

## FROGS AND TOADS FROM SOUTHWESTERN COLOMBIAN: JEWELS OF NATURE THAT OUR GRANDSONS SHOULD KNOW

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### 3. Total funding amount requested from Amphibian Ark—5000 USDS

**4. Executive summary**—Colombia has one of the highest amphibian diversity in the world; and Southwestern Colombian (with nearly 290 amphibian species) contributes with 40% of this diversity<sup>1</sup>. However, in spite of this high diversity, the conservation efforts toward this imperiled group are very scarce. From 2004, we have worked successfully on *in situ* conservation projects in the region focusing on species of special concern. At the moment, we consider that our efforts should be directed towards the implementation of responsible *ex situ* conservation programs for amphibians, accompanied by a detailed environmental education plan involving local people and the construction of legal policies to guarantee the survival of these species and their habitat. We have prioritized 45 species from SW Colombia that require immediate *ex situ* conservation actions (most of these species were not prioritized for the Amphibian Ark and other Colombian institutions in 2007, due to the lack of information at the time). To help save all of the 45 species, would require an ambitious, long term, large scale project, however, we have devised a scheme that would allow us to build facilities and have an operating program within two years in order to be able to start the breeding and reproduction phase for seven of this species. The funds requested to AArk will be used in: 1. training of two members of our team on amphibian husbandry techniques and the rearing of feeder insect colonies at internationally recognized *ex situ* institutions in Ecuador, (the only facilities currently housing amphibians that are phylogenetically similar to the ones targeted in our project) 2. Environmental education for local people and environmental authorities to improve the quality of existing amphibian habitats, and 3. Engage in policy-making efforts to enact legal actions for these species and their habitats.

**5. Introduction**— Southwestern Colombia includes four departments (Cauca, Caquetá, Nariño and Putumayo) with an area of approximately 176.400 Km<sup>2</sup>. In this region, rain forest, cloud forests, páramo, snow-capped mountains, upper Amazon basin and Amazon lowland forests, are found; many of them still unexplored. We have worked extensively in the region since year 2000 and have produced numerous articles<sup>2-10</sup>, including the discovery of 16 new species of frogs and 4 new species of snakes, among others. From the year 2004, with the support of Conservation International- Colombia, we carry out successfully several projects of *in situ* conservation, obtaining information on the natural history of eight threatened species.

In 2009, we studied the recently described tiger frog (*Hyloscirtus tigrinus*), with funds of Conservation International-Colombia<sup>10</sup>, We identified six new populations (including distribution extensions), and gathered the needed information to categorize *H. tigrinus* as Endangered (EN) and propose to classify it as CITES I to prevent unrestrained exploitation by the pet trade. *H. tigrinus* is a new species not yet included in IUCN's Red List. In July of the same year, Mueses-Cisneros carried out the First Meeting of Herpetology from Southwestern Colombia<sup>1</sup>; an academic gathering of 36 local herpetologist, to analyze among other aspects, the conservation status of amphibians from the region. A list of 45 species that require conservation actions with major urgency emerged (*see appendix 1*). Most of these species are restricted in their range of occurrence, with very small populations, are little known, and in most cases their habitats have been destroyed (mainly by deforestation), contaminated (mainly with pesticides) or transformed for cultivated land and cattle raising. Furthermore we don't know whether they are infected by the deadly amphibian pathogen *Batrachochytrium dendrobatidis* (Bd), and also suspect that volcanic ash emissions from Galeras and Puracé volcanoes might constitute another threat for these species; for this reason we consider very important to work urgently with these species. It was decided at this meeting that an *ex situ* conservation project was needed to guarantee the survival of the 45 most endangered species in the region. We recognize that probably we might not ever be able to target all of these species; however our final goal is to bring as many of them back to sufficient numbers in order to reintroduce them to their historical habitat. Our long-term objective is to re-establish populations of all of these species back into the wild so our grandsons can know the frog species that we know today; but to achieve this, we should work strongly and diligently to fulfill our objectives. Over the next two years we will implement a responsible *ex situ* conservation program for seven species, a detailed environmental education plan with local people, enact policy to conserve amphibians from SW Colombia and their habitat and will be organized as a Not-for-Profit, Non Governmental Organization.

**6. Methodology— *Ex situ* program.** To start, we will establish captive populations of seven species of amphibians of special concern: *Gastrotheca ruizi* (CR), *G. espeletia* (EN), *Hyloscirtus tigrinus* (EN)<sup>10</sup>, *Pristimantis repens* (EN), *Osornophryne guacamayo* (EN), *O. bufoniformis* (EN) and *Hypodactylus brunneus* (EN), although the Colombian populations of these last three species possibly are undescribed species. Our intermediate goal is to include additional species as we progress in our program. We will build a captive breeding facility following the norms recommended for *ex situ* conservation programs for amphibians<sup>11-13</sup>. This facility will be built in the area of influence of the project and is expected to be completed by mid 2011. The facility will consist of a quarantine area, two large modular rooms for housing permanent, isolated assurance colonies for each of the seven species of frogs and a modular tadpole rearing room. A separate area will be built for culturing live foods and another area for educational and administrative activities. We are requesting \$25,000 to the Mohamed bin Zayed Species Conservation Fund and others institutions to begin construction work, and have secured the locality where the facilities will be built. Funds requested to the Amphibian Ark will be used to finance the logistic involved with the training of two amphibian keepers in Ecuador, including transportation to Ecuador,

lodging and meals in Quito. Our amphibian keepers will carry a 15-day internship at "La Balsa de los Sapos" in Quito and a second 15-day internship at Centro de Conservación de Anfibios-Bosque de Mazán near Cuenca, Ecuador. Both centers conduct state of the art *ex situ* and *in situ* conservation programs with amphibian species that are most similar to the ones we will work. The internship will include training on daily care, feeding, reproduction, biosecurity and handling of specimens in captivity and in the establishment and rearing of a variety of feeder invertebrates and basic practices on *in situ* research with endangered amphibians. Keepers will return with a better understanding of the life support systems needed to construct our facility and will share their experiences to the rest of the team. We will continue to gather data on the species chosen for the captive program and will sample specimens for Bd by running PCR assays of skin swabs with funds donated by other institutions. The success and continuity of this project depends on obtaining funds; for this reason, we are already requesting funds to other national and international institutions. The environmental educational activities proposed here will contribute with the maintenance of the species, by engaging locals in our team.

***Environmental education plan.*** We have chosen *H. tigrinus* as the emblematic species of our project. Since its discovery, *H. tigrinus* has been our most valuable species and has help spark local interest in amphibian conservation<sup>7</sup>. We want to take advantage of the attractiveness of this frog as a strategy that will allow us to arrive to additional local communities, possible donors, and administrative and environmental authorities as well. Our education component will last seven consecutive months in the El Encano corregimiento, which is the type locality of *H. tigrinus*, near the city of Pasto, Nariño department. We have devised a three layered approach: **1. Work with children.** This work allows us perpetuate the conservation actions that we take in the present. We will use games, interactive chats, field work, reforestation trips, and playful workshops to teach children about the diversity of amphibians, the current problematic and how they can help to preserve them. Our aim is to form a group of young people that defend and protect the amphibians of the region. **2. Work with adults.** The adults are who have voice and vote in the decisions that we will take, they are the owners of the lands where the amphibians inhabit and where we need to work. We will continue working with the peasants that we have worked throughout these years, but now we want to link to more persons and generate a sense of ownership of the local community towards their amphibians. We will instruct the adults with didactic chats, on amphibian diversity, loss of this diversity and what actions they can do to preserve the species. We will work in reforesting with native trees, on two of the localities where we have found *H. tigrinus*, as well as a community based proposal to declare their type locality as a reserve to protect the tiger frog. **3. Work with environmental and administrative authorities.** We will reach local environmental authorities (Cabildo Indígena de El Encano, Red de Reservas Naturales de la Laguna de El Encano, Sistema de Parques Naturales Nacionales de Colombia and Corponariño) in order to propose and create legal actions so that these species and his habitats are considered conservation targets. Our group is very well known in the region; we do not have potential risks that go in opposition to the execution of the project. We can calmly work in the field, as well as in the communities. We are in no risk of confronting unstable or anti-government groups in any of our study areas.

## 7. Budget (in US Dollars).

Budget category	Requested from AArk	CI received	PZG received	MBZCF requesting	Other requested
<b>Internship</b>					
Transportation Colombia-Quito-Cuenca and back by bus (\$145 person x 2 people)	\$ 290				
Lodging and food in Quito (\$19.5 per person x 15 days x 2 people)	\$ 285		300		
Lodging and food in Cuenca (\$10 per person x 15 days x 2 people)			300		
<b>Environmental Education</b>					
Environmental Education Materials	\$ 500				
Transportation (\$185 x 7 months)	\$ 1.295				
Lodging and food (\$159 per trip x 7 months)	\$ 1.113				
Reforestation	\$ 417				
Video-beam projector	\$ 1.100				
<b>Construction of Facility</b>					
Materials and labor				\$ 12.300	
Air conditioning system				\$ 1.100	
Vivaria plumbing, water filtering system				\$ 1.000	
Vivaria 50 x \$79unit				\$ 3.950	
Aquaria 100 x \$8.4 unit				\$ 840	
<b>Management of ex situ specimens</b>					
Bd testing supplies (\$5swab, \$20test, 40)			\$ 1.000		
Live food production for 24 months				\$ 1.200	
Administrative costs for 24 months				\$ 2.000	
Others				\$ 410	
<b>Personnel</b>					
Director (\$500 per month x 24 months)					12000
Keepers (\$300 per month x 24 months x 2)				\$ 2.000	12400
<b>Field Work</b>					
Logistics		\$ 3530			
Local guide (\$15day x 30 days)		\$ 450			
Field equipment and hygiene protocol		\$ 750		\$200	
<b>Total</b>	<b>\$ 5.000</b>	<b>\$ 4.730</b>	<b>\$ 1.600</b>	<b>\$ 25.000</b>	<b>\$ 24.400</b>
<b>Percentage</b>	<b>8.2%</b>	<b>7.8%</b>	<b>2.6%</b>	<b>41.2%</b>	<b>40.2</b>
<b>Total</b>	<b>\$ 60.730</b>				

CI = Conservation International Colombia; PZG = Philadelphia Zoological Gardens; MBZCF = Mohamed bin Zayed Species Conservation Fund

## 9. Timeline of work

<b>Activity</b>	<b><i>Start date</i></b>	<b>Finalization</b>	<b>Duration</b>
Fundraising for program expansion	March 2010	Indefinite	
Execution of the Environmental Education Plan	August 2010	February 2011	7 months
Internship of the team members	August 2010	September 2010	30 days
Construction of facility and vivaria	January 2011	July 2011	6 months
Establishment of live food cultures	August 2011	February 2011	6 months
Fieldwork	August 2011	December 2011	4 months
Collection of founder specimens	August 2011	December 2011	4 months
Bd testing	August 2011	Indefinite	
Breeding program	August 2011	Indefinite	
Report of results by AArk	-	March 2011	

## 8. Scientific citations

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