amphibian ark

Keeping threatened amphibian species afloat

Newsletter

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Amphibian Advocates

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Improved access to amphibian husbandry documents

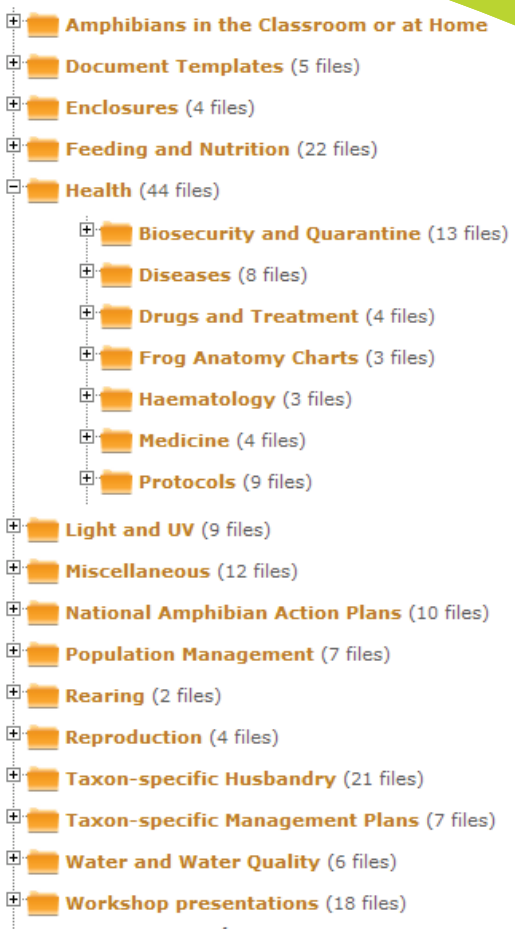
AArk staff have recently updated the Husbandry Documents page (www.amphibianark.org/husbandry-documents/) on the AArk web site. The new format presents the documents in an expandable folder hierarchy, with additional details shown for each document, including description (abstract), author, language and version. All of these details are searchable, using the main Search field on the right side of the menu bar.

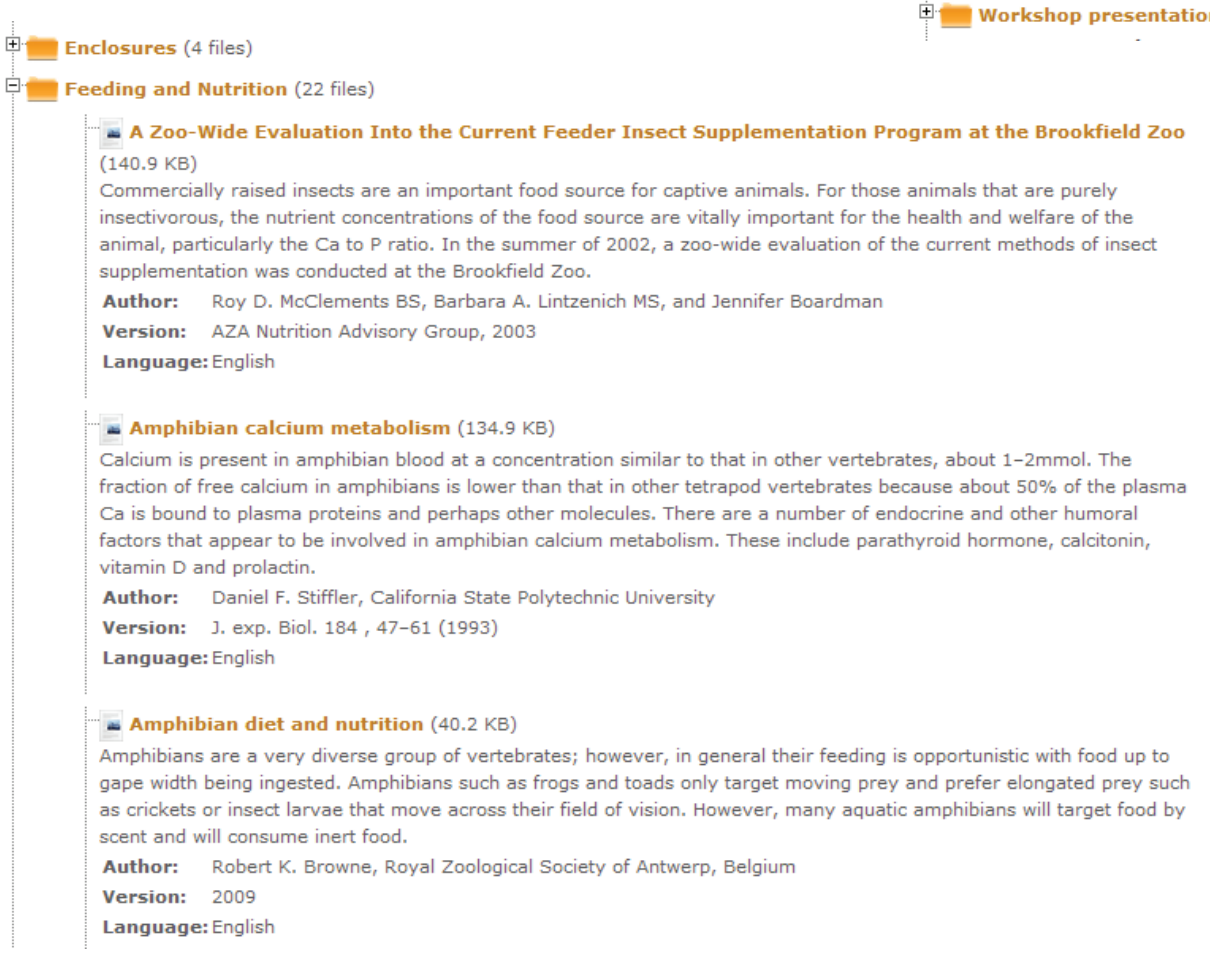
As well as general husbandry articles, the library also includes taxon-specific husbandry guidelines and management plans. And while not strictly husbandry documents, we have recently added new sections for national amphibian action plans and for caring for amphibians in the classroom and at home. We have also recently added French versions of the amphibian husbandry guidelines template and the taxon management plan template.

The AArk husbandry document library currently has over 160 articles in it, with additional articles being added regularly. If you have amphibian husbandry documents that you are willing to share with your colleagues around the world, you are welcome to submit them to us using the simple form on the web page.

We are particularly keen to add documents in languages other than English, so we can ensure that information about good amphibian husbandry practices is readily available to everyone.

Your contributions will help make this a one-stop shop for all amphibian husbandry documents!





Amphibian Ark 2015 Seed Grant announcement and guidelines

Amphibian Ark is pleased to announce the 7th annual call for proposals for its Seed Grant program!

This competitive US$5,000 grant is intended to fund start-up rescue projects for species that cannot currently be saved in the wild. Successful proposals will reflect AArk values; please pay careful attention to the grant guidelines (below and also at www.amphibianark.org/aark-seed-grant/) for details on what types of projects are favored. Past grantees can be seen at the web link listed above.

Inquiries can be directed to Kevin Johnson, Taxon Officer KevinJ@amphibianark.org.

We would like to acknowledge the generous support of the Andrew Sabin Family Foundation, Ronna Erickson, Woodland Park Zoo, the European Association of Zoos and Aquariums, and the other AArk supporters (www.amphibianark.org/acknowledgements.htm) who helped establish this grant.

Priority guidelines - please read very carefully!

This grant is **not** intended to fund workshops, educational exhibits, project overheard or indirect costs.

AArk staff are available if you need assistance in formulating your proposal. Please do not hesitate to contact us with any questions. Each year several proposals have been rejected due to issues that could have been prevented!

Projects **must include an *ex situ* component**, and **must be working with species that need to be rescued** (species whose threats cannot be mitigated in nature in time to prevent their extinction and which therefore require urgent *ex situ* intervention to persist). Projects **must be based within the native range country** of the species and **must adhere to recommended biosecurity standards**, except where a valid scientific argument can be made to the contrary. The concept of a 'seed' grant is to fund **newly-launched projects** - those at the very beginning of their life, in order to help them attract larger and/or long-term funding for the duration of the program.

Please read the Seed Grant page on the AArk web site, www.amphibianark.org/aark-seed-grant/ and download the applications guidelines, www.amphibianark.org/pdf/AArk_Seed_Grant_2015.pdf - all applications must follow these guidelines.

Important dates

Grant application deadline: **1 May 2014**
Grant decision/notification date: 15 May 2015
Winners must provide bank details by: 21 May 2015
Grant payment date: 1 June 2015
Progress report due 1 June 2016

In November 2013 we produced a report which includes updates from each of the seed grant recipients on the progress of their projects. The report is available at www.amphibianark.org/pdf/Seed-Grant-report-2013.pdf.

AZA responds to salamander fungus concerns

Steve Olson, Association of Zoos & Aquariums

The Association of Zoos and Aquariums (AZA) recently sent a letter to United States Fish and Wildlife Service (USFWS) Director Dan Ashe in response to concerns regarding the threat of the salamander fungus, *Batrachochytrium salamandrivorans* (*Bsal*), entering the United States. In its letter, AZA agreed that all common-sense steps should be undertaken quickly to minimize the risk of *Bsal* introduction and spread…including a temporary import moratorium if necessary. If such moratoria were enacted, AZA strongly urged USFWS and stakeholders to continue to look at ways in which to effectively and efficiently test and monitor future imports of salamanders.

Amphibian Advocates

In this newsletter we are pleased to begin a new series featuring amphibian conservationists from around the world who focus much of their efforts on captive rescue and research programs for some of the most threatened species. These captive efforts allow us to buy time, so that the threats faced by the species in the wild can be properly evaluated and overcome, and eventually, captive-bred animals can be returned to a safe environment.

We will also be adding these Amphibian Advocates to our web site, and they can be found at www.amphibianark.org/amphibian-advocates.

The first of our Amphibian Advocates are Andrés Merino-Viteri and Benjamin Tapley. If you would like to nominate an Amphibian Advocate to be featured in a future edition of the AArk Newsletter, please send us an email at newsletter@amphibianark.org and we'll add your suggestion to our list!

Andrés Merino-Viteri, Balsa de los Sapos, Ecuador

I was born in Quito, Ecuador. Even though my family was not very outdoors oriented, since I was a kid, I knew I wanted to become a biologist. This was especially clear after my first visit to the Galapagos Islands when I was eleven years old.

I started my biology career at Pontificia Universidad Catolica del Ecuador (PUCE) in Quito, Ecuador in 1994, where I aspired to get my Licenciatura degree to study a postgrad on dolphin or whale biology. However, mid-career, I realized that what I really loved was studying ecology. To do that, I needed an organism to study. Around that time, I took a class with Dr. Luis A. Coloma, who is one of the best herpetologists in the country, and who I owe all my love for amphibians. He used to ask the students questions with no answers about Ecuadorian amphibians. We, the students, were usually very surprised that no one had studied so many basic topics before. One of those questions was "Why did the (once abundant and common) frogs from the highlands in Ecuador disappear during the 1980s?". I decided to answer this ecological question, and it changed my whole future career. It was a real challenge to try to find answers, but after a couple of years, I was able to propose some possible explanations. In a way, I was the first person to identify *Batrachochytrium dendrobatidis* (chytrid) in South American frogs.

After getting my undergraduate degree, I was offered a lecturer position at PUCE. I was also associated to the Herpetology Lab at the Museum of Zoology (QCAZ) from the university where I continued doing research on frogs that had disappeared from the Andes. I also travelled all over the country looking for anurans that had not been recorded since the 1980s.

Andrés Merino-Viteri in one of the iconic amphibian laboratories at the Balsa de los Sapos (Life raft for frogs) in Quito, Ecuador. His love for amphibians came after taking a class with one of Ecuador's leading herpetologists, Dr. Luis A. Coloma. Photo: Andrés Merino-Viteri.

In 2005, along with Luis A. Coloma and Martin Bustamante (a university cohort colleague), we organized a public exhibit of live frogs to show the great Ecuadorian amphibian diversity to Ecuadorians. The exhibit named "SAPARI" (a created word related to frog and safari in Spanish) was a complete success in Quito. Lots of school students visited our natural jewels, and some of them are now our students at PUCE because of how impressed they were by the amphibians during that event.

This exhibit was the seed for the Conservation Initiative for Ecuadorian Threatened Amphibians "Balsa de los Sapos" (Life raft for frogs). This initiative has five components, including improvement of human resources and infrastructure, field research and monitoring, public education, *ex situ* management, and publication of results. In the *ex situ* facilities, we take care of decedents of amphibian species threatened in the wild, including some harlequin frogs of the genus *Atelopus*. We have developed husbandry and breeding protocols for several of these amphibian species.

Since 2011, after returning from my PhD research in Australia, I have been in charge of the Balsa de los Sapos. In recent years, the Balsa has continued with its commitment to conservation, however, it has also increased scientific research on the frogs being managed in the Balsa. Research on developmental biology, ontogeny documentation, and action against pathogens from skin secretions have all been supported by the Balsa. In collaboration with Doñana Biological Research Station from Spain, we have also started a new research program to gather ecophysiology parameters in order to provide an accurate and complete assessment of how changes in the climate and microclimate may affect the amphibian species along Ecuador's mainland. I believe climate change is having, and will continue to have, important effects on wild amphibian populations.

Finally, the success achieved by the Balsa de los Sapos initiative is not based in the work of one person. It has been the accumulated effort of a team that has changed since 2005. It is important to thank the support given by PUCE to keep the project's personnel and facilities since 2005, and all the people involved, in many different ways with the Balsa. Our joint work, I am sure, will help to keep these amazing and beautiful animals for future generations.

Benjamin Tapley, ZSL London Zoo, England

I first became interested in amphibians as a small child and used to spend my spring and summers up to my knees in mud and ponds chasing after frogs, toads and newts. By the age of nine my bedroom was crammed full of an assortment of reptiles and amphibians and I spent all my free time reading about them. I was an avid reader of Gerald Durrell's books and his call to action woke something inside me and I decided to pursue a career in conservation. I studied Conservation Biology at the University of Surrey Roehampton and then worked towards my MSc at the Durrell Institute for Conservation and Ecology at the University of Kent. This was an extremely formative time for me, global amphibian declines were making headlines and the Global Amphibian Assessment had just been published.

After completing my MSc I secured a job as an amphibian and reptile keeper at Durrell Wildlife Conservation Trust in Jersey. Here I came face to face with some of the threatened amphibians I had read so much about - Mountain Chickens and Mallorcan Midwife Toads. I had great support from Gerardo Garcia, Matt Goetz and Kay Bradfield and refined my amphibian husbandry skills and was actively involved in conservation breeding programs for non-native species such as the Mountain Chicken as well as work head-starting a native species, Agile Frogs.

As well as working at ZSL London Zoo in the UK, Ben Tapley has also worked at Durrell Wildlife Conservation Trust in Jersey, and has done amphibian field work in Dominica, India and China.

Whilst at Durrell I got my first taste of developing amphibian conservation and husbandry capacity helping to deliver various courses for both the European zoo community and courses aimed at building capacity in the regions that support the most diverse amphibian assemblages. It was also at Durrell where I had my first experiences working in the field with amphibians and spent many cold nights capturing, marking and radio-tracking toads, and later on, aquatic caecilians in Colombia, where I was keen to implement environmental data collected from the field into the management of specimens back at Durrell. The field work bug had really bitten me and I left Durrell to gain more field experience and headed to India and developed an amphibian population dynamics study at the Agumbe Rainforest Research Station with the Gerry Martin Project in one of the wettest places on the planet.

In 2011 I began my association with the Zoological Society of London (ZSL) and headed out to volunteer on the Mountain Chicken frog program in Dominica. Here I worked with local partners and helped oversee the captive husbandry of frogs maintained in a dedicated breeding facility and even managed to find several Mountain Chickens during field surveys. This was a fantastic opportunity, and it was great to be involved in both the *ex situ* and *in situ* components of this fantastic project. I returned to the UK in 2012 and secured the position of Team Leader for the herpetology section at ZSL London Zoo. In 2012 we managed to breed the Mountain Chickens at ZSL for the first time and these were subsequently reared and released on Montserrat. It was at ZSL that I first became involved in Chinese Giant Salamander conservation and I am currently working as part of a team to develop the evidence-base and capacity to underpin, promote and conduct a strategic conservation plan for the species within its native range in China. This involved developing standardized survey techniques and training partners in field surveys which are currently being rolled out across much of the former distributional range of the species. I also work very closely with the EDGE of Existence program which highlights and conserves one-of-a-kind species that are on the verge of extinction. I have been fortunate enough to work with many of the amphibian EDGE Fellows on projects with Chinese Giant Salamanders, Indian Toad-skinned Frogs and the Lake Lerma Salamander.

At ZSL London Zoo we have a large collection of amphibians, and we are currently focusing on caecilians. In partnership with the Natural History Museum we are developing evidence- based husbandry protocols and have gained new insights on the impact that chytridiomycosis may have on caecilians. We are also developing husbandry and breeding protocols for the Critically Endangered Lake Oku Frog and various species of midwife toads. The collection at ZSL is constantly evolving and we are always developing new research programs and most importantly disseminating the information through peer review publications. I also chair the British and Irish Association of Zoos and Aquariums (BIAZA) reptile and amphibian working group and co-chair the Amphibian Specialist Group, Captive Breeding Working Group. In these groups I work with other members to promote best practice in terms of *ex situ* management of amphibians.

I firmly believe that *ex situ* management has a pivotal role to play in the conservation of many threatened amphibian species and I hope to continue to work with partners to develop and build conservation husbandry capacity.

Raising Baw Baw Frogs at Melbourne Zoo

Chris Banks, Wildlife Conservation & Science, Zoos Victoria, and Deon Gilbert, Herpetofauna Department, Melbourne Zoo

As outlined in the March 2014 AArk Newsletter (www.amphibianark.org/Newsletters/AArk-newsletter-26.pdf), Zoos Victoria has a long-term commitment to supporting conservation of the Baw Baw Frog (*Philoria frosti*), one of Australia's most poorly known amphibians. Much has happened with this frog since that report.

The two egg masses collected in November 2013 developed well. Captive development from collection to metamorphosis took approximately 16 weeks, with the first 12 week temperature regime at 7-8°C. Temperatures were kept cautiously low due to limited knowledge of development of this species in captivity. Temperatures were increased from 8°C to 11°C in the final three weeks of development, coinciding with a pause in the larval development at lower incubation temperatures, particularly in egg mass No. 2.

During egg/larval development a Baw Baw Frog rearing facility was being installed at the Zoo. This is a modified 6.1m refrigerated shipping container and referred to as the Baw Baw Bunker.

The eggs were incubated in total darkness, with approximately 80 eggs in each egg mass - 47 eggs hatched in mass No. 1 after 47-51 days and 53 eggs from mass No. 2 after 30-40 days. Eggs in mass 2 were further developed (Gosner 18) than in mass 1 (Gosner 11).

All tadpoles from mass 1 metamorphosed after 83-85 days, with the young frogs feeding readily and moving around their tanks. Most tadpoles from mass 2 exhibited swollen abdomens and appeared to have retained fluid late in development – all were subsequently treated with Amphibian Ringer Solution and while most recovered fully, some died and 32 metamorphosed.

Above: Two young Baw Baw Frogs (*Philoria frosti*) at Melbourne Zoo in Australia, which were raised from wild-caught egg masses. In late 2104, the Recovery Team agreed that the species is headed for extinction in the wild and that establishment of a secure captive population must be the highest priority for the species.
Below: A late stage Baw Baw Frog metamorph at Melbourne Zoo.
Photos: Damian Goodall.

All the young frogs, 78 in total, were active from the start. This included climbing up the insides of tank walls over the first 2-3 days and feeding when keepers were present. The frogs grew steadily, with average weights of four individuals (two from each mass) increasing from 0.06-0.07g at metamorphosis to 2.8-3.0g after 10 months.

Symptoms suggesting Metabolic Bone Disease were first observed in frogs at three months of age. These were successfully treated with calcium gluconate via combinations of baths, topical applications and injections. Treatment of this condition spurred assessment of the calcium-phosphorus ratio in the food animals (crickets, etc.), and calcium, ammonia and phosphorus levels in the substrate (sphagnum moss, etc. as it broke down over time). Live moss has since been used successfully in some of the tanks. Testing has expanded into water and soil sampling from the field in order to more fully understand the relationship between frogs and their immediate surroundings; this is ongoing.

Disease testing of material surrounding the egg masses and the subsequent tadpoles and frogs was negative for chytrid.

Key success indicators

Notwithstanding the health challenges, which were not unexpected, most of the key success indicators in the approved Translocation Plan were achieved:

- 90% egg survival within masses – 64% fertile eggs survived to tadpole stage.
- 80% survival of emergent larvae – 79% larval survival.
- 50% survival of metamorphs after 6 months – 70% survival.
- 40% survival of metamorphs after 12 months – 69% survival at 10 months.

2014 and a new emergency

The Translocation Plan allowed for another egg mass to be collected in the 2014 season. Zoos Victoria and the Department of Environment & Primary Industry funded surveys of the research transects by Zoos Victoria staff and experienced survey personnel from Tasmania. This enabled collection of one egg mass, but that did not develop and it is thought to have been compromised before collection.

In late November 2014 the Baw Baw Frog Recovery Team met to review the species' status. The key outcome of discussions was that the Recovery Team unanimously agreed that the frog is headed for extinction in the wild and that establishment of a secure captive population must be the highest priority for the species now. Further, that an emergency rescue should be implemented without delay to augment the current captive husbandry program. This was approved via an extension of the Translocation Plan and staff from Zoos Victoria and the Amphibian Research Centre (ARC), with other experienced survey personnel, collected four egg masses and four frogs in early December. Two of the egg masses were split, with half going to Melbourne Zoo and the other half to the ARC. The one full egg mass and two divided ones at Melbourne Zoo produced 96 tadpoles, all of which metamorphosed successfully. The emergent frogs were 7.4-8.8mm snout-vent length and weighed 0.07-0.12g (tail stub still present). These have been divided into groups to trial effects of calcium in substrate and re-calcified water on growth.

A captive husbandry workshop is scheduled for late March 2015, to develop a focussed captive management and breeding plan for Baw Baw Frogs over the next 10-20 years.

Valentine's Day promotion

Thanks to a brilliant suggestion by amphibian lover, Roland Averitt, in the lead-up to Valentine's Day in February, AArk ran a fun promotional activity where people could sponsor one of three amphibian conservation programs, and in return, receive a personalized certificate that they could then print and give to their loved one on Valentine's Day. What a great to also show their love for amphibians!

Three amphibian programs were promoted during this promotion: the Titicaca Water Frog (*Telmatobius culeus*) program at the Bolivian Amphibian Initiative, the Buckley's Giant Glass Frog (*Centrolene buckleyi*) program at Centro Jambatu in Ecuador, and the Green Toad (*Bufo viridis*) program at Norden's Ark in Sweden. After selecting their preferred program, sponsors could then select from one of four options for supporting the program:

- Chocolate covered crickets (feed a family of four) - $25
- Sponsor/name a frog – $50
- Sponsor/name an Amphibian Abode (a captive home for a breeding pair of endangered amphibians) - $75
- Maid service (employment of a local amphibian keeper) - $200

The promotion resulted in thirteen sponsorships, raising a total of $900, all of which will be passed on to the three programs. This was a great opportunity to highlight the fantastic work being done by these three organizations to help save threatened local amphibian species.

Green Toad (*Bufo viridis*) program at Norden's Ark in Sweden.

Titicaca Water Frog (*Telmatobius culeus*) at the Bolivian Amphibian Initiative.

Buckley's Giant Glass Frog (*Centrolene buckleyi*) Centro Jambatu in Ecuador.

Development of an environmental education program in rural schools in the municipality of San Antonio del Tequendama, Colombia

Sandra Gomez, Santacruz Zoo Conservation Foundation; Viky Tellez, INCCA University of Colombia; Mary Luz Castañeda, Santacruz Zoo Environmental Foundation; and Monsalve Haydy Redwan, Santacruz Zoo Foundation

Santacruz Zoo Foundation is an organization dedicated to conservation education. It is located in the Municipality of San Antonio del Tequendama, in the eastern cordillera of the Serrania de rose, Colombia, which includes the lower basin of the Bogotá river, amid an ecosystem of Andean cloud forest, where the three focal species that make up the amphibian conservation program of the Santacruz Zoo Foundation can be found.

For several years, the Foundation has been working for the conservation of local biodiversity through species conservation programs ranging from *ex situ* management, implementation of sustainable development strategies in communities and environmental education, which propose to answer the various problems identified in the area, such as forest clearance, pollution, open dumps, poor distribution and utilization of water resources, and the effects of climate change.

The Amphibian Environmental Education project has been developed over the past four years, with the aim of achieving a sense of ownership of local biodiversity with an educational program in educational institutions and communities in the municipality, working in six rural schools with an average population of 11 teachers and 235 students. All of these schools are located within the range area of the focal amphibian species.

The process of environmental education takes place in six consecutive phases: preliminary phase, theoretical recognition of the local environment, investigative phase, phase assessing environmental conditions and overall program evaluation, with a special day at the end of the school year called “Environment Day”. Environment Day allows children and teachers of the institutions involved in the program to show the results of the work they have done on environmental projects during the school year, and includes other amphibian species which can be found in the region.

One group of children focussed on amphibians, and they analysed environmental conditions and gave a presentation of a series of student proposals to mitigate impacts in the area and ensure the survival of amphibians. Photo: Fundación Zoológico Santacruz.

The latest Environment Day celebration included presentations of the results of research work done by five environmental ecological groups:

- Birds, with the development of a local bird guide
- Bats, with a representation of the physical characteristics of bats and their eating habits
- Butterflies, presenting the life cycle of the monarch butterfly
- Orchids, explaining the parts of the plant and their functions
- Amphibians, where children performed an analysis of environmental conditions and gave a presentation of a series of student proposals to mitigate impacts in the area and ensure the survival of amphibians.

All of the presentations have been condensed into a book of Environmental Proposals. During Environment Day the school groups also presented a series of proposals for reusing recycled materials, including everyday items such as cans, curtains, Christmas ornaments, and games.

A group of students (year 9 and 10) gave a presentation about the company formed by Micro ESTATE, which makes products from recycled paper. The paper is collected in the classrooms, and this presentation included strategies for proper management of solid waste and sustainable production projects of the environmental education program.

This year’s Environment Day coincided with a visit from members of Amphibian Ark’s Veterinary Outreach Program, and they acted as guest judges to evaluate the presentations of the students’ final work, with the students explaining what they had done throughout the year.

The Santacruz Zoo Foundation is actively working to build new generations who are committed to the conservation of local biodiversity, recognizing it as a heritage of the region.

Guest judges John Sykes, Brad Wilson, Jorge Eliecer Olaya, Haydy Monsalve, Luis Carrillo and Carlos Rodríguez, evaluated the children’s projects this year. Photo: Fundación Zoológico Santacruz.

The "megadiverse" frog communities of Madagascar are at risk after discovery of a potentially deadly fungus

Candace M. Hansen-Hendrikx, Amphibian Survival Alliance

Conservationists worldwide mobilize to address emerging threat to more than 500 Malagasy frog species

The amphibian fungus known as *Batrachochytrium dendrobatidis* (*Bd*), which has caused the precipitous decline of frog populations in Central America, Australia, the western United States, Europe and east Africa, has now been detected in Madagascar, according to a new paper released in late February in the journal Scientific Reports (http://nature.com/articles/doi:10.1038/srep08633). The paper documents the detection of *Bd* since 2010 in wild Malagasy amphibians and has spurred conservationists to action in a country that is home to about seven percent of the world's amphibian species.

"We know how bad this could be, but this time we can still make a difference by preventing the kinds of mass die-offs we've seen in other countries," said Reid Harris, co-author on the paper and director of international disease mitigation for the Amphibian Survival Alliance (ASA). "Together the global conservation community is addressing the emergency at its inception, putting into practice what we've learned in the midst of - or even after - extinctions in places like Central America."

The Painted Mantella (*Mantella baroni*) is an iconic Malagasy frog species and one of more than 500 that could be in the path of a potentially deadly fungal disease.
Photo: Brian Gratwicke, Conservation Biology Institute.

An international team of experts screened more than 4,100 amphibians across Madagascar and confirmed the presence of *Bd* in five locations across Madagascar. The researchers detected the fungus as early as 2010 in Madagascar's remote Makay Massif. Now the paper's authors are working on determining whether the fungus they have detected belongs to the same deadly strain that is threatening to cause the loss of more than one third of the planet's amphibians.
"Ninety-nine percent of the frogs in Madagascar are only found in Madagascar," said Falitiana Rabemananjara, coordinator of the Chytrid Emergency Cell in Madagascar and co-author on the paper. "That means that if the *Bd* presence in Madagascar is lethal or becomes lethal to frogs, we could lose a significant portion of the world's amphibian diversity. With an integrative, proactive approach, we are going to do everything we can to prevent that from happening."

Madagascar Bright-eyed Frog (*Boophis madagascariensis*) collected by James Madison University researcher Molly Bletz for Bd swabbing at Vatoharanana in the Ranomafana National Park, Madagascar. Photo by Brian Gratwicke, Smithsonian Conservation Biology Institute.

In November of 2014, the ASA provided financial support for ACSAM2 "A Conservation Strategy for the Amphibians of Madagascar," the second meeting in the last decade to bring together local and international conservationists to address threats to Madagascar's amphibians. This year's meeting focused on developing a plan for this emerging crisis, which includes:

- The development of an emergency response strategy for the amphibians of Madagascar.
- The identification of the *Bd* lineage(s) and characterization of its virulence.
- The establishment of a national protocol and permit to collect dead frogs from the field.
- Building captive assurance populations of priority species to weather the storm.

"The loss of Malagasy amphibians is not only important for herpetologists and frog researchers," said Franco Andreone co-chair of the IUCN Amphibian Specialist Group-Madagascar, organizer of ACSAM2 and co-author on the paper. "It would be a huge loss for the whole world. Everyone has a role to play if this mammoth of a conservation project is going to succeed."

The ASA is continuing to coordinate funding for the monitoring of *Bd* in Madagascar and is also supporting the development of disease mitigation tools. The ASA calls on conservation-minded individuals to help in these efforts by visiting www.amphibians.org.

A Venezuelan initiative for endangered Andean herps

Enrique La Marca, Venezuelan Andean Reptile and Amphibian Conservation Center and Universidad de Los Andes, Merida, Venezuela; Felipe Pereira and Elvis Albornoz, Venezuelan Andean Reptile and Amphibian Conservation Center, and Asociacion Civil Biocontacto, Merida, Venezuela

A new conservation center is being developed at an emblematic zoo in the Venezuelan Andes, the Chorros de Milla's Park Zoo in Merida City, under the leadership of the NGO Biocontacto. The initiative involves captive breeding of Andean herp species that are in some category of risk. Among the first species planned to fit the project are harlequin frogs (*Atelopus*), skunk frogs (*Aromobates*), collared frogs (*Mannophryne*), a rocket frog (*Leptodactylus*), high mountain lizards (*Anadia*), the Mountain Rattlesnake (*Crotalus maricelae*) and the Red-snout Lizard (*Ameiva provitai*).

The project currently includes two endangered frog species from the terrace where the city of Merida is located. Due to the increasing urban development of the city, and the lack of space for the city to expand, most of the suitable habitats for native species have disappeared. This process became more notorious since the middle of the last century, but is more conspicuous within this century. Habitat destruction has taken away most places where the Collared Frog (*Mannophryne collaris*) and a yet undescribed species of rocket frog (genus *Leptodactylus*) used to live. Given the urgency of rescuing the surviving populations, it was deemed appropriated to start the conservation project with these two taxa.

An as yet un-named species of rocket frog (*Leptodactylus* sp.) from Merida City in Venezuela has now been successfully bred at the Venezuelan Andean Reptile and Amphibian Conservation Center. Photo: Biocontacto Archives.

Captive facilities had to be adapted to the different ecological strategies for both species. The Collared Frog lives along cascading but also in slow water streams under seasonal semi-deciduous forests, while *Leptodacytlus* sp. inhabits pools in open spaces under the same ecological unit. We have created enclosures for reproductive parents that try to emulate the contrasting natural conditions: those for *Leptodactylus* have more light and heat exposure, with artificial pools and a substrate with pebbles and sand; while those for *Mannophryne* have more plants, humidity and hiding places, a substrate of decaying leaves, and an artificial system combining rain, cascading stream and fog production.

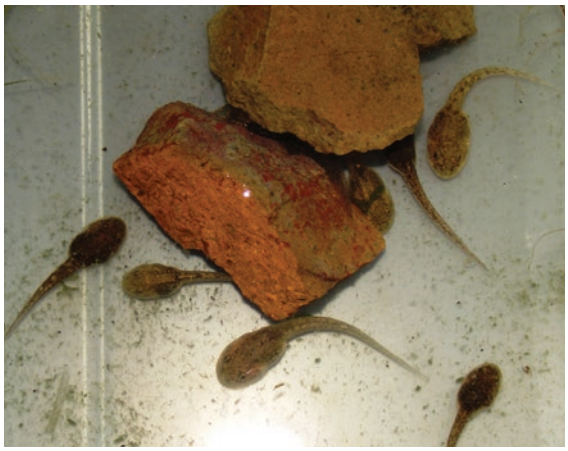
Above: Habitat destruction around the city of Merida has taken away most places where the Collared Frog (*Mannophryne collaris*) used to exist. Photo: Biocontacto Archives.

Both species responded well to the captive facilities and started to reproduce a few months after we began the project at the beginning of 2014. The first reproductive efforts for *Leptodactylus* were almost completely lost, due to the high percentage of diseases at the larval stage. Almost no information was available in the literature of captive breeding of rocket frogs, which is why we first started to improvise and then to follow a trial and error method. In spite of the hundreds of tadpoles produced by the parental stocks, very few managed to survive. Now we have accumulated experience that has yielded good results with food and micro ecological requirements for the larvae, with the outcome that about two dozen froglets completed metamorphosis and are now healthy and developing well.

The reproduction and rearing of *Mannophryne collaris* relied on an abundant and helpful amount of literature on captive breeding of dendrobatid frogs. In spite of the low production of eggs - usually less than a dozen - in every single reproductive event per mating pair, about fifty tadpoles have completed development and the small frogs are now heading towards maturity.

In the course of the project, a manual on captive breeding procedures has been developed, covering different topics such as equipment, light requirements, humidity and temperature conditions, as well as food production, detection and treatment of diseases, among other captive breeding aspects. The idea is to develop a manual in Spanish to help other regional and national initiatives that may take place in the future.

At the moment, the Venezuelan Andean Reptile and Amphibian Conservation Center (or VARAC Center) is the only one of its kind in the country. The regional initiative is also generating materials aimed at raising public awareness as long as it begins to get tangible results for the conservation of some endangered herp species.



Captive breeding of the Collared Frog in Venezuela has been very successful, with about fifty tadpoles from each reproductive event completing development. Photo: Biocontacto Archives.

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