nature literally enrich our lives and inform our choices for future generations.

- Nature renews the spirit, refreshes emotional and mental health, and provides places to live, play, recreate, explore, learn, and enjoy.
- Nature's beauty and resources are national and international treasures, defining our character and heritage.
- The variety and diversity of life on Earth is needed and inspirational for human existence.

Man's Effect on Nature

All life on earth exists with interdependent relationships between living things and their environments. A healthy environment sustains life for humans and animals.

- Humans are responsible for dramatic changes to nature at a rate unprecedented in Earth's history. This is due to population growth, increased consumption of resources, global warming, habitat destruction, invasive species, and over-use of many species.
- People increasingly recognise their responsibility to care for the Earth and leave a healthy environment for our families and future generations. Due to the unprecedented changes occurring on the planet, we must often intervene to save wildlife.

Frogs Matter

Amphibians are a critical part of a healthy natural world. In addition to their intrinsic value as a beautiful part of nature, they offer many benefits:

- They play an important role in the food web as predator and prey, maintaining the delicate balance of nature. Where they are disappearing, detrimental effects are being documented.
- Amphibians eat pest insects, benefiting successful agriculture around the world and minimizing the spread of diseases, including malaria.
- The skin of amphibians has substances that protect them from some microbes and viruses, offering possible medical cures for a variety of human diseases, including HIV/AIDS.
- Biologists refer to amphibians as "the canary in the coal mine:" They are among the first species to be affected by environmental stressors; so when they show declines in the wild, it serves as a warning to all other species, including humans.
- Amphibians' skin is highly permeable, allowing them to drink and breathe. Contaminants also readily enter the body, making amphibians an exceptional indicator of environmental quality. They are particularly sensitive to pollution, making them important sentinels to potential human threats.



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- Frogs have had a special place in various human cultures for centuries, cherished as agents of life and good luck.

The Problem

After thriving for over 360 million years, 1/3 to 1/2 of the world's approximately 6,000 known amphibian species could be extinct in our lifetime.

Our planet is facing the single largest mass extinction since the disappearance of dinosaurs.



The Reason

Amphibians are severely affected by habitat loss, climate change, pollution and pesticides, introduced species, and over-collection for food and pets. While habitat destruction is the major threat, one immediate cause is a parasitic fungus called amphibian chytrid, a disease that is deadly to hundreds of amphibian species and has quickly spread from Africa across the planet over the past 30-40 years. Global climate change may also have exacerbated the problem.

- Amphibian chytrid was discovered a decade ago and since then dozens of frog species have gone extinct as a result of this fungus.
- Since the 1930s, African Clawed Frogs (*Xenopus laevis*) (likely resistant carriers of the fungus) have been shipped around the world by the thousands for human pregnancy tests and lab studies, spreading the disease worldwide. It is believed that the food and pet trade may have contributed to the problem.
- Presently amphibian chytrid is unstoppable and untreatable in the wild, even in protected habitats. In the environments where it thrives, the fungus can kill 80 percent of the native amphibians within months, leading to widespread amphibian extinctions.
- The amphibian chytrid's spread and effects may be exacerbated by climate change.
- Warmer temperatures dry the moist areas where amphibians thrive, and cause stress that may lead to greater susceptibility to disease.

The Solution

In response to the problem, scientists and conservationists agreed to a global Amphibian Conservation Action Plan (ACAP), which includes research findings and requirements, assessment, and conservation strategies. For those species that cannot be saved in nature, the plan is to rescue them before they are gone, and to protect them in captive facilities until the threats to the wild populations can be controlled. Captive management is a vital component of ACAP's integrated conservation effort, buying valuable time to mitigate threats for species that would otherwise go extinct.

The Amphibian Ark is an initiative to fulfill our responsibility for this critical component of the ACAP. The AArk plan requires at least \$50 million in funding.

- Amphibian Ark is a program coordinated by the World Conservation Union (IUCN)/Species Survival Commission (SSC) Conservation Breeding Specialist Group, IUCN/SSC Amphibian Specialist Group, and the World Association of Zoos and



Aquariums (WAZA), and supported by a worldwide network of zoos and aquariums, to help keep threatened amphibian species afloat.

- Where appropriate, the AArk program will rescue priority endangered species and place them in “protective custody” in dedicated biosecure facilities at zoos, aquariums, and other institutions around the world for safekeeping and breeding, helping to ensure the long-term survival of amphibians.
- These rescued amphibians will be released back into the wild when the original threats have been controlled.

Getting the Word Out

Organisations that support Amphibian Ark will lead a global public awareness campaign, “2008: The Year of the Frog” to:

- Raise awareness among governments, media, educators, and the wider community about the vulnerability of amphibians and the extinction crisis they face.
- Raise funds through public fundraising, corporate sponsorship, donations, public, and government involvement to support AArk’s rescue efforts and ensure amphibians’ long-term sustainability
- Funds paid to AArk through the Global Conservation Network, a part of the Conservation Breeding Specialist Group will cover costs such as:
 - Prioritisation workshops to identify amphibian species in more need of conservation action.
 - Biosecure rescue centres and related operating expenses for amphibians brought into captivity.
 - Staffing training to build understanding and knowledge of amphibian management.
 - Field surveys and rescues of amphibians.
- Inspire the zoo community and other institutions to participate in AArk by creating and maintaining facilities for the most threatened amphibians.
- Further establish IUCN and the world zoo and aquarium community as leaders in global conservation.

A Further Purpose

The Year of the Frog will serve as an example of how to boldly and confidently face one of our planet’s biggest environmental challenges.

- The condition of our planet and its vanishing wildlife is a top concern of both adults and children, who are frustrated and unsure of how to help. This campaign and the AArk program will give them a direct chance to help.
- People will be invited to participate in the AArk initiative by getting engaged as volunteers where needed, spreading the word, making donations, and influencing governments, and they will learn that, working together, we can deal with environmental crises.
- The Amphibian Ark and Year of the Frog will help us to confidently face and address other environmental challenges.



The ARAZPA 2008 Year of the Frog Campaign



Goals

- To generate public awareness and understanding of the amphibian extinction crisis.
- To raise AU\$400,000 for implementing the *ex situ* aspects of the Amphibian Conservation Action Plan (ACAP), and to help realise actions from the ARAZPA Amphibian Action Plan.
- To create partnerships among zoos, aquariums, botanical gardens, and private and public institutions (universities, etc.) within Australasia and in other regions to ensure the global survival of amphibians.
- To highlight ways in which the public can make positive contributions to conservation through activities in their daily lives.
- To stimulate a sustained and long-term interest in amphibian conservation and related interactions with the wider environment.
- To raise increased awareness about the protection of biodiversity through the conservation of amphibians.
- To position the zoo community as leaders in global conservation.

Key Messages

Theme Statement: "Frogs are important in our environment, are sensitive to its change and need our help."

1. Frogs Matter

Amphibians are an important part of the natural world, with significant value in ecology, bio-medicine, environmental health and human culture.

Supporting Information

- a) Ecological Significance
 - Frogs have intrinsic value as a beautiful part of nature
 - Frogs play an important role in the food web as both predator and prey, maintaining the delicate balance of nature.
 - Amphibians eat pest insects, benefiting successful agriculture around the world and minimising the spread of diseases, including malaria.
- b) Biomedical Significance
 - The skin of amphibians has substances that protect them from some microbes and viruses, offering possible medical cures for a variety of human diseases, including AIDS.
- c) Environmental Significance
 - Biologists refer to amphibians as "the canary in the coal mine." They are among the first species to be affected by the environmental stressors; so when they show declines in the wild, it serves as a warning to other species including humans.
- d) Cultural Significance
 - Frogs have had a special place in various human cultures for centuries, cherished as agents of life and luck.



2. The Problem

After thriving for over 360 million years, one third to a half of the world's approximately 6,000 known amphibian species could become extinct in our lifetime.

Supporting Information

- Earth is facing the single largest mass extinction since the disappearance of dinosaurs.
- The crisis is due to disease (chytrid fungus), habitat loss, pollution, pesticides and climate change.
- Amphibian chytrid is currently unstoppable, and untreatable in the wild, even in protected areas. It can kill up to 80% of the native amphibians within months, causing widespread amphibian extinctions.
- Humans transporting the African Clawed Frog for human pregnancy tests and lab studies have spread amphibian chytrid worldwide.
- The amphibian chytrid's spread and effects may be exacerbated by climate change. Shifting temperatures and rainfall patterns are adversely affecting amphibians, using stress that may lead to greater susceptibility.

3. The Solution

The Amphibian Ark is a global initiative to help keep threatened amphibian species alive in captive facilities until threats to the wild populations can be controlled.

Supporting Information

- Amphibian Ark aims to rescue amphibians in the wild and bring them into captivity for safekeeping; in the hope they can be released back into the environment.
- Assist field conservation efforts to conserve species in the wild.
- Contribute to research to develop ways to tackle threats such as chytrid fungus.

4. Jump In

Individuals and corporations can help by raising awareness and critical funds, and by acting to positively impact the environment.

Further information

a) Raise Awareness

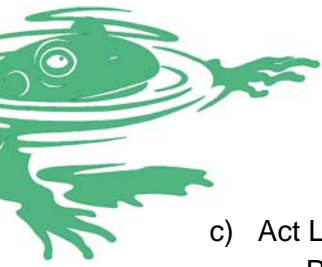
Raise awareness among national, state and local governments, world media, school educators, and the general public about the vulnerability of amphibians, and the extinction crisis they face.

b) Raise Funds

Raise funds through corporate sponsorship, philanthropy, and public and government involvement.

Funds raised will provide opportunity for:

- Prioritisation workshops to be conducted
- Field surveys and rescues
- The creation of biosecure rescue centres and required operating expenses
- Staffing and training



c) Act Locally

- Protect and conserve our natural habitats
- Encourage sustainable use (of products and resources)
- Reduce and offset carbon emissions
- Reduce the impact of introduced species
- Ensure a clean healthy planet free from pollution and disease

Long-Term Partnerships

2008 Year of the Frog campaign participants are invited to commit themselves to conservation programs after the campaign year. The organisers set high hopes on the success of this scheme. Please consider a longer-term participation and join! A long-term commitment of your institution offers the following benefits:

- Raise and donate money for an *ex situ* amphibian conservation program over a fixed time period of several years and in return receive up-to-date information related to the program.
- The information received can be communicated directly to your visitors. This will boost your institution's credibility and may lead to further donations.
- Engagement in *ex situ* and *in situ* conservation becomes a reality.
- Your institution's name will be carried to other countries. Locals and tourists will take note of your involvement.
- A long-term engagement will enrich your activities and lead to an interesting world-wide exchange.
- You add a substantial contribution towards nature's conservation.



Ten Good Reasons to Join the Campaign

1. After surviving for 360 million years, one-third to one-half of all amphibian species are in danger of becoming extinct ... potentially the single largest disappearance of a species since the dinosaurs.
2. Amphibians matter. They play a critical role in the ecosystem as both predator and prey, they perform invertebrate pest control important to agricultural efforts, and their skin has substances that offer promising medical cures for humans.
3. The *ex situ* program provides a real solution for those amphibians endangered by the most urgent threat, chytrid fungus. The chance to participate in an effort with a tangible solution, where success is real and viable, shouldn't be passed up.
4. Many people don't know the importance of amphibians, nor how threatened they are. This is a chance for zoos and aquariums to excel at one of our most important roles: education.
5. This is the first truly global conservation initiative to save endangered animals. ARAZPA member institutions can and should play a role in this unified effort.
6. Participation provides an opportunity to engage your local community in a global crisis.
7. The crisis provides a unique opportunity to demonstrate to the world that zoos and aquariums are valid and powerful conservation partners.
8. The success of this global collaboration can lay the groundwork for future global conservation efforts.
9. Zoos and aquariums must not stand by and watch hundreds of these exquisite species become extinct in our lifetime ... especially when *ex situ* captive breeding provides a viable, yet simple, solution. If we do not respond immediately and on an unprecedented scale, much of an entire vertebrate class will be lost, and we will have failed in our most basic conservation mission.
10. Amphibian Ark demonstrates to humankind what people working together for a common cause can accomplish. The result will be empowerment for the public to get involved in solving future problems and responding to future crises.



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ARAZPA Campaign Guidelines

Participation and Registration

The ARAZPA Year of the Frog Campaign will be officially launched in March 2008 during the ARAZPA Conference at Taronga Zoo, Sydney, and will last through March 2009. ARAZPA members, botanical gardens, universities and the private sector are invited to join the Year of the Frog Campaign. A registration form for participation is available in this Info Pack. The form should preferably be completed and returned before March 2008, although it is also possible to register throughout the year.

Campaign Info Pack

This Info Pack contains information that participating institutions can use for Campaign activities throughout the year, as well as information on the guidelines of the Campaign and useful information on amphibian biology and conservation status. A CD-ROM included with the pack contains photos, logos, amphibian information, and other materials for use during the Campaign.

Information Updates

Throughout the year, all participating institutions will be kept updated on the developments of the 2008 Year of the Frog Campaign on the ARAZPA web site (www.2008yearofthefrog.org.au), and in the ARAZPA Newsletter. Additional information will be available through the Amphibian Ark Web site (www.amphibianark.org), WAZA Web site (www.waza.org), and newsletters.

The main focus of the information updates will be successful fundraising and awareness activities from participating institutions, as well as other relevant information. Please send your campaign updates to the Regional Campaign Coordinator.



Year of the Frog Registration Form

Those who would like to participate in the ARAZPA 2008 Year of the Frog Campaign should complete this form and return it to the ARAZPA office as soon as possible.

By signing this form, your institution declares that:

1. All photographs and other publicity material contained in the Info Pack **will only be used to support fundraising for the 2008 Amphibian Ark Campaign**, following the relevant copyright details (see "use of images"). Full credits must be given when using the photographs.
2. When raising funds for the campaign, these funds must be transferred to the campaign's account (see "fundraising money transfer details").

Name of Institution: _____

Name and Signature: _____

Date: _____

Contact person for the
2008 Year of the Frog Campaign: _____

Email address: _____

Fundraising goal (in dollars, 0.3 cents/visitor): _____

Estimated start date of the Campaign in your institution: _____

Estimated closing date of the Campaign in your institution: _____

Please return the completed Registration Form to:

Year of the Frog Campaign
ARAZPA
PO Box 20
Mosman NSW 2088
Australia

Fax: +61 2 9978 4761
Email: admin@arazpa.org.au
Phone: +61 2 9978 4797





Use of Images

Amphibian Ark has been incredibly fortunate to have been supplied with a generous number of images for the 2008 Year of the Frog Campaign by a number of photographers across the world. All of the images have been compiled by Amphibian Ark staff and they are available for use in the Campaign, free of charge, by all participating institutions as part of their Campaign activities. These images can be found at:

<http://zims.isis.org/aark/YOTF%20Campaign%20Pack%20images/Forms/AllItems.aspx>.

Images available on this site are low resolution, and include thumbnails and a low resolution image. They are suitable for web sites, and presentations. Higher resolution versions of the same images, suitable for printed materials, can be found at:

<http://zims.isis.org/aark/Hi%20res%20YOTF%20images/Forms/AllItems.aspx>

Please note the following restrictions regarding all images supplied in connection with the Year of the Frog Campaign:

- The use of the images is restricted to ***institutions that have registered to participate*** in the 2008 Year of the Frog Campaign.
- Use of images ***is only allowed during the period of the Campaign*** (December 2007 – March 2009). Any signs, brochures, etc. produced for your 2008 Year of the Frog Campaign that contain any of these images cannot be used after the end of the Campaign (March 2009) without special permission. If you need to continue to use them for any reason, contact KevinJ@amphibianark.org
- Images are to be used only for educational and fundraising purposes and only in material relating directly to the 2008 Year of the Frog Campaign. They are not available for general use.
- If you want to supply any image to an external agency such as a newspaper or magazine, to make any commercial use of a picture (e.g., to print on a t-shirt), to place a picture on a Web site (other than at low resolution), or to use any picture after the Campaign has ended (March 2009), you must contact KevinJ@amphibianark.org to request permission. The owner of the image will then be contacted, for his/her approval.
- Images are only allowed for use on web sites of participating institutions in low-resolution format.
- When using any of the images, it is essential that full credit is given to the photographer. The correct credit line is included on the web site above. If you have any further questions regarding the use of images, please contact KevinJ@amphibianark.org.



Use of Logos

All printed material associated with the Campaign **must** include the Amphibian Ark 2008 Year of the Frog Campaign logo. The ARAZPA logo and/or individual institution logos can also be included. The ARAZPA logo and the Amphibian Ark 2008 Year of the Frog logo and style guide are included on the enclosed CD.

An example is shown below:



The correct wording of the Campaign for all printed materials is as follows:

Amphibian Ark 2008 Year of the Frog

The following slogan may also be used: **Frogs Matter, Jump In.**

Fundraising Money Transfer Details

Preferably, funds should be transferred bank-to-bank, but cheques can also be accepted.

Please make cheques (in Australian dollars) payable to **ARAZPA (Year of the Frog)** and send to:

ARAZPA Year of the Frog
PO Box 20
Mosman
NSW, 2088

OR

Bank Transfer details:

Account name: Australasian Regional Association of Zoological Parks and Aquaria (Year of the Frog).

BSB: 012-351

Account no: 486499031

Swift Code: ANZBAU3M

Contact person: Deb Martins (deb@arazpa.org.au)



Please send any funds you raise at intervals throughout the year, rather than waiting until the end of the Campaign. Doing this will enable us to:

- Help fund regional amphibian initiatives in Australasia.
- Ensure global survival of amphibians by making possible the Amphibian Ark responsibility to develop, promote, and guide short term *ex situ* management.
- Enable Amphibian Ark to continue its year round amphibian management workshops throughout the world, particularly in those countries where resources for conservation are limited.
- Establish partnerships and knowledge to support amphibian conservation.
- Support Amphibian Ark global coordination.
- Send news and updates from these projects during the lifetime of the Campaign.
- Send out the Fundraising Certificates for your zoo or aquarium as you reach fundraising targets.

Sharing Information and Materials

During and after the 2008 Year of the Frog Campaign, ARAZPA will keep everyone informed of the progress of the Campaign. Ideas for fundraising and awareness activities from your fellow members should be provided to stimulate the membership in successful campaigning and consequently making the 2008 Year of the Frog Campaign a success.

We need help from all institutions in order to provide everyone participating in this campaign with successful ideas for raising awareness and fundraising for the selected projects. Please provide Amphibian Ark and ARAZPA with your success stories, which will then be shared with the rest of the participants. Your Campaign activities can be published on the ARAZPA web site and will also appear on the Amphibian Ark web site, www.amphibianark.org. Please submit your success stories by writing a brief article and submitting it by e-mail to kevin@arazpa.org.au. Relevant photos (in jpeg format, at least 300dpi) or illustrations are welcome and encouraged.

Awards

2008 Amphibian Ark Campaign Special Awards

We do not just want the ARAZPA Year of the Frog Campaign to be about successful fundraising, since not all zoos and aquariums have the same fundraising potential. We are therefore inviting applications for special awards at the 2009 ARAZPA Conference, in the following categories:

Amphibian Campaign Education Award

This will be awarded to the most innovative and original school and/or public education program or product produced by any zoo or aquarium in support of the awareness target of the Year of the Frog Campaign.

Amphibian Campaign Marketing Award

This award will be presented to the most innovative marketing event by an ARAZPA member in support of the Year of the Frog Campaign.

Amphibian Campaign Fundraising Award

This award is for the most innovative and imaginative fundraising scheme or event in support of the fundraising target of the Year of the Frog Campaign. This award will be



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judged only on the imagination and innovation involved – not on the amount of money raised.

These “Year of the Frog” Campaign Special Awards will be presented during the ARAZPA awards presentation at the 2009 ARAZPA Conference. The panel of judges will consist of members selected by the ARAZPA office.

Calls for nominations for these awards will be made in the last quarter of 2008, and should be supported with photographs wherever possible.

Campaign Contacts

Regional Representatives:

ARAZPA regional representatives are available as contact points in order to help you promote and support the Amphibian Campaign in your zoo or aquarium. They will be able to provide you with additional sources of information. If they are unable to help you directly, they will be able to put you in contact with someone who can. Furthermore, they may assist in case of media interest in the Campaign.

Please contact any of the regional representatives if you or your institution can help by either suggesting a sponsor to support the Campaign in your region or by taking on some of the work or responsibility for the promotion of the Amphibian Campaign.

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Section 3

The Global Communications and Fundraising Plan

Communications and Fundraising Overview

Critical to the development and deployment of communications and fundraising plans for the ARAZPA 2008 Year of the Frog is an understanding of the “big picture”... the goals of Amphibian Ark, its leadership, and its member institutions; some fundamental assumptions about the situation; a look at the many key audiences; and, agreement on measurement criteria.

Goals of ARAZPA 2008 Year of the Frog

- As the emergency response component of the ACAP, help avert the mass extinction of amphibian species by:
 - **Raising awareness and understanding** of the situation.
 - **Educating all audiences on what must be done.**
 - **Raising \$50-\$60 million** in funding through a global call to action.
- By raising awareness and educating the general public through global outreach about the amphibian crisis, international organisations, groups, and individuals will be empowered to preserve nature and wildlife for future generations.

Fundamental Assumptions

- There is **competition for mind share** in the environmental and ecological discussion.
- The Year of the Frog campaign can be likened to a **political campaign**.
 - **Focus on simple messages that cut through clutter, unite audiences, and quickly build momentum.**
 - **Impart a greater sense of urgency to “Turn Out the Vote” to rescue amphibians,** utilising the Year of the Frog as the key platform.

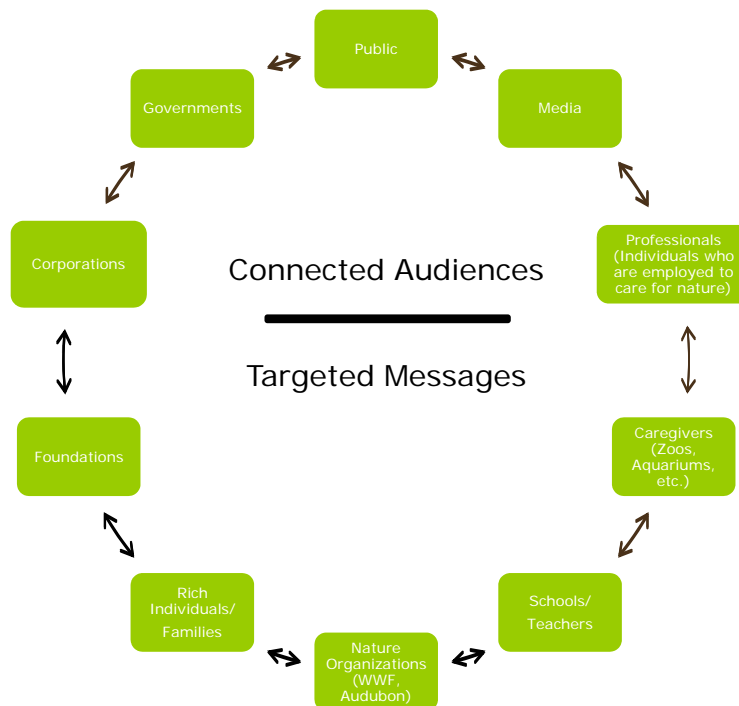


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Audiences

There are many target audiences for Amphibian Ark, and they are often interconnected.

- Drawing from the key messages, additional messaging will be created and targeted to each audience based upon and for:
 - **Level of awareness and understanding of the amphibian crisis.**
 - **Sophistication level (e.g. scientific community vs. general public).**
 - **Media, the ultimate audience (e.g. *Scientific American* vs. *People* magazine).**
 - **Type of potential donor (e.g. corporate vs. philanthropic).**



Measurement

- **Funds raised**
- **Message impact**
 - Pre- and post-campaign **measurement of awareness** of amphibian crisis and Amphibian Ark initiative
 - Multiple samples:
 - Public: national and international
 - Corporations
 - Philanthropists
 - Educators



ARAZPA 2008 Year of the Frog Communications Plan

Situation

The IUCN/SSC Conservation Breeding Specialist Group (CBSG) and Amphibian Specialist Group (ASG) have come together with the World Association of Zoos and Aquariums (WAZA) to form the Amphibian Ark, a high-profile, global program to help ensure long-term survival of those amphibian species around the globe that cannot be saved in nature.

Amphibian Ark represents one portion of the larger Amphibian Conservation Action Plan (ACAP), which covers research, assessment, long-term conservation programs, and emergency responses to immediate crises.

It is the emergency response portion of the ACAP – saving species that cannot be safeguarded in nature – for which Amphibian Ark was formed. In performing the emergency response phase of the ACAP, Amphibian Ark provides a high profile, easily identifiable, and interest-generating call-to-action platform for media, donors, the general public, and other stakeholders. In fact, it is a viable anchor for an international communications, marketing, and fundraising plan for the amphibian crisis.

The goal of Amphibian Ark is to save amphibians facing rapid extinction (due primarily to amphibian chytrid) through captive breeding. In what may be mankind's biggest lesson and concerted effort to date in working together to protect our planet, Amphibian Ark will coordinate *ex situ* programs with zoos, aquariums, and other partners, with biosecure facilities placed around the world to shelter, protect, breed, and, ultimately, reintroduce these amphibians to the wild, using global coordination, technical guidance, training, and more.

The communications plan – the 2008 Year of the Frog campaign – will raise awareness of the amphibian crisis and, most important, the urgent need to generate funds to execute the emergency response captive breeding phase of the program, ultimately helping to ensure amphibians' long-term survival. Creative, strategic, and tactical communications, special events, and media outreach will be necessary to elevate the dialogue among the general public, corporations, philanthropists, and governments in order to raise the necessary funds for this program.

The 2008 Year of the Frog global campaign is designed to generate international awareness and understanding of the amphibian extinction crisis. Without an immediate and sustained conservation effort to support captive management, hundreds of species of these wonderful creatures could become extinct in our own lifetime.



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Objectives of 2008 Year of the Frog

The primary objective of Year of the Frog is to position Amphibian Ark as the intuitive choice for companies, organisations, individuals, and other parties to support the effort to respond quickly to save the most endangered amphibians and help to ensure long-term survival of threatened amphibian species. Specifically:

- Develop, implement, manage, and measure global, targeted, and comprehensive media relations, communications, and special events, including engaging prominent third-party experts and ambassadors.
- Use these programs to raise awareness of the amphibian threat globally among companies, organisations, individuals, political leaders, and other stakeholders.
- Cut through media clutter, unite audiences, and quickly build momentum.
- Meet and exceed ARAZPA's fundraising goals of \$400,000 by leveraging increased public awareness to motivate potential funding sources.
- Educate and empower the global public to save endangered species and support Amphibian Ark.
- Drive participation in local educational and promotional programs and events.

Execution

The communications and fundraising effort is being executed at multiple levels, each designed to include media relations, education, political outreach, events to garner public participation, and stakeholder communication. Because of the complexity of the relationships and the number of parties involved, it's critical that strong communication is maintained between all.

Global

- *Communications:* The following communications plan is being implemented on a global basis, working closely with the various international, regional, and national associations. Several key major events that are planned include the official launch of the "Year of the Frog" on New Year's Eve, Kiss a Frog Day, International Day of the Frog on Leap Day, Frog Fashion Week, Wearing of the Green, Olympians Jump for Frogs, and Amphibian Art. These events will serve to generate global awareness of the amphibian crisis, providing a platform from which associations and individual institutions can execute amphibian communication programs and from which corporate partners can develop impactful marketing programs that engage the public. The global campaign will keep the associations fully informed of activities and media results.
- *Fundraising:* Major global Amphibian Ark corporate sponsors as well as philanthropists (both foundation and individual) are being sought to generate the \$50-\$60 million (globally) needed to support the efforts of Amphibian Ark. These sponsors, depending on their investment level, will have exposure at all global Amphibian Ark events and promotions and on all Amphibian Ark media and collateral materials. Payments are being made to the Global Conservation Network, a 501(c)3 that is incorporated as part of the CBSG. Solid communications and media results will support this effort by raising international awareness and understanding of the crisis.



Regional Associations

- *Communications:* Regional associations will work with members to promote amphibian awareness programs customized to the region. These programs, in concert with global and national events and/or created specifically by the organisations, will use the Amphibian Ark-approved global graphics and key messages (as outlined in Section 1) to ensure consistency of messaging throughout the world. Regional association logos can be added to the Amphibian Ark logo for these regional programs.
- *Fundraising:* To further the reach of international efforts, ARAZPA is promoting fundraising efforts to implement regional programs and to support the global work of Amphibian Ark.

Individual Participating Institutions

- *Communications:* Individual participating institutions, under the guidance of ARAZPA, will execute local programs, events, and activities to support what each is doing to participate in Amphibian Ark, whether providing biosecure facilities or educational information to its visitors. These programs should also use the approved Amphibian Ark global graphics and key messages (as outlined in Section 1), but individual institution logos (as well as the ARAZPA logo) may be added.
- *Fundraising:* Individual institutions may execute their own local fundraising to support their Amphibian Ark participation.



Amphibian Ark Communications Tools

The following are some of the tools that will be used by the Australasian and global Amphibian Ark campaigns to tell the story. These efforts will provide a platform for and complement the work of the regional associations and individual institutions.

Message Development

Amphibian Ark has a newsworthy and compelling story to tell. Clear messaging is the cornerstone to ensure that a consistent voice is used in global, regional, and local media outreach, Web sites, materials, speaking engagements, and all communications opportunities. Key messages have been drafted (as outlined in Section 1) that:



- Identify Amphibian Ark as part of the Amphibian Conservation Action Plan (ACAP).
- Position Amphibian Ark as the global thought leader on captive management and the intuitive choice for those wishing to support the emergency response to the amphibian crisis.
- Explain Amphibian Ark's expertise and capabilities.
- Capture the worldwide benefits of this effort.
- Compel stakeholders to get involved:
 - Media – to tell the story of the amphibian crisis and what's being done, especially in Australasia.
 - Public – to gain awareness and understanding of the amphibian crisis, prompting personal donations and word-of-mouth communication.
 - Corporations – to recognise the importance of the amphibian crisis to the public and to get involved through cause marketing and donations.
 - Philanthropists – to recognise the importance of the amphibian crisis and to provide funding to help with the solution.

Ambassadors, Advocates, Spokespeople

To further educate all stakeholders in the global effort, it's important to put "faces" on the stories told. The use of third-party ambassadors will play a key role in Amphibian Ark communication. Many ambassadors have already been identified; others will be added:

- Reach out to and engage local experts and celebrities, including zoo and aquarium leaders, political supporters, conservationists etc.
- Use spokespeople at major events, during high-profile interviews, meetings with major companies, etc.

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Materials Development

An attention-getting, comprehensive, up-to-date media kit is being developed in both print and electronic form. The ARAZPA Info Pack includes the materials below. Individual ARAZPA institutions are encouraged to use this kit and add regional and local elements as appropriate. (A preliminary version of this media kit is included on this CD.)

- Press releases
- Fact sheets
- Amphibian crisis background information
- Amphibian Ark executive biographies
- Ambassador biographies and comments
- Case studies (to be developed and updated on an ongoing basis)
- List of participating zoos, aquariums, and other institutions
- Amphibian Ark “Year of the Frog” logos
- Links to amphibian photos, highlighting positive images

Other public relations tools will be created based on regional media nuances around the world to tell the Amphibian Ark story. These tools could include:

- Satellite Media Tour (SMT): Show the story through a pre-scheduled television “tour” featuring interviews with a prominent spokesperson and b-roll (video footage) of amphibians and rescues.
- Radio Media Tour (RMT): Tell the story through pre-scheduled radio interviews featuring program leaders and prominent third parties.
- Public Service Announcements (PSAs): Show and tell the story through attention-grabbing announcements featuring key third parties and share with major television and radio stations.

Media Relations

The campaign will assist with maximising information on amphibians:

- Provide up-to-date information for briefings with media and reporters.
- Involve reporters in select rescues when they may occur.
- Cast a wide international net with unique story pitches to earn media placements.
- Monitor print and broadcast coverage and analyse messages, provide regular news clips and recap summaries, and capitalize on news coverage by identifying reporters, editors, and producers supporting the cause.

Educational Outreach

The campaign will help to publicise the national and international learning campaigns that are being developed by ARAZPA, including teacher workshops, newspaper partnerships, adopt a species, etc.



Digital/Grassroots

The ARAZPA campaign will develop grassroots programs to generate publicity and drive word-of-mouth communications. These efforts could include:

- Enhancing the current Amphibian Ark web site (<http://www.amphibianark.org/>) to share news, provide RSS feeds, build grassroots support groups (Amphibian Advocates, Friends of Frogs, etc.), show rescue videos and photographs of biosecure facilities around the world, entertain and educate children, process donations, etc.
- Encourage ARAZPA institutions to develop Year of the Frog pages on your own institution's web sites,
- Developing a blog for Amphibian Ark Web site.
- Partnering with Google Earth to highlight participating zoos and aquariums, as well as the transportation of amphibians to biosecure facilities.
- Identifying, reaching out to, and interacting with science, conservation, zoo and aquarium, and other internet sites.
- Creating an online petition to secure names of people interested in supporting Amphibian Ark and the amphibian crisis. This list can then be leveraged to demonstrate public support when approaching potential donors.
- Creating and posting YouTube videos of amphibian rescues.
- Creating an Amphibian Ark MySpace page.

Special Programming

In addition to ongoing media outreach outlined above, as well as media coverage based on the events and activities outlined further in this plan, there are key media partners with whom Amphibian Ark will partner to create special programming. Such media partners will be identified around the world; in Australasia, for example, they could include:

- Australian Geographic: Regular feature stories/updates in *Australian Geographic* magazine
- The media outlets which your institution already has links with could assist with championing amphibian conservation in partnership with you.
- Bindi the Jungle Girl: Encourage ongoing amphibian stories in Bindi Irwin's TV show.
- Catalyst; the ABC Science Show; and other science based radio and television programs
- Totally Wild: Solicit the producers of Totally Wild to devote portions of the show on a regular basis to the amphibian crisis and the species programs ARAZPA institutions are involved with.

Sustainable Amphibian Ark Communications

In addition to the media relations activities outlined above, it will be important to establish routine and ongoing Amphibian Ark communication tools. These tools could include:

- Weekly Amphibian Ark updates
 - Send weekly e-mail updates to key media highlighting activities for the week.
- Monthly Amphibian Ark teleconference
 - Hold a monthly Amphibian Ark teleconference with international media to provide updates on rescues and successes.
 - Each call could feature a different participating institution as a case study.



- Monthly Amphibian Ark e-newsletter
 - Send a copy of the monthly Amphibian Ark e-newsletter to international media and all stakeholders, providing an update on rescues and successes, special events and activities, corporate sponsors, promotions, etc.
- Amphibian Ark speakers bureau
 - Identify appropriate Amphibian Ark speakers in every participating country.
 - Proactively solicit speaking opportunities and coordinate speakers, working through regional associations.

Amphibian Ark Events

In addition to ongoing and aggressive national and regional media outreach as outlined above, the Amphibian Ark global campaign will focus on several major events and activities leading up to and during the “Year of the Frog.” These events will serve as opportunities for public involvement in the campaign as well as key media hooks to generate coverage which will ultimately benefit sustained fundraising efforts.

Global media outreach will be executed around each of these events (except where noted for the internal launch).

Ideas for major amphibian events include:

February 14: Valentines Day - Kiss a Frog Day

Take advantage of the Valentine’s Day holiday to use the fun visual of people kissing frogs to draw media attention to Amphibian Ark.

- Create frog-kissing events at your institution, and science centres, using the princess frog-kissing photos as a “challenge” to encourage participation. Anyone who kisses a frog receives an “I Kissed a Frog for Amphibian Ark” sticker and is entered into a sweepstakes for prizes (amphibian stuffed animals, free tickets to the zoo or aquarium, etc.). (Note: For health and welfare reasons, model or stuffed frogs would be used.)

February 29: Leap Day - International Day of the Frog

Stage multiple amphibian rescues on Feb. 29 and create educational programs around them.

- Invite select media to accompany rescue teams all over the world and report on the rescue.
- Have scientists participating in the rescues do a live feed that can be picked up by schools. Allow selected students to ask questions to create interactive dialogue with the scientists. Programming can be carried online at <http://www.amphibianark.org/>
- Partner with Google Earth to provide mapping of rescue locations.
- Secure official recognition of International Day of the Frog by the United Nations.

March 2: Clean up Australia Day – Frog Focus

- Organise local Clean up Australia Day events with a frog focus.

March 21: International World Water Day

April 22: Earth Day



ARAZPA Fundraising Plan

Objective

- Raise \$400,000 (3 cents per visitor per institution) in funding (corporate, philanthropic, government, public).

Key Targets

- Corporate Partners
 - Develop a tiered corporate sponsorship program and proposal packages, including pricing and benefits.
 - Identify a “top tier” list of corporations that would be ideal sponsors and schedule meetings to solicit funding.
- Philanthropic Funding
 - Identify appropriate foundations (those that have demonstrated interest in supporting conservation and/or environmental causes).
 - Determine the decision-making and funding cycle, as well as grant proposal formats and deadlines.
 - Write and submit grant proposals.
 - Seek early symbolic grant with high media value and publicise to foster additional funding.
- Government Funding
 - Raise the visibility of the amphibian threat and opportunities among key government decision-makers through a lobbying and awareness campaign.
 - Support lobbying with government agencies responsible for conservation. .
 - Conduct meetings with key agencies.
 - Recruit champions within government, environmental, and scientific communities to lend third-party voices.
- General Public
 - In addition to the public funding resulting from the various cause marketing programs outlined above:
 - Provide ARAZPA and member institutions with messages and graphics to use for donor solicitation.
 - Create tools for consumer participation in fundraising
 - Collection boxes at Amphibian Ark displays inviting the public to make a “Leap of Faith.”
 - “Adopt a Species” program for schools and individuals.
 - Personal pledge opportunities.



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Section 4

How Will My Money Be Used?

The Amphibian Ark Campaign will contribute to the goals of a simultaneous worldwide capital campaign coordinated by regional associations and organised at the level of the individual institutions. This campaign is mostly focused on *ex situ* breeding programs and *in situ* conservation projects related to captive breeding for conservation. Zoos, botanical gardens, aquariums and many scientific/research institutions play an important role in providing *ex situ* breeding grounds for immediate conservation action.

We recommend that every zoo independently target their normal donor base (public, local corporations, etc.) and more, to raise money for amphibian conservation. We expect that while individual institutions are campaigning to their normal donor base, regional and national associations will engage in a simultaneous program targeting regional and national corporations at a higher level.

In the Australasian region, 70% of funds raised by the region will be allocated to urgent amphibian projects in Australia and New Zealand. Amphibian experts consistent with ARAZPA's Amphibian Action Plan and consistent with government conservation priorities will determine these projects.

Thirty per cent of the funds raised will support the global campaign, and will be allocated for public awareness, management of the global program and also to help fund initiatives such as workshops, rescues, cooperatively managed centres and coordination of activities within each region. When raising funds for the global amphibian crisis, everyone will benefit. At the global level, funds will be made available in accordance with the overall priorities as set by the Amphibian Ark and regional Zoological organizations including ARAZPA, therefore local organizations may also apply to use global funds in addition to the regional funds. As a result, countries that may not be able to raise too many funds will get the benefit from those who have better capacity of raising funds.

If enough funds are raised it is planned that these can be turned into an Endowment Fund, which can provide a long-term guarantee for the amphibian conservation activities. This also means that the fund will remain active after the campaign has ended, i.e. funds can continue to come in many years after the campaign is closed.



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Section 5

Suggested Campaign Activities

Public Relations and Marketing

Global Campaign

As outlined above, the global Amphibian Ark campaign will undertake a variety of major, worldwide marketing programs on behalf of the global Amphibian Ark initiative, including an international public launch of The Year of the Frog at the end of 2007. These programs will be supported with global media outreach, with the goal of raising awareness of the amphibian crisis and the Amphibian Ark program among the public, as well as corporations and foundations.

The global Amphibian Ark campaign will communicate throughout The Year of the Frog with all regional associations, to keep them informed of all activities. Each regional association including ARAZPA, will pass that information on to their membership and participating organisations.

Local Efforts

Local zoos, aquariums, and other participating institutions can plan and execute their own marketing and public relations programs on a local level. This will complement and reinforce the efforts of the global campaign, just as the global campaign initiatives will complement the local activities.

Local marketing and public relations activities should follow these guidelines:

- Make sure messages used in your activities are consistent with the messages outlined in Section 1 (“Why a Campaign?”) of this Information Pack. These messages are consistent with those being used by the global Amphibian Ark campaign.
- Use the approved Amphibian Ark Year of the Frog logo presented in this Information Pack on collateral materials and press releases related to your local Year of the Frog activities. Additionally, please follow the style guide outlining proper usage of the logo, including incorporation of local association and institution logos. No other Amphibian Ark or Year of the Frog logos should be used.
- Use the following paragraphs in all local press releases to explain the global Amphibian Ark program:

“One half to one third of all amphibian species are threatened with extinction due to habitat loss, climate change, pollution and pesticides, introduced species, over-collection and, most urgently, a parasitic fungus called amphibian chytrid, a deadly disease that is rapidly eradicating amphibian species throughout the planet. This represents the greatest species conservation challenge in our history. The World Conservation Union (IUCN) Global Amphibian Assessment indicates that hundreds of species face threats that cannot be mitigated in the wild and, therefore, require zoos and other institutions to save them in the short term until adequate conservation measures to secure wild populations can be developed. In response to this crisis, Amphibian Ark (AArk) was formed by the World Association of Zoos and Aquariums (WAZA) and two branches of the IUCN Species Survival



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Commission (IUCN/SSC) – the Conservation Breeding Specialist Group (CBSG) and the Amphibian Specialist Group (ASG).

Amphibian Ark will help zoos, aquariums, and other participating institutions to save as many amphibian species as possible by bringing into those institutions species for captive breeding that cannot be safeguarded in nature. Amphibian Ark will provide global coordination, technical guidance, training, necessary linkages to other IUCN groups, communications, and guidance on publicity and capital campaigns. The global conservation community has named 2008 'The Year of the Frog' as a means of building public awareness of the amphibian crisis."

Identify a knowledgeable spokesperson that can speak to local media about your local institution's efforts on behalf of amphibians, as well as the global Amphibian Ark Year of the Frog program. Develop consistent key messages for your spokesperson, using the information in Section 1 of the Info Pack.

A few ideas for local marketing and public relations activities include:

- Adopt an Amphibian: Invite members of the public to adopt, for a fee, one of the amphibians at your institution, with the "parent" to receive "adoption papers" and a special Amphibian Ark supporter ID card. This could be integrated into your existing adopt an animal program if they exist in your institution.
- Conduct special behind the scenes tours of your amphibian projects for a premium fee. Ensure that your staff that deliver and develop programs are available to conduct the tour, so the information is portrayed in 'the authentic voice'.

Education

Suggested Education Activities

During the entire duration of the campaign, ARAZPA can be an information centre for the Amphibian Ark campaign. A special calendar of events which involves a full range of 'days of action,' events, workshops, festivities, etc. in which the focus will be on amphibians (in zoos, but also with community outreach programs).

Following are ideas for educational activities that can be executed at local institutions:

Workshops

- All about toads and frogs – how do they live, what do they eat, etc.?
- Experiencing the local amphibians and their habitat – learn interesting aspects about their life cycles
- Photography
- A year in the life of a frog
- Metamorphosis, reproductive biology, etc.
- Breathing – pulmonary breathing, mouth-breathing, skin-breathing
- Amphibian workshop for all senses
- Camouflage / warning: amphibians and their colors
- Sustainable resources – "green" workshop

Amphibian Trail

- Create a specific entertaining trail with four-six stations, where visitors can take action by answering questions to receive a prize

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- Why protect amphibians?
- Ecological aspects
- Local and exotic amphibians

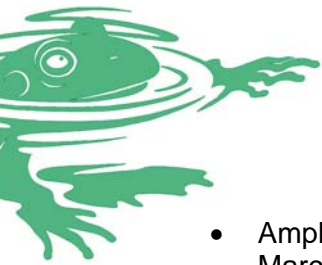
Activities

- Frog call contest
- Frog-jumping contest
- Clay modeling courses for kids
- Amphibian rally
- Frog masks (appendix 3a)
- Face painting
- Dice game activities
- Guided tours through backstage areas
- Keeper's talk
- Feeding information shows
- Puppet theatre
- Info Mobile
- Frog origami
- Interactive play-games
- Amphibian tattoos
- Creative corner: A special handicrafts corner for young children
- Get your local schools and community groups involved in making frog lanterns – released on a special “frog” day (see below)



Events

- Storyteller featuring amphibian stories from the public point of view
- Frog Day – frogs and toads in myth and tradition
- Frog Party – children could visit the “creative corner” and make their own fantastic amphibian masks or have themselves painted at a face-painting station. The best masks can then be selected and awarded zoo prizes.



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- Amphibian action week (for example, around the International World Water Day on March 21)

Materials

- Poster exhibition: “What does this campaign hope to achieve?”
 - use *ex situ* captive management programs to help save the amphibians
 - preserve their natural habitats
 - educate the public about the specific threats they face
 - support scientific projects
- Peek boxes – a thrilling “peek box” can be set up: everyone who takes a peek gets a firsthand look at the main threats that amphibians face
- Information brochures
- Leaflets and signs
- Colouring books
- Amphibian quiz-book
- Memory cards
- Puzzle rally
- Amphibian cartoons

Outreach Programs

- Habitat conservation plans
- Networking with wildlife agencies, NGOs and national parks

Fundraising

Following are ideas for ways local institutions can raise funds to support Amphibian Ark:

Sell amphibian merchandise

- The Amphibian Ark campaign has selected various amphibian merchandise items that can be sold in zoo shops (see Section 4). Part of the revenue can be donated to the campaign. Local institutions can also develop their own amphibian merchandise items.

Solicit cooperation of companies that have a frog in their logo

- Many companies and organisations use amphibians in their logo. Contact these companies to support your campaign, either financially or in another way.

Adopt a frog

- Offer visitors the possibility to adopt amphibians in your collection during the campaign period.

Collection boxes

- The easiest way to collect funds is by putting up a collection box near your amphibian campaign exhibition or amphibian enclosures in the zoo. You can also design your own frog money collector that croaks at every coin that is thrown in!

Award donations

- Stimulate donations by providing a small gift (e.g. frog sticker or button) to all visitors who donate money.

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Amphibian quiz, puzzle, or trail

- Develop an amphibian puzzle or quiz that visitors can buy at the entrance and complete during their zoo visit. This can be extended to a “Frog Trail” that leads visitors through the zoo with activities at various locations.

Guess the weight contest

- Visitors can guess the weight of an amphibian species in your collection for a small fee. Various prizes can be awarded to the person(s) whose guess is closest to the actual weight of the animal.

Organise an auction or raffle

- Collect as many amphibian-related products as you can find and organise a raffle or auction where visitors can win or buy these special collectors items. This auction could be on site, or online.

Involve artists

- Local artists might be willing to make a painting, drawing, or sculpture that you can sell to zoo visitors in an auction or give away as a prize in one of your amphibian contests.

Frog hop race

- A sponsored run is always a very effective way to raise funds. For the amphibian campaign, you could adapt this to a frog hop race where participants are sponsored for the distance they can cover hopping like a frog.

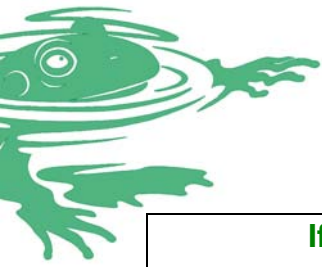
Face painting

- Children can get their face painted as a frog for a small fee.

If we do not have any amphibians in our collection, how can we get involved?

All zoos and aquariums can link their collections to the story of the amphibians and the campaign, not just those that actually house amphibians. Non-amphibian holding members can develop related displays and activities by focusing on the following aspects:

1. Amphibians in ponds and pools on zoo grounds
2. Educational panels on the food chain next to exhibits on amphibian-feeding predators
3. Simply referring to our commitment to support activities that lead to conservation or biodiversity.



If we have limited time and resources, can we still get involved?

All zoos and aquariums, no matter how big or small, can participate in Year of the Frog. Here are some simple ideas that require little time and money:

1. Simply place a collection box with the YOTF logo on it at your front entrance, in your merchandise shop or any other place that will attract donations.
2. Tailor school holiday programs towards frog conservation.
3. Place information on YOTF on your bistro tables – spread the word.
4. Work with other organisations to support their fundraising efforts.
5. Promote local community groups working with frogs.
6. Create a link on your website, directing potential visitors to the Amphibian Ark website.
7. Place fundraising chocolates in your staff lunchroom – they'll go like hot frogs!
8. If you have a frog exhibit, add some information about Amphibian Ark and a collection box.
9. Investigate if any of your visitor programs can include a frog focus.
10. Simply provide the information included in this pack to your staff and see what fantastic ideas they will come up with.



Section 6

Merchandise

Selling merchandise in your souvenir shop is a good way to raise funds for the Campaign ... that is, if you allow part of the profit from the sales to go to the Campaign. This can be done in addition to putting up a collection box and/or organising all kinds of activities to collect money for the Year of the Frog Campaign.

Source Your Own Amphibian Ark Year of the Frog Merchandise

Registered participants in the Campaign are encouraged to produce their own products to support the Campaign financially. The Amphibian Ark Year of the Frog logo must be used on these products.

To assist you in setting up a special Amphibian Ark Year of the Frog Campaign corner in your gift or souvenir shop, the global campaign has made arrangements with a number of companies to prepare special merchandise with the official Campaign logo. Of course, you can also produce your own souvenir products, for which we sincerely hope you will contribute a part of the profit made to the Campaign.

For further information on available amphibian Campaign merchandise, please refer to the Amphibian Ark and WAZA web sites.

2008 Year of the Frog Calendars are Available

These are 21.5cm x 28cm wall calendars featuring amazing photographs of amphibian species from around the world and include amphibian conservation messages that are educational and informative. The calendars were produced jointly by Amphibian Ark and The Amphibian Project of the *Emerging Wildlife Conservation Leaders* program with all profits going into a grant to help one Latin American zoo save one priority threatened amphibian species from extinction.

Calendars can be ordered from Elizabeth Townsend at the CGSG office
elizabeth@cbsq.org



This medium-sized rain, or true frog, is native to West Africa. The Ivory Coast Frog prefers to inhabit lowland primary forest. Because the frog's habitat is in demand for growing crops and building homes, this species is now listed as Endangered.
 Ivory Coast Frog (*Amphibia ocellulata*)
 Photo: © Peter Haselbeck

January

Take Action - Look, listen and learn: Educate yourself and your family about amphibians.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	New Year's Day		9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

After thriving for over 360 million years, one third to one half of the world's approximately 6,000 known amphibian species could go extinct in our lifetime. Earth is facing the single largest mass extinction since the disappearance of dinosaurs.

The Panamanian Golden Frog is the national symbol of Panama where this species is endemic. This toad is a symbol of good luck or "buena suerte" in its homeland where it is represented by brightly painted clay or gold charms called *Awacas*. This species lacks eardrums and communicates by using its hands. This toad has disappeared from all but a handful of the localities where it was once abundant. It is Critically Endangered and is now being bred in captivity until a time when it can be reintroduced into the wild.

Panamanian Golden Frog (*Atelopus zotteri*)
 Photo: © David B. Reville

Sun	Mon	Tue	Wed	Thu	Fri	Sat
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Sun	Mon	Tue	Wed	Thu	Fri	Sat
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	

The Amphibian Project
 in partnership with

amphibian ark
ONE STEP FOR THE FROG



ARAZPA 2008 Year of the Frog Campaign



Amphibians in Australasia

Australasian Success Stories

Auckland Zoo researches Archey's Frogs

Experts estimate that there are over 5,500 species of frogs in the world, however there are only four remaining in New Zealand, all belonging to the genus *Leiopelma*, and all are endangered. A dramatic decline in New Zealand frog populations is attributed to a range of factors including habitat loss, infectious diseases, pollution and chemical contamination, over harvesting, and climate change.



Auckland Zoo's native frog research centre is home to the New Zealand's Archey's Frog (*Leiopelma archeyi*) which grows to just 37mm. Establishing captive populations without chytrid fungus present in collaboration with the Department of Conservation Native Frog Recovery Group is viewed as critical in ensuring the survival of this species. Chytrid fungus was identified from dead frogs in both of the only two locations these animals are found.

Managing this captive population is aided by Dr Stephanie Shaw, Resident in Conservation Medicine and concurrent PhD student at James Cook University (JCU), Townsville, Queensland. Stephanie is enjoying the major collaboration with James Cook University, University of Otago, and Auckland Zoo. Her PhD subject is "*Amphibian Disease in New Zealand Native Frogs*". Her principal supervisor is Prof Rick Speare of JCU and co-supervisors Dr Lee Skerratt and Dr Lee Berger (both from JCU), and Dr Phil Bishop from University of Otago. Some components of her PhD are:

1. Assessing national amphibian decline or growth using anecdotal data.
2. Amphibian disease in *Leiopelma* and *Litoria*.
3. National mapping of chytridiomycosis in New Zealand amphibians.
4. Surveying wild *Leiopelma* bacterial skin flora and challenging with chytrid to investigate the possible protective function of skin bacteria.
5. Evaluating and formalizing the current system of monitoring frog health and disease surveillance.

Little is yet known about the husbandry and reproductive requirements for New Zealand species. Captive breeding at the research centre continues to benefit from data collected from season to season helping to refine husbandry which has led to the first ever froglet hatching in 2007.

Additionally for National Frog Week (22-28 October, 2007) as part of a Department of Conservation initiative to raise awareness for New Zealand's four remaining frog species,



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Auckland Zoo hosted the 'Cadburys Frog Road Show'. Sponsored by Cadburys this was an information centre that traveled around the country's captive facilities engaging children with a variety of interactive activities all designed to inform, educate and excite. Facilitated by Auckland Zoo, Cadburys also contributed an additional \$10,000 towards frog conservation.



Leiopelma archeyi, courtesy of Auckland Zoo



Conserving Western Australia's Frogs

What can one zoo do to save its State's frog species from the onslaught of chytrid fungus disease and the invading cane toad? How can we respond as zoos and aquariums to the global amphibian crisis that is playing out in our own backyards?

For a start, here at Perth Zoo, we developed a plan to work with the local amphibian experts and collaborate with the established recovery teams and researchers to understand more about our threatened amphibian species. As husbandry and captive management experts our aim was to discover more about the biology and reproduction of local amphibian species so we could manage them in captivity. This would provide us with the basis of how to maintain and breed threatened and endangered species and hopefully conserve them for the future.

Late in 2005 Perth Zoo applied for and was successful in a funding application to the Western Australian office of Science, Technology and Innovation to follow through on our plan to develop successful captive breeding and management for Western Australian frogs. Our partners in this research were members of local amphibian recovery teams – staff from the Department of Environment and Conservation (DEC), the Western Australian Museum, The University of Western Australia and Murdoch University.

Our approach has largely been about building research relationships and building confidence in our ability as a zoo to be a serious partner in amphibian conservation. Now, some two years into the program we have two PhD students well into their research and another PhD student about to commence. Their work is cutting edge work on reproductive biology of our local endangered amphibians.

Perth Zoo now has a dedicated amphibian research and husbandry team working as a part of the Zoo's existing Native Species Breeding Program. In addition to doctoral students we also have several Honours students and Voluntary Research Fellows contributing to the Perth Zoo's Frog Breeding and Research Project. We are increasing our veterinary knowledge and expertise and we have effectively linked with amphibian experts globally on nutrition and amphibian reproductive management.

There are three species from the southwest of Western Australia that are the focus of our current research: *Geocrinia rosea* (right), *G. vitellina*, and *Spicospina flammocaerulea*. Little is known about the husbandry and reproductive biology of these species so discovering how to provide optimum living conditions in captivity and their requirements for breeding have been a major initial part of the research to date.



Geocrinia rosea Photo courtesy of Perth zoo.

Excitingly, the program has already yielded results, particularly with *G. rosea*, an analogue to the threatened *G. vitellina* and *G. alba*. In 2007 we have had the first successful captive breeding of this species. In the process we have found out a lot about the basic biology of these fascinating animals. For example, we have discovered that *G. rosea*, a direct developer, can breed within the first year of life whereas previously it was thought to breed in the second or third year. We also found that females can double clutch (produce more than one egg mass per breeding



ARAZPA 2008 Year of the Frog Campaign

season). We now know that once the eggs inside the egg mass turn into tadpoles, they can be removed safely and put into water to continue their development should the egg mass become contaminated. We also found that we can remove a newly laid egg mass and transfer it to an artificial nest (an ice cube tray!) and that the eggs will continue to develop and the tadpoles metamorphose into frogs.

This new knowledge will be applied during the next breeding season when we attempt to breed their threatened relative, *G. vitellina*.

Monitoring of the threatened species *Spicospina flammocaerulea* by the Recovery Team and DEC officers, has determined that this species has perhaps not bred in their natural habitats for the last two years. This species is found in a very restricted area in the southwest and inhabits ancient peat bog, which is rapidly drying up.

Our recent fieldwork as part of the frog research program, determined that the water in the peat bogs has increased in acidity well beyond the usual levels to a point that would prevent the successful development of tadpoles.

At some sites, the pH level was recorded as low as 2.5, close to the pH of vinegar. We discovered that of the 17 sites where the frogs have been known to live previously, only three had males calling. One site had only three males calling to mates while another had an estimated 14–18 males calling. The water levels of the breeding sites were also found to be much lower, down to about 30 to 40cm from over a metre in previous years.

Another critical discovery made by Perth Zoo researchers has been that chytrid fungus is present in two populations of threatened frog species, *G. vitellina* at Margaret River in Western Australia's southwest and *S. flammocaerulea* at one of the Walpole sites further south. Although present, we do not yet know whether the chytrid is having a negative effect on either of these two threatened species. That potential will be investigated soon through a new PhD research project to commence in 2008.

Another result has been in developing industry responsiveness to this conservation priority. Until recently all chytrid testing in Australia was conducted at one place in the Australian Animal Health Laboratories - AAHL in Victoria. As a result of our project, we have been instrumental in encouraging a local biotech company, Saturn Biotech, to develop the required test (Taqman Real Time PCR) in Western Australia. Our own Perth Zoo veterinary team is also trialing treatment of frogs with chytrid infections and has so far successfully treated four different species.

We are substantively but slowly increasing knowledge about the frogs of Western Australia. Of course, the more we learn about our Western Australian frogs the more we realise that there are many more things to learn. With more questions than answers, we have a long way to go until we can say we really know a lot about our local species. However, with the persistence and enthusiasm of our zoo team and collaborating researchers, we hope to unravel some more of their mysteries during the next few years.

Perth Zoo
December 2007



Amphibians in ARAZPA institutions

See Appendix 3 for a list of Australasian frog species and their current conservation status.

Class : Amphibia

Order: Caudata

Family: Ambystomatidae

Axolotl (*Ambystoma mexicanum*)

Auckland Zoo	0	0	8	0	0	8	Maintain for education programs
Hamilton Zoo	0	1	0	0	0	2	Acquire
Melbourne Zoological Gardens	0	1	11	0	0	0	Delete
National Aquarium of New Zealand	0	0	19	0	0	19	Maintain
Underwater World	0	0	4	0	0	4	Maintain
Wellington Zoo Trust	1	0	0	1	0	0	Maintain during 2008
Totals	1	2	42	1	0	33	

IUCN : CR CITES : II VPC : 4

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Family: Salamandridae

Japanese Red-bellied Newt (*Cynops pyrrhogaster*)

Auckland Zoo	0	0	33	0	0	10	Delete excess
Melbourne Zoological Gardens	9	11	8	5	5	0	Delete excess
National Aquarium of New Zealand	9	2	0	9	2	0	Maintain
Totals	18	13	41	14	7	10	

VPC : 2

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Order: Anura

Family: Bufonidae

Cane Toad (*Bufo marinus*)

Australian Reptile Park	0	0	6	0	0	6	Maintain
Taronga Zoo	0	0	2	0	0	2	Maintain
Territory Wildlife Park	1	1	1	0	0	0	Delete
Underwater World	0	0	6	0	0	7	Maintain
Totals	1	1	15	0	0	15	

VPC : 1

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

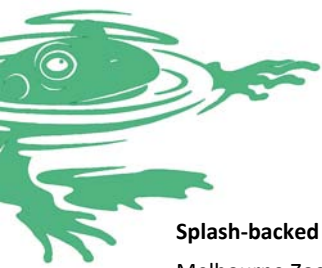
Family: Dendrobatidae

Blue Poison-arrow Frog (*Dendrobates azureus*)

Australian Reptile Park	0	0	0	3	3	0	Acquire
Melbourne Zoological Gardens	5	5	2	8	8	0	Breed to regional requirements
Totals	5	5	2	11	11	0	

IUCN : VU CITES : II

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3



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Splash-backed Poison-arrow Frog (*Dendrobates galactonotus*)

Melbourne Zoological Gardens	2	3	1	8	8	0	Breed as required
CITES : II							
ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3							

Dyeing Poison-arrow Frog (*Dendrobates tinctorius*)

Adelaide Zoo	0	0	0	5	5	0	Acquire during 2008
Cairns Tropical Zoo	8	0	0	8	0	0	Maintain
Melbourne Zoological Gardens	8	10	19	15	15	0	Breed to regional requirements
Mogo Zoo	0	0	0	3	3	0	Acquire
Totals	16	10	19	31	23	0	

CITES : II VPC : 2

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Family: Hylidae

Giant Water-holding Frog (*Cyclorana australis*)

Territory Wildlife Park	0	2	0	0	2	0	Maintain during 2008
ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3							

Eastern Water-holding Frog (*Cyclorana novaehollandiae*)

Cairns Tropical Zoo	2	1	0	3	3	0	Acquire
ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3							

Slender Tree-frog (*Litoria adelaidensis*)

Perth Zoological Gardens	0	0	14	0	0	10	Dispose of excess and continue use in research during 2008
ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3							

Green-and-gold Bell Frog (*Litoria aurea*)

Auckland Zoo	0	0	13	0	0	13	Maintain
Australian Reptile Park	0	0	1	0	0	1	Maintain
Hamilton Zoo	3	1	5	0	0	9	Maintain
Melbourne Museum	2	1	2	2	1	2	Maintain
Orana Wildlife Park	0	0	4	0	0	4	Maintain for display
Otago Museum Tropical Butterfly House	0	0	0	2	0	0	Acquire during 2008
Taronga Zoo	7	11	17	16	16	0	Follow recovery program recommendations
Underwater World	0	0	7	0	0	8	Maintain
Totals	12	13	49	20	17	37	

IUCN : VU

ASMP Reptile & Amphibian TAG; Conservation Program; Management Level 3

Booroolong Frog (*Litoria booroolongensis*)

Taronga Zoo	6	7	15	0	0	40	Follow NPWS recovery plan
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IUCN : CR

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

ARAZPA 2008 Year of the Frog Campaign



Green Tree-frog (*Litoria caerulea*)

Australian Reptile Park	0	0	0	0	0	6	Acquire
Ballarat Wildlife Park	0	0	5	0	0	5	Maintain
Blackbutt Reserve	0	0	0	0	0	2	Acquire during 2009
Brisbane's Alma Park Zoo	0	0	0	0	0	6	Acquire
Cairns Tropical Zoo	1	1	0	2	2	0	Acquire; breed
Cleland Wildlife Park	1	0	3	0	0	4	Maintain
Currumbin Wildlife Sanctuary	0	0	3	0	0	3	Maintain
Dreamworld	3	0	4	3	0	4	Maintain
Healesville Sanctuary	2	1	4	2	1	4	Maintain
Lone Pine Koala Sanctuary	1	1	0	1	1	0	Maintain
Melbourne Museum	3	0	1	3	0	1	Maintain
Melbourne Zoological Gardens	4	3	12	4	3	12	Maintain (14 education only)
Mogo Zoo	0	0	1	0	0	3	Acquire
National Zoo and Aquarium	0	0	8	0	0	8	Maintain
Perth Zoological Gardens	2	5	12	2	5	12	Maintain during 2008
Sea World	0	0	6	0	0	6	Maintain
Taronga Zoo	6	0	18	0	0	26	Maintain
Territory Wildlife Park	0	0	1	0	0	21	Collect locally during 2008
Underwater World	0	0	7	0	0	6	Maintain
Werribee Open Range Zoo	1	2	2	1	2	7	Acquire for education programs
Western Plains Zoo	0	0	2	0	0	4	Acquire
Totals	24	13	89	18	14	140	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Cave-dwelling Frog (*Litoria cavernicola*)

Perth Zoological Gardens	0	0	3	2	2	20	Research breeding biology during 2008
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ASMP Reptile & Amphibian TAG; Not Evaluated; Management Level 3

Red-eyed Tree-frog (*Litoria chloris*)

Blackbutt Reserve	0	0	0	0	0	4	Acquire during 2009
Perth Zoological Gardens	0	0	6	0	0	10	Confirm sexes and breed to requirements during 2008
Taronga Zoo	0	0	1	0	0	0	Delete by attrition
Totals	0	0	7	0	0	14	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Blue Mountains Tree-frog (*Litoria citropa*)

Melbourne Museum	2	1	0	2	1	0	Maintain
Melbourne Zoological Gardens	0	0	21	0	0	21	Maintain
Totals	2	1	21	2	1	21	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3



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Spot-thighed Frog (*Litoria cyclorhyncha*)

Perth Zoological Gardens	0	0	1	0	0	1	Maintain during 2008
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Dahl's Frog (*Litoria dahliei*)

Territory Wildlife Park	0	0	4	0	0	24	Collect locally
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Brown Tree-frog (*Litoria ewingii*)

Auckland Zoo	0	0	1	0	0	0	Delete
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Eastern Dwarf Tree-frog (*Litoria fallax*)

Melbourne Zoological Gardens	0	0	7	0	0	7	Maintain
Taronga Zoo	0	0	14	15	15	0	Acquire
Totals	0	0	21	15	15	7	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Green-eyed Tree-frog (*Litoria genimaculata*)

Cairns Tropical Zoo	0	0	0	2	2	0	Collect under permit
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ASMP Reptile & Amphibian TAG; Not Evaluated; Management Level 3

Centralian Tree-frog (*Litoria gilleni*)

Alice Springs Desert Park	0	0	0	0	0	10	Acquire (local provenance) during 2008
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ASMP Reptile & Amphibian TAG; Not Evaluated; Management Level 3

Dainty Green Tree-frog (*Litoria gracilentata*)

Brisbane's Alma Park Zoo	0	0	6	0	0	9	Acquire
Taronga Zoo	0	0	6	0	0	10	Maintain
Totals	0	0	12	0	0	19	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

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Giant Green Tree-frog (*Litoria infrafrenata*)

Australia Zoo	0	0	3	0	0	3	Maintain
Cairns Tropical Zoo	1	1	2	1	1	2	Maintain
Currumbin Wildlife Sanctuary	0	0	9	0	0	9	Maintain
Dreamworld	0	0	0	1	2	0	Acquire
Healesville Sanctuary	0	0	7	0	0	7	Maintain
National Zoo and Aquarium	0	0	2	0	0	2	Maintain
Pearcedale Conservation Park	1	0	0	1	1	0	Acquire
Taronga Zoo	3	2	7	0	0	10	Maintain
Underwater World	1	0	0	2	1	0	Acquire
Western Plains Zoo	0	0	0	0	0	2	Acquire
Totals	6	3	30	5	5	35	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Broad-palmed Rocket Frog (*Litoria latopalmata*)

Western Plains Zoo	0	0	1	0	0	0	Delete
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Lesueur's Frog (*Litoria lesueuri*)

Melbourne Museum	0	0	29	10	10	10	Breed to own requirements
Melbourne Zoological Gardens	2	0	8	0	0	0	Delete
Underwater World	0	0	4	0	0	3	Maintain
Totals	2	0	41	10	10	13	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Western Green-and-gold Bell Frog (*Litoria moorei*)

Perth Zoological Gardens	3	2	7	2	2	600	Acquire locally; breed to requirements during 2008
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Peron's Tree-frog (*Litoria peronii*)

Healesville Sanctuary	0	0	4	0	0	0	Delete
Lone Pine Koala Sanctuary	1	1	0	1	1	0	Maintain
Melbourne Zoological Gardens	3	0	3	0	0	6	Maintain
Underwater World	0	0	6	0	0	6	Maintain
Western Plains Zoo	0	0	3	0	0	0	Delete
Totals	4	1	16	1	1	12	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Leaf Green Tree-frog (*Litoria phyllochroa*)

Pearcedale Conservation Park	0	0	0	3	3	0	Acquire
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3



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Southern Bell Frog (*Litoria raniformis*)

Adelaide Zoo	0	0	0	3	3	0	Acquire during 2008
Brooklands Zoo	0	0	0	0	0	10	Acquire during 2008
Healesville Sanctuary	0	0	7	0	0	7	Maintain
Melbourne Museum	1	1	8	1	1	8	Maintain
Melbourne Zoological Gardens	7	2	3	10	10	0	Breed to requirements
National Aquarium of New Zealand	0	0	3	0	0	3	Maintain
Pearcedale Conservation Park	0	0	0	3	3	0	Acquire as available
Southern Encounter Aquarium & Kiwi House	0	0	2	0	0	2	Maintain for display
Wellington Zoo Trust	0	0	6	0	0	6	Maintain during 2008
Werribee Open Range Zoo	2	3	6	2	3	6	Maintain
Totals	10	6	35	19	20	42	

IUCN : EN

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Roth's Tree-frog (*Litoria rothi*)

Territory Wildlife Park	0	0	0	0	0	20	Collect locally
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ASMP Reptile & Amphibian TAG; Not Evaluated; Management Level 3

Desert Tree-frog (*Litoria rubella*)

Alice Springs Desert Park	0	0	0	0	0	7	Acquire (local provenance) during 2008
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Spotted Tree-frog (*Litoria spenceri*)

Healesville Sanctuary	6	6	17	0	0	100	Follow local recovery program
Taronga Zoo	0	0	5	0	0	50	Follow NPWS recovery plan
Totals	6	6	22	0	0	150	

IUCN : CR

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

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Splendid Frog (*Litoria splendida*)

Adelaide Zoo	0	0	9	0	0	9	Maintain
Australian Reptile Park	0	0	8	0	0	8	Maintain
Ballarat Wildlife Park	0	0	16	0	0	16	Breed to requirements
Cairns Tropical Zoo	0	0	3	0	0	6	Acquire
Currumbin Wildlife Sanctuary	0	0	6	0	0	6	Maintain
Healesville Sanctuary	0	0	6	0	0	6	Maintain
Lone Pine Koala Sanctuary	5	1	0	5	1	0	Maintain
National Zoo and Aquarium	0	0	12	0	0	12	Maintain
Perth Zoological Gardens	2	1	11	2	1	11	Maintain; attempt breeding during 2008
Taronga Zoo	0	0	2	0	0	6	Acquire
Territory Wildlife Park	0	0	5	0	0	5	Maintain during 2008
Underwater World	0	0	4	0	0	4	Maintain
Totals	7	2	82	7	2	89	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Fawn Tree-frog (*Litoria verreauxii*)

Pearcedale Conservation Park	0	0	0	3	3	0	Acquire as available
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Family: Leiopelmatidae

Archeys's Frog (*Leiopelma archeyi*)

Auckland Zoo	1	1	61	0	0	70	Follow program recommendations
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IUCN : CR

ASMP New Zealand Fauna TAG; No Regional Program; Management Level 3

Hochstetter's Frog (*Leiopelma hochstetteri*)

Hamilton Zoo	0	0	41	0	0	80	Follow program recommendations
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IUCN : VU

ASMP New Zealand Fauna TAG; No Regional Program; Management Level 3

Family: Myobatrachidae

Red Ground Froglet (*Geocrinia rosea*)

Perth Zoological Gardens	11	17	6	14	20	40	Research breeding biology during 2008
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Orange-bellied Froglet (*Geocrinia vitellina*)

Perth Zoological Gardens	2	2	5	4	5	20	Research breeding biology during 2008
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IUCN : VU

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Marbled Frog (*Limnodynastes convexiusculus*)

Territory Wildlife Park	0	0	2	0	0	22	Collect locally during 2008
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3



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Eastern Banjo Frog (*Limnodynastes dumerilii*)

Melbourne Museum	0	0	4	4	4	0	Acquire breeding stock
Melbourne Zoological Gardens	0	0	6	0	0	0	Delete by attrition
Underwater World	0	0	1	0	0	4	Acquire
Totals	0	0	11	4	4	4	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Striped Marsh Frog (*Limnodynastes peronii*)

Pearcedale Conservation Park	0	0	1	3	3	0	Acquire as available
Taronga Zoo	0	0	0	0	0	100	Acquire
Totals	0	0	1	3	3	100	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Spencer's Burrowing Frog (*Limnodynastes spenceri*)

Alice Springs Desert Park	0	0	8	4	8	0	Maintain (local provenance) during 2008
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Spotted Grass Frog (*Limnodynastes tasmaniensis*)

Melbourne Zoological Gardens	0	0	10	0	0	10	Maintain
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ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Barred Frog (*Mixophyes balbus*)

Healesville Sanctuary	2	2	0	2	2	0	Maintain
Melbourne Zoological Gardens	1	5	30	10	10	0	Follow NPWS recovery plan
Totals	3	7	30	12	12	0	

IUCN : VU

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Planned Category: Conservation Program; Management Level 3

Great Barred Frog (*Mixophyes fasciolatus*)

Cairns Tropical Zoo	0	0	0	2	2	0	Analogue for <i>M. schevilli</i>
Currumbin Wildlife Sanctuary	0	0	0	2	2	0	
Dreamworld	1	2	1	1	2	1	Maintain
Lone Pine Koala Sanctuary	8	7	0	8	7	0	Maintain research
Melbourne Zoological Gardens	8	3	2	0	0	0	Delete
Underwater World	0	0	2	0	0	4	Acquire
Totals	17	12	5	13	13	5	

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

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Fleay's Barred Frog (*Mixophyes fleayi*)

Currumbin Wildlife Sanctuary	0	0	0	5	5	0	Acquire
Lone Pine Koala Sanctuary	4	5	0	4	5	0	Maintain research
Totals	4	5	0	9	10	0	

IUCN : EN

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Meowing Frog (*Neobatrachus pictus*)

Adelaide Zoo	0	0	0	3	3	0	Local program
ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3							

Desert Spadefoot Toad (*Notaden nichollsi*)

Melbourne Zoological Gardens	1	2	0	1	2	0	Maintain
ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3							

Weigel's Toad (*Notaden weigeli*)

Perth Zoological Gardens	0	0	3	2	2	20	Research breeding biology during 2008
ASMP Reptile & Amphibian TAG; Not Evaluated; Management Level 3							

Red-crowned Toadlet (*Pseudophryne australis*)

Taronga Zoo	4	1	4	5	5	0	Maintain
IUCN : VU							
ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3							

Corroboree Frog (*Pseudophryne corroboree*)

Healesville Sanctuary	0	0	20	0	0	100	Follow recovery program recommendations
Melbourne Zoological Gardens	2	3	3	10	10	0	Follow NPWS recovery plan
Taronga Zoo	0	0	206	2	2	500	Follow NPWS recovery plan
Totals	2	3	229	12	12	600	

IUCN : CR

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Planned Category: Conservation Program; Management Level 3

Northern Corroboree Frog (*Pseudophryne pengilleyi*)

Tidbinbilla Nature Reserve	0	0	1350	0	0	1500	Follow recovery program recommendations
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IUCN : EN

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Family: Pipidae



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Clawed Frog (*Xenopus laevis*)

Auckland Zoo	0	0	24	0	0	7	Delete excess
Brooklands Zoo	4	2	0	4	2	0	Maintain
National Aquarium of New Zealand	0	0	48	10	10	40	Delete excess; breed to requirements
Wellington Zoo Trust	3	4	0	3	4	0	Maintain during 2008
Totals	7	6	72	17	16	47	

VPC : 2

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3

Family: Ranidae

African Bullfrog (*Pyxicephalus adspersus*)

Australian Reptile Park	2	0	0	2	0	0	Maintain
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VPC : 2

ASMP Reptile & Amphibian TAG; No Regional Program; Management Level 3



Section 8

Amphibian Information

Introduction

The Global Amphibian Assessment of the World Conservation Union (IUCN) revealed in 2005 that one third to one half of the world's 6,000 amphibian species are threatened with extinction and over 120 have already disappeared in recent years. The IUCN has previously urged that "All Critically Endangered and Extinct in the Wild taxa should be subject to *ex situ* management to ensure recovery of wild populations." Scientists around the world have recognised that captive management is necessary as a temporary solution and as part of an integrated conservation effort to prevent the extinction of hundreds of additional amphibian species. Fortunately, this conservation challenge is one that the *ex situ* community including zoos, aquariums, botanical gardens, research centres, museums, nature centres, and private breeders is uniquely capable of addressing.

During the 2005 Amphibian Conservation Summit – convened by the IUCN and Conservation International (CI) – the Amphibian Conservation Action Plan (ACAP – see appendix 1) was also developed. In that meeting, the IUCN/SSC Conservation Breeding Specialist Group (CBSG) was commissioned with the implementation of the *ex situ* aspects of the ACAP.

A year later, the CBSG, the IUCN/SSC ASG and the World Association of Zoos and Aquariums (WAZA), set up a collaborative program called Amphibian Ark (AArk – see appendix 2) to develop, promote and guide short-term *ex situ* management thus making possible long-term survival in nature of amphibians for which adequate protection in the wild is not currently feasible. The AArk coordinates *ex situ* programs implemented by partners around the world, with emphasis on programs within the range countries of each species, and constant attention to our obligation to couple *ex situ* conservation with efforts to protect or restore species in their natural habitats.

The urgent need for the AArk has been recognised for almost two years already. Since then, a considerable number of amphibians have been lost (perhaps 10 per year) and the survival of other species is uncertain. The spread of amphibian chytrid, which is responsible for the current crisis, is relentless and does not weaken, so the imperative to act is stronger now than ever before. The preferred solution is to create "Survival Assurance Populations" in zoos but that requires effort, engagement, and investment on an unprecedented scale. Before that can happen, there needs to be public awareness.

2008 has therefore been designated as the **Year of the Frog** (appendix 1) to optimize the opportunity afforded by a one-year-long focus on amphibians and ensure sustainability of the "Survival Assurance Populations" by creating a cash fund for this conservation work that will extend far beyond 2008.



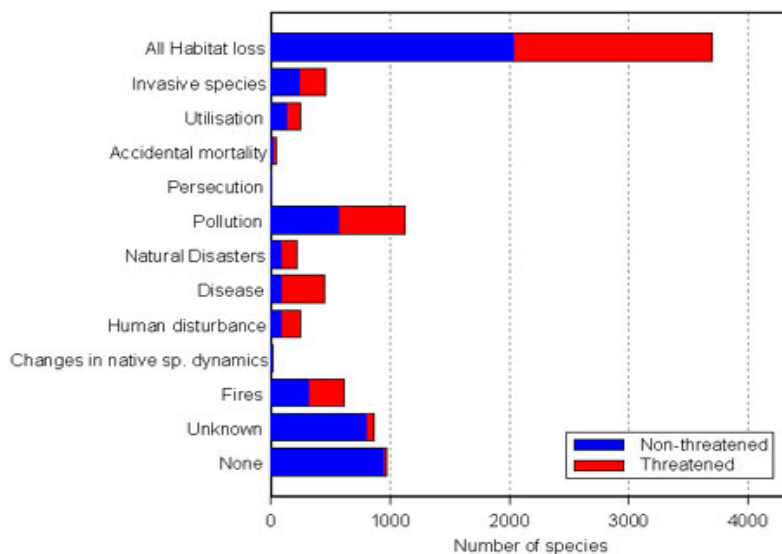
Amphibians in Danger

Addressing the amphibian extinction crisis represents the greatest species conservation challenge in human history. One third to one half of all amphibian species are threatened with extinction, with probably more than 120 already extinct in recent years. This is significantly more than any other group of organisms: by comparison, 12 percent of bird species and 25 percent of mammal species are threatened. The IUCN Global Amphibian Assessment (GAA) has alerted us to the fact that hundreds of species face threats that cannot be mitigated in the wild, i.e., they require zoos to save them in the short term until adequate conservation measures to secure wild populations can be developed.

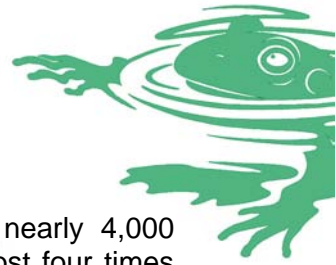
Threats [source: the Global Amphibian Assessment. www.globalamphibians.org]

A variety of threats are impacting amphibian species around the world, causing the massive declines. To better understand the leading threats to amphibians, GAA researchers recorded known threats to each amphibian species using a standardized list (IUCN Major Threat Authority Files www.iucnredlist.org/info/major_habitats.html) of major threats. A summary of the number of species affected by each threatening process is shown in Figure 1.

Figure 1. Major Threats to Amphibians



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Habitat loss and degradation are the greatest threat to amphibians, affecting nearly 4,000 species. The number of species impacted by habitat loss and degradation is almost four times greater than the next most common threat, pollution. Although disease appears to be a relatively less significant threat for amphibians, for those species affected, it can cause sudden and dramatic population declines resulting in very rapid extinction. In comparison, although habitat loss and degradation affect a much greater number of species, the rate at which a species declines is usually much slower, and there are a number of strategies, such as the creation of protected areas, to counter this threat (GAA).

Red List Status [source: *the Global Amphibian Assessment*. www.globalamphibians.org]

A primary goal of the GAA is to assess each known amphibian species with respect to the IUCN Red List categories and criteria www.iucnredlist.org/info/categories_criteria.html. These categories provide an explicit framework for determining a species' conservation status, with an emphasis on identifying those at highest risk of global extinction. In this context, the term "Threatened" refers to those species classified under Red List categories of Vulnerable, Endangered, or Critically Endangered.

Of the 5,918 amphibian species assessed, nearly one-third of extant species (32.2%) are globally threatened, representing 1,896 species (Figure 2). This is considerably higher than the comparable figures for birds (12%) and mammals (23%), the only other animal groups for which comprehensive global assessments have been completed. Thirty-four species are considered to be Extinct (EX), and one Extinct in the Wild (EW). Another 2,604 species are not considered to be threatened at present, being classified in the IUCN Categories of Near Threatened (NT) or Least Concern (LC), while sufficient information was not available to assess the status of an additional 1,383 species.

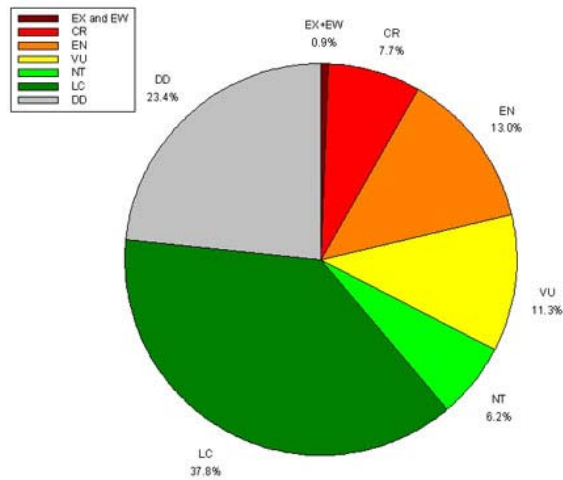
Relative to other animal groups, a particularly high proportion of amphibians are in higher threat categories. For example, 7.7 percent of amphibians are listed as Critically Endangered (456 species) compared with 1.8 percent of birds (179 species) and 3.8 percent of mammals (184 species). Threat levels for amphibians are also undoubtedly an underestimate given that nearly a quarter (23.4%) of species are too poorly known to assess (i.e., Data Deficient), and a significant proportion of these are likely to be globally threatened. Comparable figures for birds and mammals are 0.8 percent and 5.3 percent respectively.

Documenting population trends is a key to assessing species status, and a special effort was made to determine which species are declining, stable, or increasing. The GAA found declines to be widespread among amphibians, with 42.5 percent of species reported to be in decline. In contrast, 26.6 percent appear to be stable and just 0.5 percent are increasing. Because trends information is not available for 30.4 percent of species, however, the percentage of species in decline may actually be considerably higher.



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Figure 2. IUCN Red List Assessment for all 5,918 Known Amphibian Species



Extinctions [source: *the Global Amphibian Assessment*. www.globalamphibians.org]

Extinctions are notoriously difficult to confirm. Using the most conservative approach to documenting extinctions, just 34 amphibians are known to have become extinct since the year 1500. Of greater concern, however, are the many amphibians that are missing and can no longer be found. Until exhaustive surveys probing their disappearance can be carried out, these species cannot be classified in the Red List category of Extinct, but rather are flagged as “possibly extinct” within the Critically Endangered category. The GAA documents 130 such possibly extinct species.

Unfortunately, there is strong evidence that the pace of extinctions is increasing. Of the 34 known extinctions, nine have occurred since 1980, including such species as the golden toad (*Bufo periglenes*) of Monteverde, Costa Rica. Among those amphibians regarded as “possibly extinct,” at least 113 have disappeared and have not been seen since 1980. Fortunately, a few amphibians that previously were thought to be extinct have been rediscovered. For example, *Atelopus cruciger* was not seen in its native Venezuela after 1986, until a tiny population was found in 2003.

Status by Taxonomic Group [source: *the Global Amphibian Assessment*. www.globalamphibians.org]

Amphibians comprise three major groups, or taxonomic orders: Anura (frogs and toads), Caudata (salamanders and newts), and Gymnophiona (caecilians). Significant differences exist among these groups in both species numbers as well as threatened status. For instance, there is an order of magnitude – more frogs and toads than salamanders and newts, and even fewer caecilians are known. Frogs and toads, with 5,211 species, very much drive the average threat level for amphibians as a whole with 32.1 percent (1,675 species) either threatened or extinct. Salamanders and newts, however, show significantly higher threat levels, with 46.9 percent (251 species) of their species threatened or extinct. Caecilians, in contrast, appear to be relatively secure with just 2.9 percent (five species) threatened. However, two-thirds (66%) of caecilians are so poorly known that they have been assessed as Data Deficient.



Table 1. Red List Status by Taxonomic Order

Order	Total	EX	EW	CR	EN	VU	NT	LC	DD	% Threatened or Extinct
Anura Frogs & Toads	5,211	32	1	401	659	582	311	2,028	1,197	32.1
Caudata Salamanders & Newts	535	2	0	54	109	86	58	155	71	46.9
Gymnophiona Caecilians	172	0	0	1	1	3	0	53	114	2.9
Total	5,918	34	1	456	769	671	369	2,236	1,382	32.9

Significant difference in threat levels is also exhibited at the level of taxonomic Family, as shown in Table 2. Very diverse families of frogs and toads that are more threatened than the global average include the Bufonidae, Leptodactylidae and Rhacophoridae. Sadly, both species of the Australian endemic family Rheobatrachidae (the gastric-brooding frogs) are now Extinct. Two other families at severe risk of disappearing altogether are Leiopelmatidae (New Zealand frogs) and Rhinodermatidae (Darwin’s frogs in Chile and Argentina). Diverse families that are less threatened than the global average include Ranidae, Microhylidae, and Hyperoliidae. Among larger salamander families, Hynobiidae and Plethodontidae exhibit much higher levels of threat than Salamandridae.



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Darwin's frog (*Rhinoderma darwini*), Chile and Argentina / Photo by Michael and Patricia Fogden



Maud Island frog (*Leiopelma pakeka*), New Zealand / Photo by Phillip Bishop



Nasikabatrachus sahyadrensis, India / Photo by S.D. Biju



Seychelles palm frog (*Sooglossus pipilodryas*), Seychelles / Photo by Justin Gerlach



Southern gastric-brooding frog (*Rheobatrachus silus*), Australia / Photo by Michael J. Tyler



Table 2. Red List Assessment by Family
 source: the Global Amphibian Assessment. www.globalamphibians.org

Family	TOTAL	EX	EW	CR	EN	VU	NT	LC	DD	% Threatened or Extinct
Allophrynidae	1	0	0	0	0	0	0	1	0	0
Ambystomatidae	30	0	0	9	2	2	1	13	3	43.3
Amphiumidae	3	0	0	0	0	0	1	2	0	0
Arthroleptidae	51	0	0	3	9	2	3	18	16	27.5
Ascaphidae	2	0	0	0	0	0	0	2	0	0
Astylosternidae	29	0	0	2	11	8	2	5	1	72.4
Bombinatoridae	10	0	0	0	1	4	0	5	0	50.0
Brachycephalidae	8	0	0	0	0	1	1	1	5	12.5
Bufo	476	5	1	85	71	52	26	171	65	45.0
Caeciliidae	113	0	0	1	1	1	0	41	69	2.7
Centrolenidae	138	0	0	6	16	29	10	28	49	37.0
Cryptobranchidae	3	0	0	1	0	0	2	0	0	33.3
Dendrobatidae	234	0	0	20	29	16	14	58	97	27.8
Dicamptodontidae	4	0	0	0	0	0	1	3	0	0
Discoglossidae	12	1	0	0	0	2	4	5	0	25.0
Heleophrynidae	6	0	0	2	0	0	0	4	0	33.3
Hemisotidae	9	0	0	0	0	1	0	4	4	11.1
Hylidae	804	1	0	71	64	47	27	431	163	22.8
Hynobiidae	46	0	0	5	10	12	2	11	6	58.7
Hyperoliidae	253	0	0	1	19	29	17	133	54	19.4
Ichthyophiidae	39	0	0	0	0	2	0	5	32	5.1
Leiopelmatidae	4	0	0	1	1	2	0	0	0	100.0
Leptodactylidae	1,238	2	0	145	247	172	61	351	260	45.7
Limnodynastidae	50	0	0	1	7	2	1	37	2	20.0
Mantellidae	158	0	0	7	12	16	12	77	34	22.2
Megophryidae	128	0	0	3	14	27	13	40	31	34.4
Microhylidae	430	0	0	6	27	39	18	177	163	16.7
Myobatrachidae	71	1	0	6	2	4	3	49	6	18.3
Nasikabatrachidae	1	0	0	0	1	0	0	0	0	100.0
Pelobatidae	4	0	0	0	1	0	1	2	0	25.0
Pelodytidae	3	0	0	0	0	0	0	3	0	0
Petropedetidae	102	0	0	3	13	8	10	39	29	23.5
Pipidae	30	0	0	1	2	0	1	21	5	10.0
Plethodontidae	365	1	0	36	82	58	37	91	60	48.5
Proteidae	6	0	0	0	1	1	1	3	0	33.3
Ranidae	666	2	0	19	61	82	60	295	147	24.6
Rhacophoridae	277	18	0	18	51	34	26	64	66	43.7
Rheobatrachidae	2	2	0	0	0	0	0	0	0	100.0
Rhinatrematidae	9	0	0	0	0	0	0	4	5	0
Rhinodermatidae	2	0	0	1	0	1	0	0	0	100.0
Rhinophrynidae	1	0	0	0	0	0	0	1	0	0.0
Rhyacotritonidae	4	0	0	0	0	1	2	1	0	25.0



Frightening Statistics!

- 50 percent of ~6,000 described amphibian species, are threatened with extinction. 33 percent known to be threatened plus 23 percent data deficient but believed threatened mean ~3,000 species are in trouble.
- 122: minimal number of amphibian species believed to have already gone extinct.
- 500: estimated number of amphibian species whose threats currently cannot be mitigated quickly enough to stave off extinction, i.e., those who require *ex situ* intervention.
- 10: number (not percentage) of amphibian species North American zoos are currently prepared to manage long-term.
- 50: that same number extrapolated (extreme best-case scenario) to the global zoo community.
- 10 percent: portion of amphibian species threatened with extinction that the global zoo community is at best currently prepared to manage.
- 1: the number of amphibian species for which each of the 500 largest WAZA zoos must take responsibility as a stopgap to stem the losses.

Amphibians as indicators of environmental health and their contribution to humanity

Amphibians profoundly enhance our lives and our world in countless ways. They provide vital biomedicines, including compounds that are being refined for analgesics, antibiotics, stimulants for heart attack victims, and treatments for diverse diseases including depression, stroke, seizures, Alzheimer's, and cancer. The Australian red-eyed treefrog (*Litoria chloris*) and relatives give us a compound capable of preventing HIV infection, the cause of AIDS.

Amphibians' thin skins help them drink and breathe, but also make them susceptible to environmental contaminants, particularly agricultural, industrial, and pharmaceutical chemicals. For example, atrazine is the most widely used herbicide in the United States with an estimated 61 to 73 million pounds used per year during the 1990s. Scientific studies have found that atrazine may cause a variety of cancers and act as an endocrine disruptor, mimicking the feminizing hormone estrogen and harming human and animal reproductive and hormone systems. Atrazine is generally applied in spring and can accumulate in amphibian breeding pools. Laboratory studies have shown that atrazine can chemically sterilize tadpoles at levels well below the EPA maximum allowable level for drinking water. Although lawsuits brought against the EPA by the Natural Resources Defense Council date back to 1999, the EPA announced on October 31, 2003, that it had negotiated a deal with industry that would not require any new restrictions on atrazine use.

Other organochlorine pollutants (e.g., DDT, PCBs, dioxins) can also act as endocrine disruptors, inducing similar feminizing effects in amphibians. It has been demonstrated that these responses are occurring in nature, but it is yet unclear what long-term effect they will have on wild populations.

Amphibians have been likened to canaries in the coal mine: just as miners used sensitive canaries to warn them of toxic gases in the mines, amphibians might be warning us of unsafe environmental conditions that could eventually seriously impact our health. Could we be similarly affected by these widespread endocrine disruptors, or are we already? Atrazine, for example, has been detected in more than 1 million Americans' drinking water at levels higher than the EPA's drinking water standard. Some human studies suggest that the average sperm count of adult men in certain populations is significantly decreased, as much as 50 percent of what it was

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two generations ago. Are we also suffering the same feminizing effects of agrochemicals, industrial waste, and other estrogen-mimics that we see affecting amphibians so drastically?

Amphibians are also vital components of their ecosystems. In the 1970s, it was discovered that the northern redback salamander (*Plethodon cinereus*) was possibly the most abundant vertebrate in eastern U.S. forests, exceeding the biomass of all the bird or mammal species combined. Amphibians feed primarily on insects and other invertebrates. It was estimated that a single population of ~1,000 cricket frogs (*Acris crepitans*) could consume almost 5 million invertebrates in one year. Clearly they serve as significant predators of small invertebrates, as abundant prey for larger predators, and as a vital link in the food web between the two. In areas of the world where amphibians have declined, there has been an increase in invertebrate pests that damage crops and that carry human diseases.

Amphibians have also played a vital role in human culture. While in some cultures frogs and toads have been despised and regarded as evil, other cultures have embraced them as life-giving keepers of the rains or agents of fertility and good luck. Some simply use them for food. Amphibians have been both cherished and persecuted by different cultures as characters in fantasy stories, ingredients in folk medicine, and as spiritual beings.

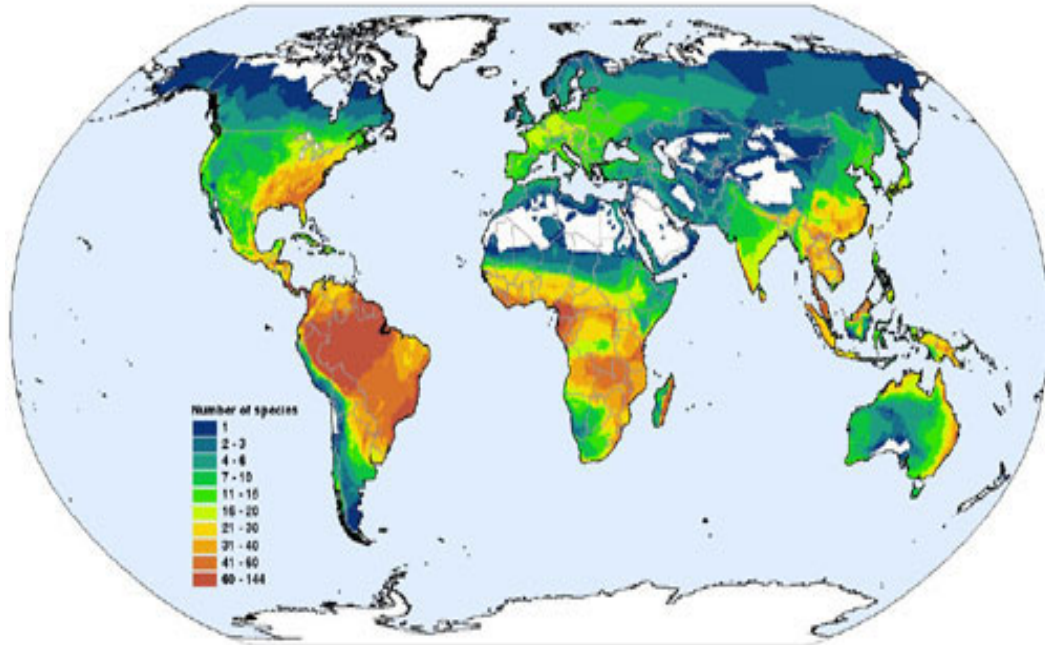
Geographic Patterns [source: *the Global Amphibian Assessment*. www.globalamphibians.org]

- *Diversity*

Global patterns of amphibian diversity are dramatically illustrated in Figure 3. This map clearly shows certain areas of high global diversity, including tropical South America and tropical West Africa. In contrast to the usual pattern of high species diversity occurring in the tropics, the southeastern United States is a global centre for amphibian diversity, being particularly rich in salamanders. The problem of uneven survey efforts around the world, however, complicates interpretation of this map. Regions such as Indonesia, New Guinea, and the Congo Basin are especially likely to be underrepresented on this map due to lack of adequate surveys.



Figure 3. Global Diversity of Amphibian Species



Looking at amphibian diversity from a country perspective, Brazil, with at least 751 species, has the greatest number of amphibians of any country on Earth, followed closely by Colombia. Table 3 lists the 20 most diverse countries and reveals some interesting findings. For instance, Colombia traditionally has been considered to be the richest country for amphibians, but has recently been surpassed by Brazil. Overall, though, these results must be considered in relation to the level of survey effort. Both Colombia and Brazil have received extensive survey efforts in recent decades, and although both countries can be expected to add significantly to their totals, the level of increase is likely to be less than in some of the other highly diverse countries. In South America, Peru in particular is relatively poorly sampled and is almost certain to rise very substantially in its species total, and can be predicted to pass the level of Ecuador. The diversity in Ecuador is, however, remarkable for such a small country.



Table 3. Countries with Most Amphibian Species

Rank	Country	Total species
1	Brazil	751
2	Colombia	697
3	Ecuador	447
4	Peru	411
5	Mexico	363
6	Indonesia	347
7	China	326
8	Venezuela	298
9	United States	261
10	Papua New Guinea	244
11	India	239
12	Madagascar	226
13	Australia	214
14	Democratic Republic of the Congo	211
15	Bolivia	209
16	Malaysia	202
17	Cameroon	196
18	Panama	195
19	Costa Rica	179
20	Tanzania	162

Among the Old World countries, the level of survey effort is often much lower than in the Americas. Indonesia can be predicted to be the richest country outside the Americas, but it is doubtful if even half of its species are yet known. It may end up with a level of diversity comparable with Brazil and Colombia. The situation in India is set to change dramatically with over 100 species in the process of description. Very large increases in species totals can also be predicted for Papua New Guinea and the Democratic Republic of Congo, the latter country having received almost no amphibian survey work in the last 40 years.

Countries that are not far behind that are set to pass the 200 species mark include Malaysia, Cameroon, Tanzania, Panama, Costa Rica, and Tanzania. The United States of America and Australia can be predicted to fall down the ranking over time, though the former will remain the most important country for salamanders, with the possible exception of Mexico.

Geography of Threatened Species [source: *the Global Amphibian Assessment*. www.globalamphibians.org]

A map showing the global distribution of threatened amphibians (Figure 4) reveals patterns very different from depictions of overall species diversity. The greatest concentration of such species - including well over half of the currently known threatened amphibians - is in a relatively limited area running from southern Mexico south to Ecuador and Venezuela, and in the Greater Antilles (details in Figure 5). This region is dominated by species with small ranges, often living in montane areas. Many of these species have been subjected to severe habitat loss, and exposure to the fungal disease chytridiomycosis.

Other important concentrations of threatened species are in the Atlantic Forests of southern Brazil (Figure 6), the Upper Guinea forests of western Africa, the forest of western Cameroon and eastern Nigeria (Figure 7), the Albertine Rift of central Africa, the Eastern Arc Mountains of Tanzania, East Africa and Madagascar (Figure 8), the Western Ghats of India, Sri Lanka (Figure



9), central and southern China, Borneo (Figure 10), the Philippines (Figure 10) and eastern Australia.

Figure 4. Global Distribution of Threatened Amphibians

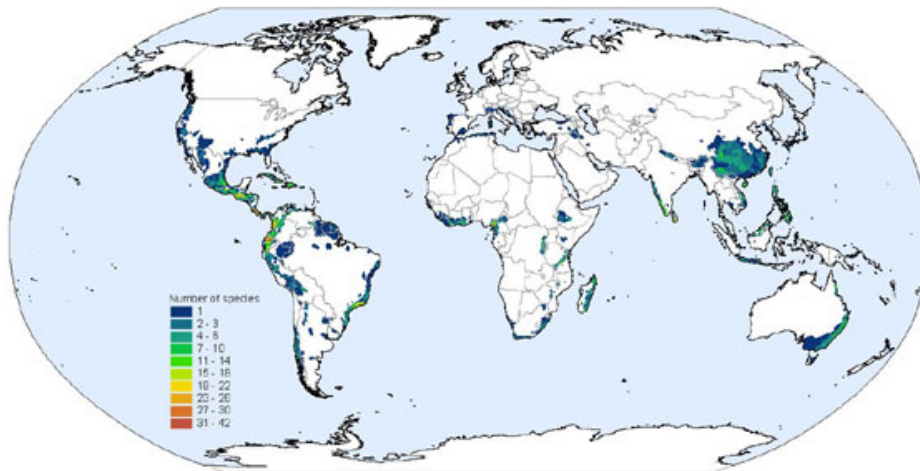




Figure 5. Distribution of Threatened Amphibians in Central America, Northern South America, and the Caribbean
[Source Global Amphibian Assessment]

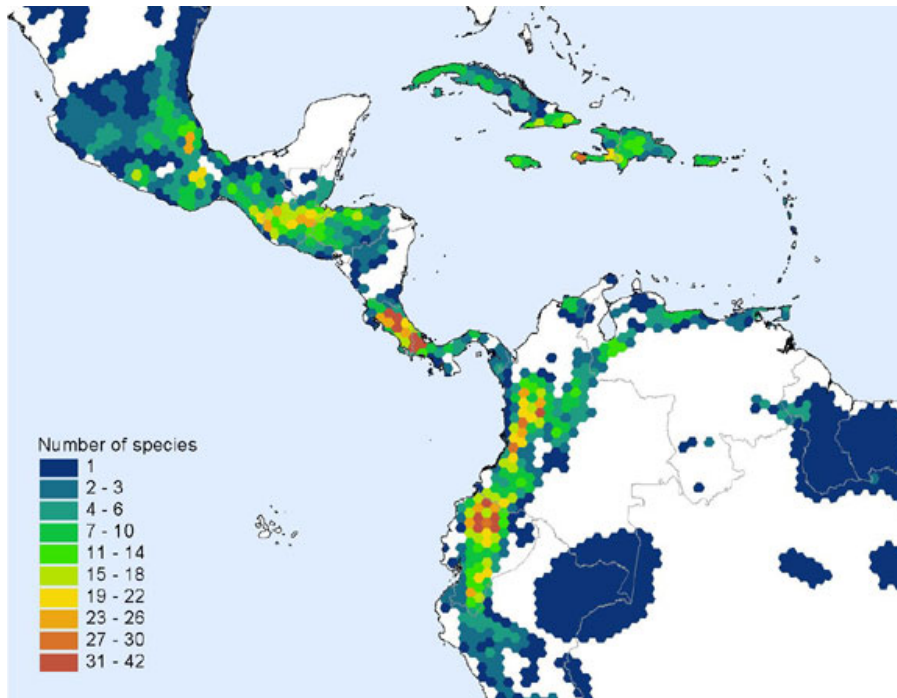


Figure 6. Distribution of Threatened Amphibians in the Atlantic Forest of Brazil.
[Source Global Amphibian Assessment]

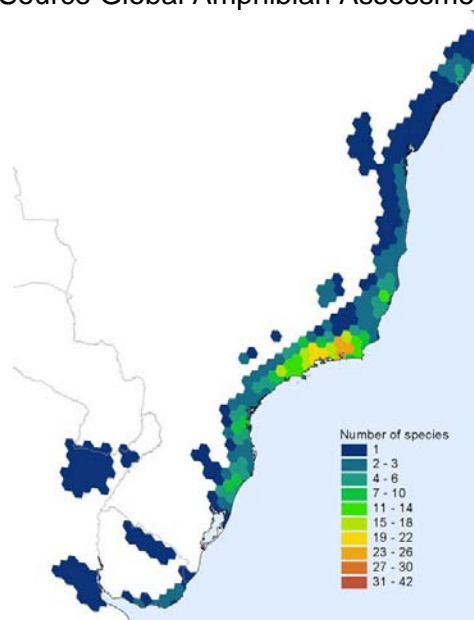




Figure 7. Distribution of Threatened Amphibians in Cameroon and West Africa.
[Source Global Amphibian Assessment]

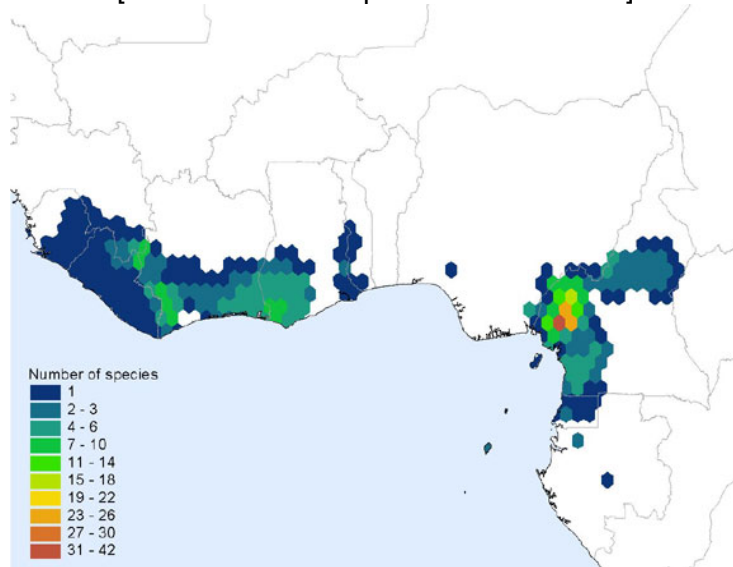


Figure 8. Distribution of Threatened Amphibians in Madagascar and Eastern Africa.
[Source Global Amphibian Assessment]

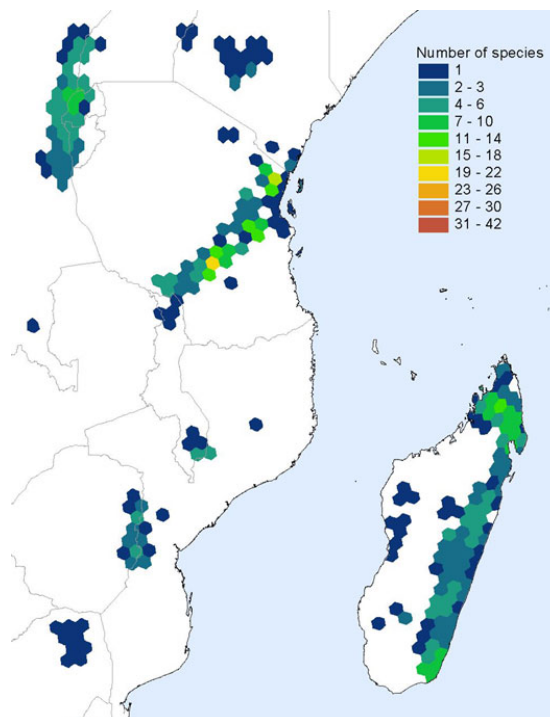




Figure 9. Distribution of Threatened Amphibians in Southern India and Sri Lanka. [Source Global Amphibian Assessment]

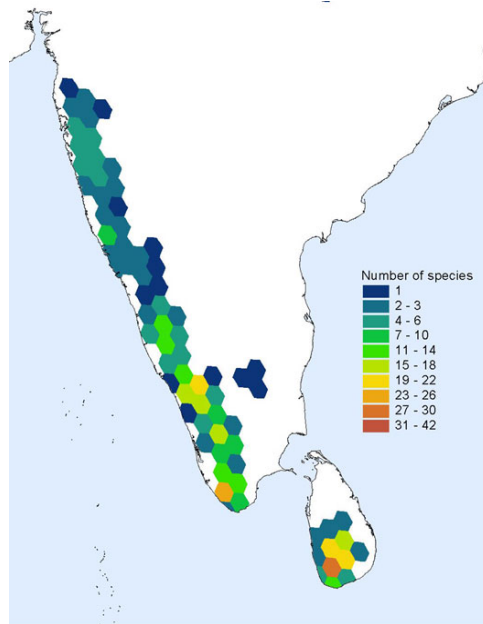
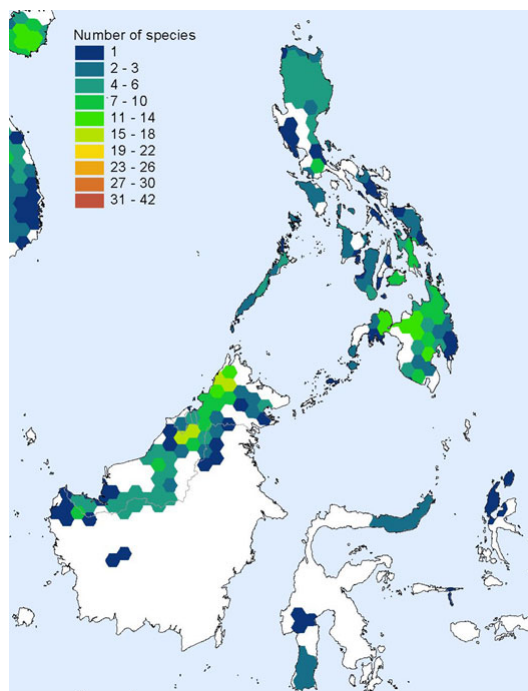


Figure 10. Distribution of Threatened Amphibians in Borneo and the Philippines. [Source Global Amphibian Assessment]





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Table 4 lists the 20 countries with the highest number of threatened amphibians. These countries are in many cases different from those listed in Table 3, suggesting that either amphibians in some countries are more susceptible to threats, that threats vary between countries, or that there are other factors influencing the distribution of threatened species.

Table 4. Countries with Highest Number of Threatened Amphibians
[Source Global Amphibian Assessment]

Rank	Country	Threatened Species
1	Colombia	209
2	Mexico	196
3	Ecuador	163
4	Brazil *	110
5	China	88
6	Peru	81
7	Guatemala	76
8	Venezuela	69
9	India	66
10	Costa Rica	61
11	Honduras	55
11	Madagascar	55
11	Panama	55
14	Cameroon	53
15	Sri Lanka	52
15	United States of America	52
17	Philippines	48
18	Australia	47
18	Cuba	47
20	Haiti	46
20	Malaysia	46

The countries listed in Table 4 have a particularly great responsibility for protecting the world's threatened amphibians. Colombia, the second-most diverse country, has the highest number of threatened species. The major threats to amphibians in Colombia are habitat loss although there have been many as yet unexplained declines also occurring, and the dramatic topography of the Andes means that many of the amphibians have very restricted ranges making them more vulnerable to threatening processes. Brazil, the most diverse country, is ranked only fourth for number of species threatened, most of which are in the Atlantic Forest region, and has a significantly lower percentage of its amphibians threatened than the global average* (see note below.).

Considering the percentage of a country's amphibian fauna that is threatened provides a stark contrast to the previous table, which focuses on the number of threatened species. Table 5 lists the countries with the highest percentage of threatened amphibians.



Table 5. Countries with Highest Percentage of Threatened Amphibians
[Source Global Amphibian Assessment]

Note: only countries with 10 or more species are included.

Rank	Country	% Threatened
1	Haiti	92.0%
2	Dominican Republic	86.1%
3	Jamaica	81.0%
4	Cuba	79.7%
5	Puerto Rico	72.2%
6	Sri Lanka	62.7%
7	Guatemala	55.1%
8	Mexico	54.5%
8	Seychelles	54.5%
10	Philippines	49.0%
11	Honduras	47.4%
12	Ecuador	36.5%
13	Chile	36.4%
14	Japan	35.7%
15	Turkey	34.6%
26	Costa Rica	34.1%
17	Colombia	30.0%
18	Panama	28.2%
19	El Salvador	28.1%
20	India	27.6%

The top five countries are all in the Caribbean, and at least 70 percent of all the amphibians in these countries are threatened. Compared to other regions, the Caribbean stands out as the region with by far the highest percentage of threatened species. This is mostly a result of extensive habitat loss as well as some incidents of disease, in particular in Puerto Rico. In Mexico, ranked fifth for diversity, but second for the number of threatened species, more than 50 percent of amphibians are threatened. Severe habitat loss as well as disease outbreak in some regions are the main threats. Most of the other countries in Table 5 are in Central or South America. The main causes of threat here are also disease and habitat loss.

** It should be noted that for certain species endemic to Brazil, it has not yet been possible to reach agreement on the Red List Categories between the GAA Coordinating Team, and the experts on the species in Brazil. The Red List Categories displayed for individual species are those that were agreed at the GAA Brazil workshop in April 2003. However, in the subsequent consistency check conducted by the GAA Coordinating Team, many of these were found to be inconsistent with the approach adopted elsewhere in the world. Under the notes on Red Listing for each species, the likely consistent Red List Category is given for these species, and it is these consistent Red List Categories that are used in the analyses presented here.*



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Patterns of Endemism [source: the Global Amphibian Assessment. www.globalamphibians.org]

The number and percentage of endemic amphibians by country shows some important patterns. Table 6 lists the 20 countries with the largest numbers of endemic species (i.e., occurring in no other countries), while Table 7 lists the twenty countries with the highest percentage of endemism.

Table 6. Countries with the Most Endemics
[Source Global Amphibian Assessment]

Rank	Country	Country Endemics
1	Brazil	489
2	Colombia	337
3	Mexico	246
4	Madagascar	225
5	Australia	200
6	United States of America	182
7	Peru	181
8	China	171
9	Papua New Guinea	164
10	Indonesia	161
11	Ecuador	159
12	Venezuela	155
13	India	154
14	Philippines	77
15	Sri Lanka	67
16	Tanzania	65
17	Cuba	57
18	Malaysia	56
19	Cameroon	55
20	Bolivia	53
20	Democratic Republic of the Congo	53



Table 7. Countries with the Highest Percentage of Endemics
[Source Global Amphibian Assessment]

Rank	Country	% Endemics
1	Jamaica	100%
2	Seychelles	100%
3	Sao Tome and Principe	100%
4	New Zealand	100%
5	Fiji	100%
6	Palau	100%
7	Madagascar	99.6%
8	Cuba	96.6%
9	Australia	93.5%
10	Sri Lanka	80.7%
11	Japan	80.4%
12	Philippines	78.6%
13	Puerto Rico	77.8%
14	United States of America	69.7%
15	Chile	69.1%
16	Mexico	67.8%
17	Papua New Guinea	67.2%
18	Brazil	65.1%
19	India	64.4%
20	China	52.5%

To a considerable extent, the countries with the largest number of endemic species (Table 6) match those with the largest total diversity of species (Table 3), which is not surprising. However, it is noteworthy that several island countries that do not appear in Table 3 do appear in Table 6: Sri Lanka; the Philippines; and Cuba. Brazil and Colombia have many more endemics than any other countries, with Mexico, Madagascar, and Australia each having 200 or more endemics.

The percentage of endemism (Table 7) shows a very different pattern, with six island countries each having 100 percent endemism (none of these with very diverse amphibian faunas). Of the countries with high amphibian diversity (Table 3), Madagascar and Australia (both essentially very large islands) stand out with by far the highest levels of endemism.

In Figure 10, a preliminary look at Endemic Amphibian Areas is provided. This map is based on the same approach adopted by BirdLife International www.birdlife.org/ in defining Endemic Bird Areas (EBAs) www.birdlife.org/datazone/ebas/. We define an Endemic Amphibian Area as any place where at least two species with ranges of less than 50,000 km² overlap. About 70 percent of amphibians have ranges of less than 50,000 km² compared with just 25 percent of bird species.



Figure 10. Endemic Amphibian Areas

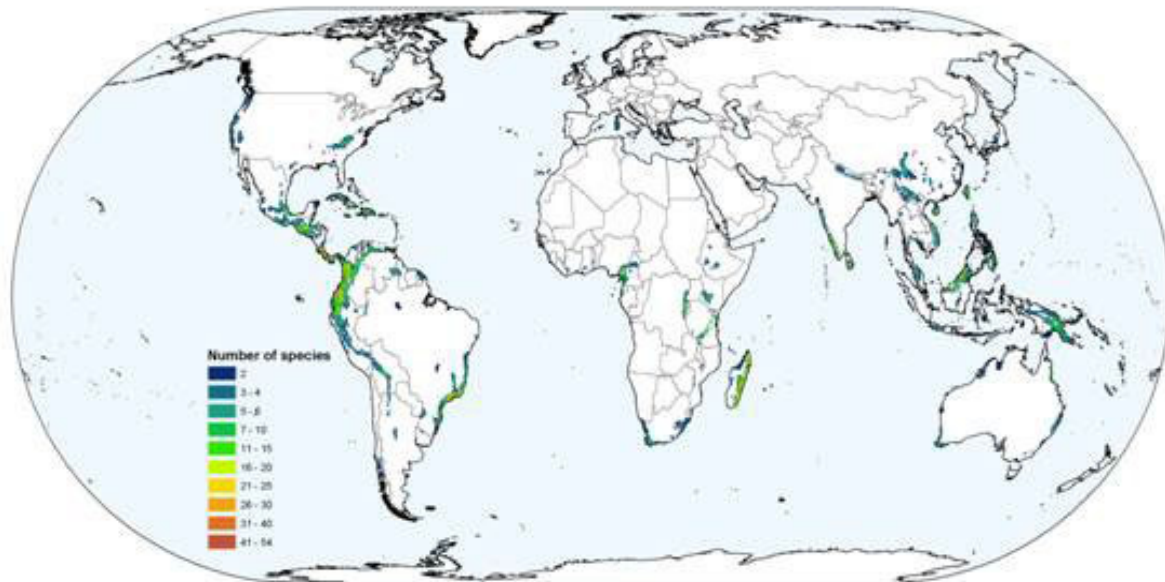


Figure 10 looks remarkably similar to the global map of Endemic Bird Areas (and also to other priority-setting mechanisms such as CI's Hotspots web.conservation.org/xp/Hotspots/hotspotsScience/). Clearly, amphibians with small ranges are concentrated in generally the same areas as birds. Preliminary results for mammals reveal a very similar pattern as well, suggesting some fundamental biogeographic patterns that tend to span diverse taxonomic groups, with different life history patterns, and different alpha-beta diversity tendencies. These fundamental patterns are clearly key to guiding the development of conservation strategies in the future. A few differences are apparent, though, the most notable being the Appalachian Mountains in the eastern United States of America, which are the world's centre of salamander diversity and endemism, and are also extremely rich in other aquatic life forms, such as freshwater fishes, turtles, mussels, and crayfishes.

Our analysis of Endemic Amphibian areas includes Data Deficient species, which perhaps should have been omitted, since these include a number of species currently known only from their type localities, but which may be more widespread. We suspect that if these Data Deficient species are removed, some of the Endemic Amphibian Areas in places such as the Amazon and Congo basins would disappear, resulting in a map even more similar to that of Endemic Bird Areas.



Chytrid Fungus

Chytrid fungi were once thought to be predominantly free-living saprophytes, with a few species capable of infecting only invertebrates and vascular plants. In 1998, a new species – *Batrachochytrium dendrobatidis* (hereafter Bd) – was described infecting amphibians. Bd has now been identified in association with amphibian die-offs on every amphibian-inhabited continent. From the site of its introduction, it generally spreads in a wave-like fashion at 28-100km/yr, often destroying entire amphibian communities as it goes. Where it thrives (generally cooler riparian habitats), 50 percent of species and 80 percent of individuals can be expected to disappear within one year. It cannot be stopped in the wild, and it persists for an unknown period of time even after the amphibians disappear. A few species seem able to live with it as adults, likely serving as reservoirs and vectors for future outbreaks. An element of hope: while many species disappear, at least one that declined appears to be coming back after 10 years. For a detailed accounting of Bd and a model regional response, see the Australian's Threat Abatement Plan www.deh.gov.au/biodiversity/threatened/publications/tap/amphibians/pubs/amphibians.pdf and Action Plan for Australian Frogs www.deh.gov.au/biodiversity/threatened/action/frogs/

The only way to avoid getting chytrid fungus in your collection is to never bring in another amphibian, from the wild (global or local) or from any other facility (zoo, commercial, lab, etc.). Obviously, this practice would make it impossible for any conservation institution to function! The realistic way to proceed is to do what most/all institutions are already doing – quarantine all incoming amphibians. Many tropical amphibians will be dead by the time a problem is visibly detected; incubation time can be 9-76 days, with most succumbing in 18-48 days. But if animals are suspected to be positive, or just as prophylaxis, an established treatment can be started as soon as they arrive. For others, and for those that die, specimens can be tested for chytrid infection. A simple skin scraping viewed under a microscope can suffice to indicate spores (see online article www.jcu.edu.au/school/phtm/PHTM/frogs/papers/briggs-2003.pdf), histology of samples from the deceased can also confirm infection (see online instruction www.jcu.edu.au/school/phtm/PHTM/frogs/histo/chhisto.htm). The surest technique is the PCR test. Swabbing techniques to collect samples for PCR and a demonstration video are included in this on line www.amphibiaweb.org/aw/chytrid/index.html

Note: all zoos get chytrid sooner or later! While it does require a swift, thorough response, it is not the end of the world. You have probably already had it in your collection and not even known it. The key to managing chytrid is to test all suspicious sick and dead animals, and treat the survivors accordingly. Treating chytrid in captivity is easy and effective; it is the wild situation that is causing us grey hairs!



Amphibians' role in culture and religion

Humans have viewed amphibians in a variety of fascinating roles. While in some cultures frogs and toads have been despised and regarded as evil, other cultures have embraced them as life-giving keepers of the rains or agents of fertility and good luck. Some simply use them for food. Amphibians have been both cherished and persecuted by different cultures as characters in fantasy stories, ingredients in folk medicine, and as spiritual beings (see section by Adler in Hutchins 2003, also Hofrichter 2000).

Pre-biblical Shamanism, dating back to the Stone Age, is believed to have given rise to all religions. The Shaman was the leader whose essential role was that of mediator between his people and the spirit world. Toads were important to the Shaman for their symbolic value and for creating hallucinogenic brews. In early Asiatic cultures and in the pre-Columbian civilizations of the Americas, the toad was regarded as a divinity, the great Mother Earth, the source and the end of all life. The Egyptian goddess of childbirth, Heqet, is usually pictured with a frog's head. Lamps and amulets with frog shapes were placed in Egyptian tombs to repel demons from the underworld.

The Bible. Christian religion does not portray amphibians in such a positive light. One of the plagues of Egypt was an army of frogs sweeping over the land. Note though that the plague of the frogs' mass exodus from water was preceded by plague of water pollution and succeeded by plague of insects – how prophetic!

I will smite with the rod that is in my hand upon the waters which are in the river, and they shall be turned to blood. And the fish that are in the river shall die, and the **river shall become foul**, and the Egyptians shall loathe to drink water from the river. (Exodus, 7:15-22)

And if thou refuse to let them go, behold, I will smite all thy borders with **frogs**. And the river shall swarm with **frogs**, which shall go up and come into thy house, and into thy bed-chamber, and upon thy bed, and into the house of thy servants, and upon thy people, and into thine ovens, and into thy kneading-troughs. And the **frogs** shall come up both upon thee, and upon thy people, and upon all thy servants. (Exodus, 7:28-29) And Aaron stretched out his hand over the waters of Egypt; and the **frogs** came up, and covered the land of Egypt. (Exodus, 8:2)

And the LORD said unto Moses: 'Say unto Aaron: Stretch out thy rod, and smite the dust of the earth, that it may become **gnats** throughout all the land of Egypt.' And they did so and Aaron stretched out his hand with his rod, and smote the dust of the earth, and there were gnats upon man, and upon beast; all the dust of the earth became gnats throughout all the land of Egypt. (Exodus, 8:12-13)



Middle ages. Since the Middle Ages, witches and toads have been closely connected. By some accounts, witches cohabited with and even dressed their amphibian associates. Chemicals in the toads' skin made them popular ingredients in magical concoctions. In Shakespeare's *Macbeth*, the witches chant:

*Round about the cauldron go;
In the poison'd entrails throw.
Toad, that under cold stone
Days and nights has thirty-one
Sweltered venom sleeping got*

*Boil thou first i' the charmed pot.
Double, double toil and trouble;
Fire burn and cauldron bubble.
Fillet of a fenny snake,
In the cauldron boil and bake;
Eye of newt and toe of frog,
Wool of bat and tongue of dog,
Adder's fork and blind-worm's sting,
Lizard's leg and owlet's wing,
For a charm of powerful trouble,
Like a hell-broth boil and bubble.*

Modern indigenous cultures. The hunters in some indigenous tribes of the Amazon rub the skin secretions of the giant monkey frog (*Phyllomedusa bicolor*) into self-inflicted burns. The toxins in the skin secretions induced nausea and hallucinations in the hunters, who claim to then have heightened awareness and increased hunting success (Daly *et al.* 1992). Aborigines use waterholding frogs (genus *Cyclorana*) as a water source during drought; they dig in dried-up ponds until they find the cocooned amphibians, then squeeze the bladder-stored water out into their mouths. The Amerindians of Columbia rub their hunting darts across the backs of golden dart frogs (*Phyllobates terribilis*), or sometimes stab the frogs with the darts, to poison the dart and create a deadly projectile with which to shoot monkeys from the canopy (Myers *et al.* 1978).

Popular culture. Kermit the frog, one of the original Jim Henson Muppets, made his television debut in 1955. He continues to charm children of all ages with his talent, warmth, and sincerity.

Some notable Kermit quotes:

"I'm a very lucky frog. I've gone everywhere, done a lot of fun things, and I've met a lot of really nice people. It doesn't get any better than that."

"It's not easy being green."

"It seems to me that if you wait until the frogs and toads have croaked their last to take some action, you've missed the point."

Other pop culture amphibians include the Michigan J. Frog and the Budweiser Frogs. Frogs also show up in stories like the Frog Prince, the Adventures of Frog and Toad, and the Celebrated Jumping Frog of Calaveras County.



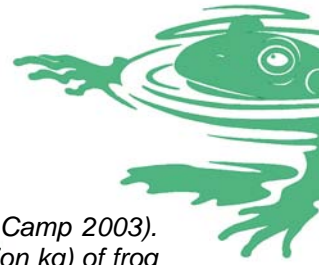
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Cultural abuses. Biology classes in high schools and colleges generally require a frog dissection laboratory. Some involve using preserved animals; others require the students to kill the frogs with an overdose of ether, by decapitation, or by pithing (scrambling the animal's brain with a sharp wire). None of these options is humane. In any case, the animals have almost certainly been collected from the wild by biological supply companies, usually by the thousands from one small area of habitat. Such over-collection is likely not sustainable. Most students do not need to dissect frogs or other animals. The career paths they will follow will have nothing to do with animal anatomy. They can learn everything they need to know from detailed textbooks and videos. For those students planning a career in zoology or medicine who need that information, there are alternatives. Video recordings of dissections and virtual dissections are viable options that are readily available. A Yahoo search for 'virtual frog dissection' yielded over 10,000 results, including:

curry.edschool.virginia.edu/go/frog/
www-itg.lbl.gov/ITG.hm.pg.docs/dissect/info.html
www.froguts.com/flash_content/index.html
step.sdsc.edu/projects95/Frog.Dissection/

In those cases where it is absolutely necessary for the student to use animals, for example, a medical student studying the effect of a new drug on the physiological interactions between nerves and muscles, farm-raised frogs are readily available (www.ranaranch.com, www.researchamphibians.com) and can be euthanized humanely with an appropriate anaesthetic (see monograph on diseases).

Another cultural practice is the consumption of frog legs as human food. The United States consumes over 1.25 million pounds of frog legs annually, primarily from the American bullfrog. Some bullfrog ranches exist, and frog-farming is far better for the environment (in terms of pollution) than raising beef or chicken. However, most of the frogs for restaurants are wild-caught. The method of collection is quite inhumane – a practice called 'gigging' in which the animal is skewered alive on a barbed, metal stick before its legs are cut off and it is tossed back to the water to die. If you choose to order frog legs in a restaurant, ask and make sure they were farm-raised. Unfortunately, bullfrogs have been introduced for human food into places outside their natural range, including Hawaii, many Caribbean islands, Mexico, Venezuela, the Netherlands, Italy, Java, Japan, Thailand, China, and throughout the western United States. Introduced bullfrogs compete with or eat the native animals, and often bring in new diseases. There is a great discussion of frog leg consumption at *AmphibiaWeb*:



*"In the 1990's, Europe imported 6,000 metric tons of frog legs each year (Jensen and Camp 2003). Between 1981 and 1984, the United States imported more than 6.5 million pounds (3 million kg) of frog meat per year. That is the equivalent of approximately 26 million frogs (Jensen and Camp 2003). Asia is the second largest market for frog leg consumption, where the most common species consumed is the Chinese Edible Frog, *Hoplobatrachus rugulosus* (Jensen and Camp 2003). In just one year, over 6 million Chinese Edible Frogs were imported to Hong Kong from Thailand (Wai-Neng Lau et al. 1999). It is presumed that all these frogs are being collected from the wild since most of the frog farms in Thailand only raise American bullfrogs (Wai-Neng Lau et al. 1999). Given the sheer number of frogs collected, this species is likely being overharvested and if this practice continues could wipe out remaining wild populations.*

*Overharvesting has had devastating effects on amphibians in the United States. In the West, the California red-legged frog, *Rana draytonii*, began to be exploited for food during the gold rush of 1849 and heavy harvesting continued until the early 1900s (Jennings and Hayes 1985). By the mid-1870s, their numbers had been significantly depleted in the vicinity of San Francisco (Lockington 1879). The overharvesting of this species was driven by a significant commercial demand. Frog legs from California were selling for \$4.09/lb in France at the turn of the century. California red-legged frogs are currently listed as federally threatened and are no longer being harvested, but their populations are still in trouble. To compensate for diminishing wild populations, people began to farm and also release into the wild American bullfrogs, *Rana catesbeiana* (Jennings and Hayes 1985). Today, American bullfrogs pose a serious threat to red legged frog populations (see introduced species page)." See also the chapter in Hofrichter (2000).*

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Appendices

1. Amphibian Ark and the 2008 Year of the Frog Campaign

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Abstract

The world's amphibians are disappearing. More than one hundred species may have already gone extinct and thousands more are threatened with extinction. Many of the threatened species cannot be safeguarded in the wild and require *ex situ* management if they are to persist. The Amphibian Ark (AArk) draws together diverse stakeholders to save select species until *in situ* threats can be mitigated. Amphibian Ark work includes species prioritization, husbandry training, capacity building, fostering partnerships, fundraising, and education. A campaign entitled *2008 Year of the Frog* is helping to raise awareness among governments, media, educators, and the general public, and to support a capital campaign to fund amphibian conservation programs worldwide.

Key Words

Amphibian declines, extinctions, Amphibian Ark, *ex situ*, Year of the Frog Campaign, captive breeding, endangered species.



Introduction

Amphibian species are becoming extinct at a pace never before seen among any animal group.

For the first time, scientists have gathered ample evidence to assert that we might be facing the biggest extinction crisis in the history of humanity (McCallum, 2007; Mendelson *et al.*, 2006; Beebee & Griffiths, 2005; Stuart *et al.*, 2004; Blaustein *et al.*, 2003; Carey & Alexander, 2003; Daszak *et al.*, 2003; Kiesecker *et al.*, 2001; Houlahan *et al.*, 2000; Pounds & Crump, 1994). Species, genera, and even families are vanishing at alarming rates. In 2004 the Global Amphibian Assessment (GAA) conducted by the World Conservation Union (IUCN) revealed that between one third and one half of the world's 6,000+ amphibian species are currently threatened with extinction and over 120 have already disappeared (Stuart *et al.*, 2004; Moore & Church this volume).

It is widely believed that many more species may go extinct before we react sufficiently and the current generation will be held responsible for this loss. It is of the utmost importance that we raise awareness among national governments, world media, school educators and the general public regarding the fragility of amphibians and the enormous responsibility that each of us has for trying to safeguard the highest number of species from extinction.

The global conservation community has come forward with a response to this crisis in the form of the Amphibian Conservation Action Plan (ACAP; Gascon *et al.* 2007), the *ex situ* components of which will be addressed by the **Amphibian Ark** (AArk) www.AmphibianArk.org. The AArk is an initiative started by a group of concerned conservation organisations (IUCN/SSC Conservation Breeding Specialist Group (CBSG), World Association of Zoos and Aquariums (WAZA), and IUCN/SSC Amphibian Specialist Group (ASG)) to support *ex situ* actions around the world whereby select species will be maintained in captivity until they can be secured in the wild. Zoos, aquariums, and botanical gardens can play a crucial role as part of the immediate response by providing *ex situ* breeding facilities for some of the most threatened species (Zippel, 2005). The *ex situ* conservation community includes other currently under-utilized components, e.g., universities, natural history museums, government, and the private sector. A response from the *ex situ* community that is proportional to the crisis will require financial and political support from all corners of the world. Zoos as committed advocates of conservation are in the forefront of a worldwide effort and face the challenge of generating attention that translates into resources and good will towards amphibian safekeeping.

Consequently, the Amphibian Ark has launched a global campaign under the name of "2008 Year of the Frog" with the aim of generating support for global and regional amphibian conservation initiatives. Individual and collective support for this campaign will help develop the capacity to coordinate crucial *ex situ* programs implemented by partner organisations around the world. In the absence of an immediate and sustained conservation effort of this kind, hundreds of species could become extinct in our lifetime.

Captive Management and the Role of Zoos

The GAA alerted us to the fact that hundreds of species face threats that cannot be easily or quickly mitigated in the wild and therefore require *ex situ* programs to save them until adequate conservation measures can be developed to secure wild populations. Amphibians are often suitable candidates for captive breeding programs as they are relatively inexpensive to maintain compared to other animal groups, many show high fecundity rates and face few behavioural problems under



captive conditions (Bloxam & Tonge, 1995; Marsh & Trenham, 2001; Trenham & Marsh, 2002; Wiese & Hutchins, 1994). This conservation initiative is one that the *ex situ* community is uniquely capable of addressing.

Fortunately, a thriving industry already exists that specializes in captive management of animals. Zoos and related facilities worldwide include over 1,200 institutions, employing more than 100,000 staff and receiving about 600 million visitors per year, equivalent to one in every 10 people in the world! Zoos can assist with initiatives such as rapid response rescues, captive assurance colonies, providing animals for release and research, conservation education, capacity building, fundraising and helping to develop species recovery plans.

The *ex situ* conservation community faces many challenges in order to meet these expectations, first and foremost is the need of rapidly increasing capacity. It is estimated that the world's zoos can currently manage viable populations of ~50 amphibian species, amounting to perhaps 10 percent of those requiring *ex situ* intervention. A dramatic increase in resources is therefore needed urgently and, would include construction of additional biosecure facilities wherever they are needed, training keepers and ensuring that resources are appropriately allocated to support these requisite actions. Of course, some zoos are already making valuable contributions to amphibian conservation by, among other things, constructing dedicated facilities in their own and other regions of the world. Zoos are also leading dozens of amphibian conservation programs, including habitat restoration, translocations, conservation education and research, (Zippel, 2005) and region-wide amphibian community rescues (Gagliardo *et al.* this volume). Additionally, there are now several zoo-led courses designed to develop husbandry expertise, including AZA's Amphibian Biology & Management course (Zippel 2007) – which has generated similar courses in Mexico, Ecuador, and Colombia – and Durrell Wildlife Conservation Trust's Amphibian Biodiversity Conservation course (Gupta 2006).

Amphibian Conservation Action Plan

During the 2005 Amphibian Conservation Summit (IUCN, 2005) convened by the IUCN and Conservation International, the Amphibian Conservation Action Plan (ACAP) was drafted (Gascon *et al.* 2007). While the ACAP's greatest conservation priority is *in situ* action, some threats like chytrid fungus cannot currently be addressed in the wild. The 2005 IUCN ACAP white papers state that "survival assurance colonies are mandatory for amphibian species that will not persist in the wild long enough to recover naturally once environments are restored; these species need to be saved now through *ex situ* measures so that more complete restoration of ecosystems is possible in the future." Comparable calls to action are included in the GAA and other IUCN documents. The ASG specifically tasked the CBSG with implementation of the *ex situ* aspects of ACAP's goals.

The Amphibian Ark

In 2006 CBSG, WAZA, and ASG founded the Amphibian Ark to develop, promote, and guide short-term *ex situ* management thus making possible the long-term survival of amphibians for which adequate protection in the wild is not currently feasible.

The Amphibian Ark is rapidly developing capacity to coordinate *ex situ* programs implemented by partners around the world, with emphasis on programs within the range countries of each species, and combining *ex situ* conservation measures with efforts to protect or restore species in their natural habitats. Amphibian Ark's vision is to maintain *the world's amphibians safe in nature*. Amphibian Ark's mission is *working in partnerships in order to ensure the global survival of amphibians – focusing on those that cannot be safeguarded in nature*.



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The urgent need for the existence of an organisation such as the Amphibian Ark has been recognized for almost two years already. Since then many additional amphibian species have probably been lost and the survival of other species has become increasingly uncertain. While traditional threats like habitat destruction, pollution, and climate change continue to erode away at amphibian biodiversity, the spread of chytrid fungus is alarmingly fast and the imperative to act is stronger now than ever. The AArk solution is to create survival assurance populations in zoos, aquariums and other institutions but that requires engagement and investment on an unprecedented scale.

Members of the Amphibian Ark are WAZA members and WAZA affiliates, members of regional or national zoo associations, ISIS, AArk-approved private partners, and AArk-approved museums, universities and wildlife agencies. Amphibian Ark is led by a Steering Committee made up of a representative from each of the associations of the organised zoo world, aquariums, botanical gardens, museums, and private sector. An Executive branch of the Steering Committee has Co-Chairs from each of the three principal partners (CBSG, WAZA, ASG) and provides strategic guidance and ensures excellent communication with all stakeholders. Advisory Committees are being formed to consult on specific issues; for example, reintroduction, gene banking and veterinary, legal, and ethical concerns. Four officers coordinate all aspects of Amphibian Ark activity; they assist Amphibian Ark members in identifying priority taxa and regions for *ex situ* conservation work; lead development and implementation of training programs for building capacity of individuals and institutions; and develop communications strategies, messages, and materials to promote understanding and action on behalf of amphibian conservation. The Amphibian Ark officers make it much easier for all Amphibian Ark partners to contribute effectively to the global effort. The Amphibian Ark activities are just one part of the comprehensive ACAP, the *ex situ* component which will help stave off many extinctions, but safeguarding these species *in situ* will be the ultimate measure of success.

2008 Year of the Frog

In 2008 Amphibian Ark will help lead the *ex situ* community in a globally coordinated public awareness campaign “Year of the Frog” (YOTF). The main goal of this campaign is to generate public awareness and understanding of the amphibian extinction crisis and ensure sustainability of the survival assurance populations by creating a cash fund for this conservation work that will extend beyond 2008. The money raised from this campaign will help fund the Amphibian Ark global coordination activities and regional initiatives such as rescue operations, training workshops, cooperatively managed centres, and coordination of activities within each region.

The 2008 YOTF campaign will be officially launched at the 2008 ARAZPA conference in Sydney and will last until March 2009. Members of regional zoo and aquarium associations, botanical gardens, museums and others are invited to join the YOTF campaign. While we expect individual institutions to target their campaigning at their normal donor base (public, local corporations, etc.), regional/national associations are expected to engage in a simultaneous program targeting regional/national corporations at a higher level and governments.

Possibilities for long-term relationships/partnerships

The 2008 YOTF campaign participants are also invited to commit themselves to *ex situ* conservation programs beyond the campaign year. A long-term commitment by individual institutions could consist of efforts to raise and donate money for an *ex situ* amphibian conservation program over a fixed time period of several years to be carried out in specific



locations across the world. In return, donating institutions can be expected to receive valuable and up-to-date information related to these programs.

Long-term engagements of this kind enrich institutional conservation activities and lead to worldwide co-operation. The reality of conservation both *in situ* and *ex situ* will expand into new domains and the contribution thus made to nature conservation will boost the institution's credibility and may lead to further donations.

Involvement of organisations not holding amphibians

All zoos and aquariums can link their collections to the story of amphibians and the 2008 YOTF campaign, not just those that actually house amphibians. The ARAZPA YOTF campaign information pack includes essential information and graphics to help develop creative displays and activities focusing on, for example, amphibians in danger, threats, extinctions, Red List status, chytrid fungus, amphibians as indicators of environmental health, climate change, geographical patterns, endemism, etc.

The main goals for the 2008 YOTF campaign are:

- To educate our visitors about the threats facing amphibians and raise global awareness and concern.
- To engage the public in amphibian conservation by highlighting ways in which they can make positive contributions through activities in their daily lives.
- To draw the attention of zoos and aquariums to the importance and urgency of amphibian *ex situ* conservation.
- To create partnerships among zoos, aquariums, botanical gardens, private and public institutions (universities, museums etc.) around the world to ensure the global survival of amphibians.
- To raise funds for implementing the *ex situ* aspects of the ACAP through Amphibian Ark activities, and other amphibian conservation initiatives.
- To stimulate a sustained and long-term interest in amphibian conservation and related interactions with the wider environment.
- To raise increased awareness about the protection of biodiversity through the conservation of amphibians.
- To strengthen zoo communities as fundraisers and global promoters of conservation.

Conclusion

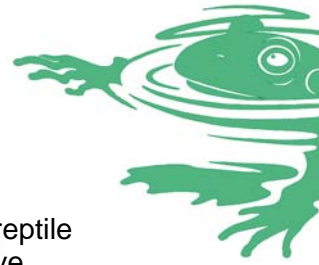
Addressing the amphibian extinction crisis represents the greatest species conservation challenge in the history of humanity. The global conservation community has formulated a response in the ACAP. An integral part of that response is the Amphibian Ark, in which select species that may otherwise be extinct will be maintained in captivity until they can be secured in the wild. Without immediate captive management as a stop-gap component of an integrated conservation effort, hundreds of species could become extinct. The outcome of the Amphibian Ark may be that we will have saved hundreds of species from extinction; developed capacity both within our institutions and globally to continue to provide amphibian species with care and protection when needed; formed true partnerships between *ex situ* and *in situ* components of conservation; established a model framework for responding to future species conservation crises; and demonstrated to the world that zoos and aquariums are essential and unique conservation organisations.



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2. The Amphibian Ark

Selections from www.amphibianark.org

The Amphibian Ark vision is the world's amphibians safe in nature and its mission is working in partnerships to ensure the global survival of amphibians – focusing on those that cannot be safeguarded in nature.

The Amphibian Ark is a collaborative partnership of WAZA – the World Association of Zoos and Aquariums, the IUCN – CBSG Conservation Breeding Specialist Group, the IUCN – SSC Amphibian Specialist Group, and zoo associations, zoos and aquariums, botanical gardens, and other conservation organisations. The primary goal of Amphibian Ark is to facilitate coordination of the global zoo community's response to the amphibian extinction crisis. Amphibian Ark's undertaking is to support long-term survival in nature utilizing short term *ex situ* management of select amphibian taxa for which adequate protection in the wild is not currently possible. Amphibian Ark will coordinate *ex situ* programs implemented by partners around the world, with the first emphasis on programs within the range countries of the species, and with a constant attention to our obligation to couple *ex situ* conservation measures with necessary efforts to protect or restore species in their natural habitats

Amphibian Ark Conservation Plan is one part of a comprehensive Amphibian Conservation Action Plan, and Amphibian Ark task is implementing the *ex situ* component of this plan.

It is NOT a goal of the Amphibian Ark to acquire pretty frogs to exhibit in zoos or sell in the pet trade, but rather to implement agreed priority actions, which may include collection from the wild, but only to meet such goals.

Never before has the conservation community at large charged zoos and aquariums with a task of this magnitude. This is an opportunity for every zoo and aquarium, regardless of size, to make a vital conservation contribution, and for our community to be broadly acknowledged as a credible conservation partner. Supporting this call to action is clearly within the financial capacity of all zoos and aquariums, and engages the diverse expertise found within all institutions. Our goal is 100 percent participation of WAZA zoos and aquariums and the regional associations. If we do not respond immediately and on an unprecedented scale, much of an entire vertebrate class will be lost, and we will have failed in our most basic conservation mission as defined in the World Zoo and Aquarium Conservation Strategy.

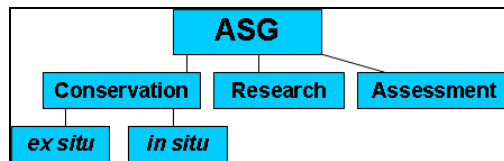
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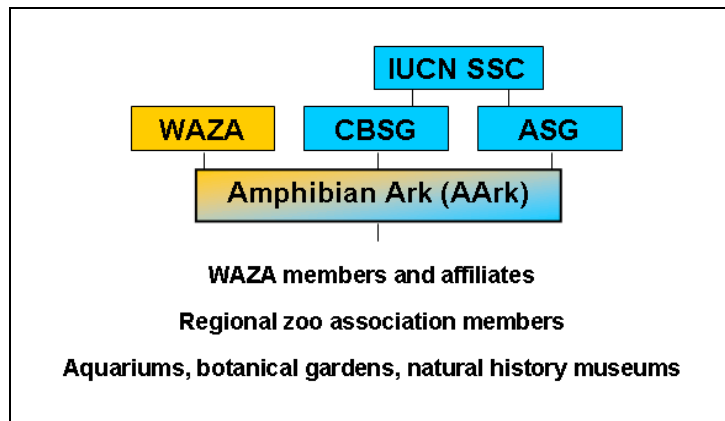
Through the Amphibian Ark initiative we will respond appropriately, we will save many species that would otherwise be lost forever, and we will demonstrate to the world that the zoos and aquariums are essential contributors to nature conservation.

Amphibian Ark Organisation

Functionally, the Amphibian Ark serves as the *ex situ* branch of ASG's Conservation division, i.e., to carry out the *ex situ* components of the ACAP.



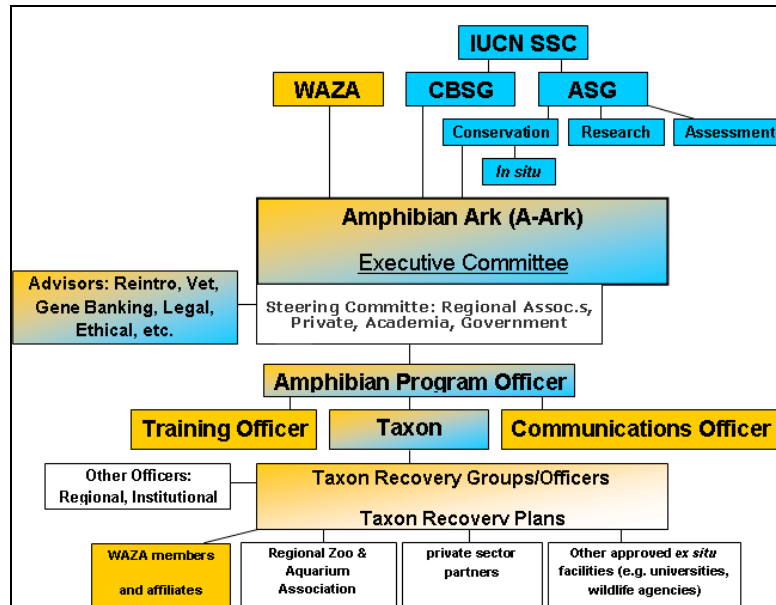
But to help a diverse set of stakeholders achieve that goal, Amphibian Ark is led by three Principal Partners.





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A magnified view of the core of Amphibian Ark reveals its functional levels



i) Principal partners and the Executive Committee The vision, mission, and priorities of the Amphibian Ark are determined by a triumvirate of conservation organisations: WAZA and two branches of the IUCN SSC (CBSG – Conservation Breeding Specialist Group and ASG – Amphibian Specialist Group). These three principal partners contribute one representative each to form the Executive Committee. The members of the Executive committee are: Jeff Bonner from CBSG – Executive Committee Chair, Gordon Reid from WAZA, Joe Mendelson from ASG

ii) Steering Committee The Executive Committee oversees the Steering Committee, which comprises representatives from regional zoo associations, the private sector, and government. The Steering Committee provides strategic guidance on the activities of the Amphibian Ark, including:

- Serving as communication conduit for WAZA, CBSG, ASG
- Providing a communication mechanism within and among regional zoo associations, private sector, other branches of ASG
- Developing and monitoring strategies for implementing the *ex situ* component of ACAP and proposing revisions as necessary
- Approving the appointment of Taxon Management Coordinators who initiate the formation of the Taxon Management Groups and leading the production of the Taxon Management Plans
- Working on recommendations from the Taxon Conservation Officer and regional groups (e.g. TAGs), fully reviewing the progress of each Taxon Management Group and its associated Plan on at least an annual basis
- Overseeing Amphibian Ark membership and requirements for membership
- Developing policies to support *ex situ* plans and programs, including proposal of policies to international bodies and lobby for their adoption

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- Helping to determine the priorities and activities of the Advisory Committees
- Coordinating fundraising and marketing activities
- Ensuring excellent communication with all stakeholders

iii) Advisory Committees Representatives from each of the Advisory Committees are available for consultation with Taxon Management Groups on species-specific issues and with the Steering Committee on general strategy and policy. Some committees include:

- Data/Population Management Advisory Committee
- Education Advisory Committee
- Ethical Advisory Committee
- Field Conservation Advisory Committee
- Fundraising Advisory Committee
- Gene Banking Advisory Committee
- Husbandry & Biosecurity Advisory Committee
- Legal Advisory Committee
- Marketing/Publicity Advisory Committee
- Rapid Response Advisory Committee
- Regulatory Advisory Committee
- Reintroduction Advisory Committee
- Research Advisory Committee
- Taxon Prioritization Advisory Committee
- Veterinary Advisory Committee

iv) Amphibian Officers

- *The Amphibian Program Officer*, Kevin Zippel, coordinates all aspects of implementation within the Amphibian Ark initiative to fulfill the mandate for *ex situ* components of the ACAP, and works with and oversees a team of Amphibian Ark officers to accomplish prioritization of efforts for taxa and geographic regions; designs sound conservation plans and management protocols; builds capacity to implement programs; monitors successes and ongoing needs; oversees communication within the Amphibian Ark, to other conservation partners, and to the public; and fundraising.
- Two Taxon Conservation Officers, Kevin Johnson and Richard Gibson, assist Amphibian Ark partners in identifying priority taxa and regions for *ex situ* conservation work and help coordinate among Taxon Management Groups.
- A Training Officer (to be appointed) will be in charge of development and implementation of training programs for building capacity of individuals and institutions to conduct successful *ex situ* conservation programs for amphibian species.
- A Communications Officer, (to be appointed) develops communications strategies, messages, and materials to promote understanding and action on behalf of amphibian conservation and assist Amphibian Ark partner organisations in reaching multiple



audiences within AArk organisations, the conservation community, governments, and the public.

v) Taxon Management Groups, Coordinators, and Plans

The functional unit of the Amphibian Ark is the Taxon Management Group. Each taxon identified as a priority for *ex situ* conservation will have a Taxon Management Group set up for it by the Amphibian Ark. Taxon Management Group participants are normally those institutions/individuals who are maintaining and breeding the specific taxon. A Taxon Management Plan Coordinator is responsible for developing and implementing each Taxon Management Groups and their associated Taxon Management Plans. Each Taxon Management Group Coordinator's responsibilities include:

- Development of a draft Taxon Management Plan for Steering Committee approval; this includes comprehensive management and husbandry guidelines for the taxon
- Development of an effective communication network between all management plan participants for the taxon
- Liaison with all appropriate regional zoo/aquarium associations, private sector representatives and other *ex situ* facilities
- In conjunction with relevant Amphibian Ark Officers and with Steering Committee approval, develop/maintain linkages with the *in situ* conservation component for the taxon
- Establish links through the Steering Committee with the other Advisory Groups and other components of the ASG, so that specialist advice is available when needed
- Update of the Taxon Management Plan on an annual basis – or as requested by the Steering Committee

vi) Amphibian Ark Membership

Participants in the Amphibian Ark ("Members") are organisations or individuals accepted into membership by the Steering Committee, and which shall sign and adhere to the conditions of this Constitution, as they may be amended from time to time.

Members may be any zoological institution, conservation organisation, educational institution, research institution, governmental agency, corporate entity, or individual that has a commitment to promoting the conservation of amphibian species through collaborative *ex situ* programs that support the long-term survival of species in the wild. Founding Members are those organisations that are represented on the initial Steering Committee.

Additional Members may request to join the Amphibian Ark at any time by written application to the Steering Committee, stating adherence to items 3.2(a), 3.2(b), and 3.3(a), and agreeing to commit resources to the Amphibian Ark under 3.3(b). New Members will be accepted into membership by a positive vote of at least 2/3s of the Steering Committee.



Obligations of the members

Each Member shall commit to participation in the Amphibian Ark for a 3-year period and shall abide by the policies and decisions of the Amphibian Ark Steering Committee. Each Member shall provide its share of resources to support the activities of the Amphibian Ark as determined by the Steering Committee.

Limitations

No part of the revenues of the Amphibian Ark shall inure to the personal benefit of any Member of the Amphibian Ark or to its representatives. Notwithstanding the above, upon approval of the Steering Committee or bodies authorized by the Steering Committee, employees of Amphibian Ark Members may be fairly compensated for such services as they may render the Amphibian Ark program, and the Amphibian Ark may reimburse Members for the value of services or material assets provided to the Amphibian Ark.

Amphibian Ark – ESCAP: the *Ex situ* Conservation Action Plan

The ACAP outlines four general phases of implementation for the *ex situ* community response:

1. Information gathering and emergency collections; preliminary captive operations.

Operating in response to recommendations from local biologists, national governments, and the various ACAP research branches, rapid-response teams would travel to sites predicted to suffer catastrophic losses to implement pre-emptive collections of animals that will form the basis of captive programs. A prototype of such a program has been used effectively to rescue the frog fauna of a site in Panama.

2. Establishment of captive operations in the range countries.

Central to the long-term success of a captive program is the establishment of captive operations in range countries. Infrastructure for such facilities may be reasonably established with portable, modular units (e.g. modified shipping containers) or by simply adapting local warehouses or houses. Local biologists or citizens must quickly be identified, hired, and trained in basic amphibian husbandry. A steady program of internships in established amphibian facilities in other countries will be critical to maintaining intellectual and practical capacity at range-country facilities. A global supervisory staff must maintain close contact and communication among all facilities in the network. Range-country programs will operate in native languages, and will be aimed to ensure that operative protocols are matched to local conditions, culture, and infrastructure.

3. Research and long-term maintenance of captive operations.

In addition to securing captive colonies in small, modular facilities, back-up populations will be secured in larger, multispecies facilities that provide for efficient care, breeding, and research on many species. These larger facilities may be in the range country and/or in facilities and programs outside the range country.



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4. Providing animals for research and reintroduction programs

The captive colonies will produce the animals needed to meet long-term research needs and to provide animals for the ultimate goal of reintroduction to natural habitats.



3. Australasian Frog Species

IUCN Listing: EX – Extinct, CR – Critically Endangered, EN – Endangered, VU – Vulnerable, DD – Data Deficient, NT – Near Threatened, LC – Least Concern

Species	Common Name	Native to	IUCN listing
<i>Cyclorana alboguttata</i>	Striped Burrowing Frog	Australia	LC
<i>Cyclorana australis</i>	Giant Frog	Australia	LC
<i>Cyclorana brevipes</i>		Australia	LC
<i>Cyclorana cryptotis</i>	Hidden-ear Frog	Australia	LC
<i>Cyclorana cultripes</i>	Knife-footed Frog	Australia	LC
<i>Cyclorana longipes</i>	Long-footed Frog	Australia	LC
<i>Cyclorana maculosa</i>	Daly Waters Frog	Australia	LC
<i>Cyclorana maini</i>	Main's Frog	Australia	LC
<i>Cyclorana manya</i>	Small Frog	Australia	LC
<i>Cyclorana novaehollandiae</i>		Australia	LC
<i>Cyclorana platycephala</i>	Water-holding Frog	Australia	LC
<i>Cyclorana vagitus</i>	Wailing Frog	Australia	LC
<i>Cyclorana verrucosa</i>	Rough Frog	Australia	LC
<i>Litoria adelaidensis</i>	Slender Tree Frog	Australia	LC
<i>Litoria andiirrmalin</i>	Cape Melville Tree Frog	Australia	VU
<i>Litoria aurea</i>	Green and Golden Bell Frog	Australia, New Caledonia (Introduced), New Zealand (Introduced)	VU
<i>Litoria bicolor</i>		Australia, Indonesia	LC
<i>Litoria booroolongensis</i>	Booroolong Frog	Australia	VU
<i>Litoria brevipalmata</i>	Green-thighed Frog	Australia	EN
<i>Litoria burrowsae</i>		Australia	LC
<i>Litoria caerulea</i>	Green Tree Frog	Australia, Indonesia, Papua New Guinea	LC
<i>Litoria castanea</i>	Yellow-spotted Tree Frog	Australia	VU
<i>Litoria cavernicola</i>	Cave-dwelling Frog	Australia	DD
<i>Litoria chloris</i>		Australia	LC
<i>Litoria citropa</i>		Australia	LC
<i>Litoria cooloolensis</i>	Cooloola Tree Frog	Australia	EN
<i>Litoria coplandi</i>		Australia	LC
<i>Litoria cyclorhynchus</i>	Spotted-thighed Frog	Australia	LC
<i>Litoria dahlii</i>	Dahl's Aquatic Frog	Australia	LC
<i>Litoria daviesae</i>		Australia	VU
<i>Litoria dentata</i>		Australia	LC



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Species	Common Name	Native to	IUCN listing
<i>Litoria electrica</i>	Buzzing Tree Frog	Australia	LC
<i>Litoria eucnemis</i>	Fringed Tree Frog	Australia, Indonesia, Papua New Guinea	LC
<i>Litoria ewingii</i>		Australia, New Zealand (Introduced)	LC
<i>Litoria fallax</i>	Eastern Dwarf Tree Frog	Australia	LC
<i>Litoria freycineti</i>	Freycinet's Frog	Australia	VU
<i>Litoria genimaculata</i>		Australia, Indonesia, Papua New Guinea	LC
<i>Litoria gilleni</i>	Centralian Tree Frog	Australia	LC
<i>Litoria gracilentia</i>		Australia	LC
<i>Litoria inermis</i>		Australia	LC
<i>Litoria infrafrenata</i>		Australia, Indonesia, Papua New Guinea, Solomon Islands, Timor-Leste	LC
<i>Litoria jervisiensis</i>		Australia	LC
<i>Litoria jungguy</i>		Australia	NT
<i>Litoria latopalmata</i>	Broad-palmed Rocket Frog	Australia	LC
<i>Litoria lesueuri</i>		Australia	LC
<i>Litoria littlejohni</i>		Australia	LC
<i>Litoria longirostris</i>		Australia	LC
<i>Litoria lorica</i>	Armoured Frog	Australia	VU
<i>Litoria meiriana</i>	Rockhole Frog	Australia	LC
<i>Litoria microbelos</i>	Javelin Frog	Australia	LC
<i>Litoria moorei</i>		Australia	LC
<i>Litoria nannotis</i>	Torrent Tree Frog	Australia	EN
<i>Litoria nasuta</i>	Rocket Frog	Australia, Indonesia, Papua New Guinea	LC
<i>Litoria nigrofrenata</i>	Bridle Frog	Australia, Papua New Guinea	LC
<i>Litoria nyakalensis</i>	Mountain Mistfrog	Australia	VU
<i>Litoria olongburensis</i>	Olongburra Frog	Australia	VU
<i>Litoria pallida</i>	Pale Frog	Australia	LC
<i>Litoria paraewingi</i>		Australia	LC
<i>Litoria pearsoniana</i>	Pearson's Green Tree Frog	Australia	NT

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Species	Common Name	Native to	IUCN listing
<i>Litoria peronii</i>		Australia	LC
<i>Litoria personata</i>		Australia	LC
<i>Litoria phyllochroa</i>		Australia	LC
<i>Litoria piperata</i>	Peppered Tree Frog	Australia	VU
<i>Litoria raniformis</i>	Southern Bell Frog	Australia, New Zealand (Introduced)	EN
<i>Litoria revelata</i>		Australia	LC
<i>Litoria rheocola</i>	Common Mist Frog	Australia	EN
<i>Litoria rothii</i>	Roth's Tree Frog	Australia, Papua New Guinea	LC
<i>Litoria rubella</i>		Australia, Indonesia, Papua New Guinea, Timor-Leste	LC
<i>Litoria spenceri</i>	Spotted Tree Frog	Australia	VU
<i>Litoria splendida</i>	Magnificent Tree Frog	Australia	LC
<i>Litoria subglandulosa</i>	Glandular Frog	Australia	VU
<i>Litoria tornieri</i>	Tornier's Frog	Australia	LC
<i>Litoria tyleri</i>		Australia	LC
<i>Litoria verreauxii</i>		Australia	LC
<i>Litoria watjulumensis</i>	Wotjulum Frog	Australia	LC
<i>Litoria wilcoxii</i>		Australia	LC
<i>Litoria xanthomera</i>	Orange-thighed Frog	Australia	LC
<i>Nyctimystes dayi</i>	Australian Lace-lid	Australia	EN
<i>Leiopelma archeyi</i>	Archey's Frog	New Zealand	VU
<i>Leiopelma hamiltoni</i>	Hamilton's Frog	New Zealand	EN
<i>Leiopelma hochstetteri</i>	Hochstetter's Frog	New Zealand	VU
<i>Leiopelma pakeka</i>	Maud Island Frog	New Zealand	VU
<i>Adelotus brevis</i>	Tusked Frog	Australia	NT
<i>Heleioporus albopunctatus</i>	Western Spotted Frog	Australia	LC
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	Australia	VU
<i>Heleioporus barycragus</i>	Western Marsh Frog	Australia	LC
<i>Heleioporus eyrei</i>	Moaning Frog	Australia	LC
<i>Heleioporus inornatus</i>		Australia	LC
<i>Heleioporus psammophilus</i>	Sand Frog	Australia	LC
<i>Lechriodus fletcheri</i>		Australia	LC
<i>Limnodynastes convexiusculus</i>	Marbled Frog	Australia, Indonesia, Papua New Guinea	LC
<i>Limnodynastes depressus</i>	Flat-headed Frog	Australia	LC
<i>Limnodynastes dorsalis</i>		Australia	LC
<i>Limnodynastes dumerilii</i>		Australia	LC
<i>Limnodynastes fletcheri</i>		Australia	LC



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<i>Limnodynastes interioris</i>		Australia	LC
<i>Limnodynastes lignarius</i>	Woodworker Frog	Australia	LC
<i>Limnodynastes ornatus</i>		Australia	LC
<i>Limnodynastes peronii</i>		Australia	LC
<i>Limnodynastes salmini</i>		Australia	LC
<i>Limnodynastes spenceri</i>		Australia	LC
<i>Limnodynastes tasmaniensis</i>		Australia	LC
<i>Limnodynastes terraereginae</i>		Australia	LC
<i>Mixophyes balbus</i>	Stuttering Frog	Australia	VU
<i>Mixophyes fasciolatus</i>	Great Barred River-Frog	Australia	LC
<i>Mixophyes fleayi</i>	Fleay's Barred-Frog	Australia	EN
<i>Mixophyes iteratus</i>	Giant Barred-Frog	Australia	EN
<i>Mixophyes schevilli</i>	Northern Barred Frog	Australia	LC
<i>Neobatrachus albipes</i>		Australia	LC
<i>Neobatrachus aquilonius</i>	Northern Burrowing Frog	Australia	LC
<i>Neobatrachus centralis</i>		Australia	LC
<i>Neobatrachus fulvus</i>		Australia	LC
<i>Neobatrachus kunapalari</i>	Kunapalari Frog	Australia	LC
<i>Neobatrachus pelobatoides</i>	Humming Frog	Australia	LC
<i>Neobatrachus pictus</i>		Australia	LC
<i>Neobatrachus sudelli</i>		Australia	LC
<i>Neobatrachus sutor</i>	Shoemaker Frog	Australia	LC
<i>Neobatrachus wilsmorei</i>		Australia	LC
<i>Notaden bennettii</i>		Australia	LC
<i>Notaden melanoscaphus</i>	Northern Spadefoot Toad	Australia	LC
<i>Notaden nichollsi</i>	Desert Spadefoot Toad	Australia	LC
<i>Notaden weigeli</i>	Weigel's Toad	Australia	DD
<i>Phyllorhina frosti</i>	Baw Baw Frog	Australia	VU
<i>Phyllorhina kundagungan</i>	Mountain Frog	Australia	EN
<i>Phyllorhina loveridgei</i>	Loveridge's Frog	Australia	EN
<i>Phyllorhina pughii</i>		Australia	EN
<i>Phyllorhina richmondensis</i>		Australia	EN
<i>Phyllorhina sphagnicolus</i>	Sphagnum Frog	Australia	EN
<i>Austrochaperina adelphe</i>	Northern Territory Frog	Australia	LC
<i>Austrochaperina fryi</i>	Fry's Frog	Australia	LC
<i>Austrochaperina gracillipes</i>	Slender Frog	Australia, Papua New Guinea	LC
<i>Austrochaperina pluvialis</i>	Rain Frog	Australia	LC

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<i>Austrochaperina robusta</i>	Robust Frog	Australia	LC
<i>Cophixalus aenigma</i>	Tapping Nursery-Frog	Australia	VU
<i>Cophixalus bombiens</i>	Buzzing Frog	Australia	NT
<i>Cophixalus concinnus</i>	Beautiful Nursery-Frog	Australia	VU
<i>Cophixalus crepitans</i>	Rattling Frog	Australia	NT
<i>Cophixalus exiguus</i>	Scanty Frog	Australia	NT
<i>Cophixalus hosmeri</i>	Hosmer's Frog	Australia	VU
<i>Cophixalus infacetus</i>	Inelegant Frog	Australia	LC
<i>Cophixalus mcdonaldi</i>	Mcdonald's Frog	Australia	EN
<i>Cophixalus monticola</i>	Mountain-top Nursery-Frog	Australia	EN
<i>Cophixalus neglectus</i>	Neglected Frog	Australia	EN
<i>Cophixalus ornatus</i>	Ornate Frog	Australia	LC
<i>Cophixalus peninsularis</i>	Cape York Frog	Australia	DD
<i>Cophixalus saxatilis</i>	Rock Frog	Australia	VU
<i>Cophixalus zweifeli</i>		Australia	DD
<i>Arenophryne rotunda</i>	Sandhill Frog	Australia	LC
<i>Assa darlingtoni</i>		Australia	LC
<i>Crinia bilinea</i>	Bilingual Frog	Australia	LC
<i>Crinia deserticola</i>	Desert Froglet	Australia	LC
<i>Crinia georgiana</i>	Quacking Frog	Australia	LC
<i>Crinia glauerti</i>	Glauert's Froglet	Australia	LC
<i>Crinia insignifera</i>	Sign-bearing Froglet	Australia	LC
<i>Crinia nimbus</i>	Moss Froglet	Australia	LC
<i>Crinia parinsignifera</i>		Australia	LC
<i>Crinia pseudinsignifera</i>	False Western Froglet	Australia	LC
<i>Crinia remota</i>	Remote Froglet	Australia, Indonesia, Papua New Guinea	LC
<i>Crinia riparia</i>	Streambank Froglet	Australia	LC
<i>Crinia signifera</i>		Australia	LC
<i>Crinia sloanei</i>	Sloane's Froglet	Australia	DD
<i>Crinia subinsignifera</i>	Small Western Froglet	Australia	LC
<i>Crinia tasmaniensis</i>	Tasmanian Froglet	Australia	LC
<i>Crinia tinnula</i>	Tinkling Froglet	Australia	VU
<i>Geocrinia alba</i>	White-bellied Frog	Australia	VU
<i>Geocrinia laevis</i>		Australia	LC
<i>Geocrinia leai</i>	Lea's Frog	Australia	LC
<i>Geocrinia lutea</i>	Walpole Frog	Australia	NT
<i>Geocrinia rosea</i>		Australia	LC
<i>Geocrinia victoriana</i>		Australia	LC
<i>Geocrinia vitellina</i>	Orange-bellied Frog	Australia	VU
<i>Metacrinia nichollsi</i>	Nicholl's Toadlet	Australia	LC



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<i>Myobatrachus gouldii</i>	Turtle Frog	Australia	LC
<i>Paracrinia haswelli</i>	Haswell's Froglet	Australia	LC
<i>Pseudophryne australis</i>	Red-crowned Toadlet	Australia	VU
<i>Pseudophryne bibronii</i>	Bibron's Toadlet	Australia	NT
<i>Pseudophryne coriacea</i>		Australia	LC
<i>Pseudophryne corroboree</i>	Corroboree Frog	Australia	VU
<i>Pseudophryne covacevichae</i>	Magnificent Broodfrog	Australia	EN
<i>Pseudophryne dendyi</i>		Australia	LC
<i>Pseudophryne douglasi</i>	Douglas' Toad	Australia	LC
<i>Pseudophryne guentheri</i>	Günther's Toadlet	Australia	LC
<i>Pseudophryne major</i>		Australia	LC
<i>Pseudophryne occidentalis</i>		Australia	LC
<i>Pseudophryne pengilleyi</i>	Northern Corroboree Frog	Australia	EN
<i>Pseudophryne raveni</i>		Australia	LC
<i>Pseudophryne semimarmorata</i>	Southern Toadlet	Australia	LC
<i>Spicospina flammocaerulea</i>	Sunset Frog	Australia	VU
<i>Taudactylus acutirostris</i>	Sharp-snouted Day Frog	Australia	VU
<i>Taudactylus diurnus</i>	Mount Glorious Torrent Frog	Australia (Extinct)	EX
<i>Taudactylus eungellensis</i>	Eungella Torrent Frog	Australia	VU
<i>Taudactylus liemi</i>	Liem'S Tinker Frog	Australia	NT
<i>Taudactylus pleione</i>	Kroombit Tinker Frog	Australia	VU
<i>Taudactylus rheophilus</i>	Northern Tinker Frog	Australia	VU
<i>Uperoleia altissima</i>	Montane Toadlet	Australia	LC
<i>Uperoleia arenicola</i>	Jabiru Toadlet	Australia	DD
<i>Uperoleia aspera</i>	Derby Toadlet	Australia	LC
<i>Uperoleia borealis</i>	Northern Toadlet	Australia	LC
<i>Uperoleia capitulata</i>	Small-headed Toadlet	Australia	LC
<i>Uperoleia crassa</i>	Fat Toadlet	Australia	LC
<i>Uperoleia fusca</i>	Dusky Toadlet	Australia	LC
<i>Uperoleia glandulosa</i>	Glandular Toadlet	Australia	LC
<i>Uperoleia inundata</i>	Flood Plain Toadlet	Australia	LC
<i>Uperoleia laevigata</i>	Smooth Toadlet	Australia	LC
<i>Uperoleia lithomoda</i>	Stonemason's Toadlet	Australia, Papua New Guinea	LC
<i>Uperoleia littlejohni</i>	Littlejohn's Toadlet	Australia	LC
<i>Uperoleia marmorata</i>	Marbled Toadlet	Australia	DD
<i>Uperoleia martini</i>	Martin's Toadlet	Australia	DD

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<i>Uperoleia micromeles</i>	Tanami Toadlet	Australia	LC
<i>Uperoleia mimula</i>	Mimic Toadlet	Australia	LC
<i>Uperoleia minima</i>	Small Toadlet	Australia	LC
<i>Uperoleia mjobergi</i>	Mjoberg's Toadlet	Australia	LC
<i>Uperoleia orientalis</i>	Alexandria Toadlet	Australia	DD
<i>Uperoleia rugosa</i>	Wrinkled Toadlet	Australia	LC
<i>Uperoleia russelli</i>	Russell's Toadlet	Australia	LC
<i>Uperoleia talpa</i>	Mole Toadlet	Australia	LC
<i>Uperoleia trachyderma</i>	Blacksoil Toadlet	Australia	LC
<i>Uperoleia tyleri</i>	Tyler's Toadlet	Australia	DD
<i>Rana daemeli</i>		Australia, Indonesia, Papua New Guinea	LC



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