

Amphibian Ark Seed Grant Program

Progress Reports



amphibian ark
keeping threatened amphibians afloat

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Andasibe, in east-central Madagascar, where Association Mitsinjo, a community-run organization founded by villagers, has launched Madagascar’s first amphibian captive breeding facility.



Amphibian Ark Seed Grants

Supporting captive programs for species that cannot currently be saved in the wild

AArk’s \$5,000 competitive seed grants are designed to fund small start-up rescue projects for species that cannot currently be saved in the wild. Successful proposals reflect AArk values:

- focusing on species whose threats cannot be mitigated in nature in time to prevent their extinction and which therefore require *ex situ* (captive) intervention to persist
- working with species within their native range country
- involving range-country biologists
- adhering to recommended biosecurity standards for *ex situ* programs
- linking *ex situ* programs to *in situ* (wild) conservation
- involving partnerships to maximize the likelihood of the programs’ long-term sustainability.

Since 2009, thirteen seed grants totaling \$55,447 have been awarded to recipients in eleven countries.

We acknowledge the generous support of Chester Zoo, Ronna Erickson, European Association of Zoos and Aquariums, Josie Lowman, George Rabb, Andrew Sabin Family Foundation, Wildlife Conservation Society and Woodland Park Zoo who helped establish and support these grants.



www.AmphibianArk.org

About Amphibian Ark Seed Grants

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- linking *ex situ* programs to *in situ* conservation
- involving partnerships to maximize the likelihood of the programs’ long-term sustainability.

The grants are not intended to fund:

- workshops
- educational exhibits
- project overhead or indirect costs.

Requirements

An *ex situ* component. While we do highly value *in situ* conservation, research, assessment, and education, our funds are extremely limited and so we must insist that all proposals include an *ex situ* component. *In situ* conservation, research, assessment, and education can be included as valuable components of any good project that otherwise focuses on rescuing species *ex situ*. Ideally, our support of *ex situ* components



Golden Mantella froglets bred at Association Mitsinjo’s amphibian breeding facility in Madagascar.



The Lake Titicaca Frog was bred by the Bolivian Amphibian Initiative for the first time in 2012.

Atelopus balios (left) and *Atelopus* sp (*spumarius-pulcher* complex) (below), two of the five species of harlequin frogs being maintained at Centro Jambatu de Investigación y Conservación de Anfibios in Ecuador.

helps secure funds for these other components as we tend not to fund “graphic panels” or other components for which other funding could be found.

Working with species that *need to be rescued*. Projects must relate to rescuing species whose threats cannot be mitigated in nature in time to prevent their extinction and which therefore require urgent *ex situ* intervention to persist. This status should be determined by relevant field experts, e.g., the IUCN SSC Amphibian Specialist Group field experts through AArk Conservation Needs Assessment Workshops, or similar processes. While we appreciate efforts to keep regionally threatened but globally stable species common, our limited funds are restricted to projects involving species that need help at a global level.

Working with species within their *native range country*. Unless capacity absolutely cannot be built in the range country in time to prevent imminent extinction, the AArk will not fund projects that remove animals from their range country. In addition, every effort should be made to enable national biologists to lead the program.

Adhering to *recommended biosecurity standards*. Regardless of where the rescue populations are held, measures must be taken to isolate them from allopatric (non-overlapping) species that might be in the collections as well as from the original threat (e.g., chytrid).

Newly launched programs. The concept of a ‘seed’ grant is to fund projects 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. We do not favour projects that are already well established or have significant funding, although we do not mind seeing some funding in place for complementary components (like fieldwork or education).

Conservation program for the Ecuadorian Tiger Frog

Diego Patricio Almeida Reinoso, Fundación Herpetológica Gustavo Orcés, Ecuador

Awarded \$5,000 in 2013

Project summary

The *ex situ* conservation program for the Ecuadorian Tiger Frog, *Hyloscirtus tigrinus*, is a new effort in Ecuador to support the conservation of one of the rarest species of tree frog. This species was recently reported in Ecuador and is currently known only from a small area in Quebrada Corazón-Santa Barbara Sucumbios Province. This species is endangered in Colombia where only a few male adults are known. In Ecuador only a few individuals have been encountered in the tadpole stage and only a single juvenile has been seen. Human pressure from the advance of the agricultural frontier, cattle-raising and pesticide use in the area where the species has been seen, combined with climate change and emerging diseases suggest that although the species has not yet been assessed for the IUCN Red List, its status should be Critically Endangered.



The goal of this project is to perform an exhaustive search for adults and tadpoles in the creek and vicinity of Quebrada-Corazón and to establish an *ex situ* management program in facilities at Gustavo Orcés Herpetological Foundation in Quito, Ecuador, as an emergency rescue measure to try to save the species from extinction. The *ex situ* colony of the Ecuadorian Tiger Frog will be maintained until the conditions for reintroduction are appropriate. We will make direct contact with the Fundación para la Investigación de Biodiversidad Amazónica, in Colombia where an *ex situ* conservation program for the species is underway in Putumayo, Colombia, so we can coordinate inter-agency mutual cooperation and optimize efforts for the conservation of this species.

Progress to date

The Centro de Conservación de Anfibios (Amphibian Conservation Center) of the Fundación Herpetológica Gustavo Orcés was created in July 2013 when the facilities were equipped for an *ex situ* program to rescue and maintain the Ecuadorian Tiger Frog, thanks to the support of the Amphibian Ark seed grant program. This *ex situ* program for this Critically Endangered species is the only conservation program of any sort for this species.

The approach that the Centro de Conservación de Anfibios has taken to save this species has been to initiate a captive breeding program to maintain genetically viable populations that can eventually be reintroduced to their natural habitats.

The equipment used to manage misting, drainage, lighting and water filtration is based on a series of filters to create water which is completely free of chlorine and pathogens. The ultraviolet and misting systems are automated, beginning at 6 a.m. and ending at 6 p.m. The room utilises natural light to ensure that changes in lighting are gradual and more natural, which is an important factor in maintaining amphibians.

In August 2013 we went on a field trip to Santa Barbara, Sucumbios Province, in Ecuador. The goal was to visit Quebrada Corazon (“Heart Creek”), the only known locality for this species in Ecuador. After an exhaustive search by the team, fifteen tadpoles of differing developmental stages were found. Even though no adults were found, these tadpoles indicate some hope for this species, suggesting that it can still be found and saved.

Searching for Ecuadorian Tiger Frogs at Heart Creek, the only known locality for this species in Ecuador.

“There are many who study the causes of global amphibian extinction and report new extinctions. I’m just a simple man trying to save one amphibian, the Ecuadorian Tiger Frog from extinction.”

The tadpoles were transported to the amphibian center, where their diet and food intake was monitored daily, using a special formula called “SAR”, a Spanish acronym for the phrase “Super Tadpole Food”. This food is spread in paste form over flat rocks so it is easily accessible to the tadpoles.

The aquariums that house the tadpoles include a system of constant oxygenation and the water temperature is maintained at 15.6 degrees Celsius, which we have found is best for the tadpoles. Fortunately they appear to be adapting well to these conditions and appear to be stable. Our irrigation system is programmed to perform four twenty-minute flushes/cycles each day. This assures a consistent rejuvenating flow each day of 50% of the total water, which assures stable pH and temperatures.

Progress highlights

Facilities established for a captive program to rescue and maintain the Ecuadorian Tiger Frog.

Misting, drainage, lighting and water filtration equipment installed and providing optimum and automated environmental conditions.

Fifteen tadpoles of differing developmental stages collected from Heart Creek.

Tadpoles have adapted well to captive conditions and appear to be stable.



Management of Buckley’s Glass Frog in Ecuador

Luis A. Coloma, Ph.D., Centro Jambatu de Investigación y Conservación de Anfibios/Fundación Otonga, Ecuador

Awarded \$5,000 in 2013

Project summary

This project aims to prevent the extinction of Buckley’s Glass Frog, *Centrolene buckleyi*, an extant species of glass frog in Ecuador, through *ex situ* breeding and management. The extant populations of this species are Critically Endangered (based on IUCN criteria) through all of its distribution. Given the threats this species faces, *in situ* management is not enough to save the species, and at this point, *ex situ* management is an urgently needed proactive solution to save the extant populations from extinction. Previous efforts to captive breed other species from the family Centrolenidae have been relatively minor and unsuccessful, except for the Reticulated Glass Frog, *Hyalinobatrachium valerioi*.

We have had success raising several specimens of this species under our lab conditions. Thus, our objectives and activities are directed to finding additional founders, adequately equip the *ex situ* facilities for the program Arca de los Sapos of Jambatu Center, and continually document all concepts utilized and successes obtained. With this project we expect to produce the first descendants of future genetically viable populations of this

“The Amphibian Ark Seed Grant is allowing us to help save Buckley’s Glass Frog from extinction in Ecuador.”

species. We will keep them under lab conditions until the causes of their declines and disappearances are better understood and mitigated in nature, so their reintroduction would be feasible.

Progress to date

Between June and September 2013 we further equipped the *ex situ* facilities of the program at Arca de los Sapos of Centro Jambatu. We currently maintain eight individuals of this species, three females, one juvenile and four tadpoles. Field searches for parental individuals are planned for October 2013, when the rainy season begins.

Populations of the beautiful Buckley’s Glass Frog are Critically Endangered through its entire distribution in Ecuador.



Staff at Arca de los Sapos of Centro Jambatu, are developing a program to breed Buckley’s Glass Frog.

Reproduction and conservation of Vanzolini’s Spiny-chest Frog

Dr. Juan Carlos Ortiz Zapata – Director of the project
M.V. MSc (c) Camila Castro Carrasco – *In situ* conservation component
M.V. MSc (c) Carlos Barrientos Donoso – *Ex situ* reproduction component
Departamento de Zoología, Facultad de Ciencias Naturales y Oceanográficas, Universidad de Concepción, Chile
Awarded \$5,000 in 2013

Project summary

Vanzolini’s Spiny-chest Frog, *Alsodes vanzolinii*, is a species listed as Critically Endangered according to the IUCN (2013) and is ranked 123 on the EDGE list (Evolutionarily Distinct and Globally Endangered, www.edgeofexistence.org/amphibians). Since its description in 1974, nobody had sighted and/or collected the species again, and therefore it was thought to be extinct. However in 2010, it was rediscovered in three places near the type locality, Ramadillas, in Chile. There are only four publications related to Vanzolini’s Spiny-chest Frog and there is scarce knowledge about their biology. Besides being a rare and difficult to find species, it has a restricted distribution, with an area of occupancy less than 40 km² and it is not present in the National System of Protected Areas of the State. These locations correspond to small patches of native forest remnants in an array of exotic forest plantations. The main threat to the survival of this species is the loss of habitat, and any type of stochastic event (fire, water pollution, diseases or invasive species) could cause local populations to disappear. For these reasons, it is imperative that conservation programs, both *ex situ* and *in situ*, are implemented as a matter of urgency.

This proposed project integrates *ex situ* and *in situ* conservation to prevent Vanzolini’s Spiny-chest Frog from becoming extinct. Part of the project will involve attempting *ex situ* breeding of the species by expanding the Darwin’s Frog Breeding Station, which is successfully managed by the University of Concepción and Leipzig Zoo. In addition, *in situ* conservation plans have recently been approved and will be implemented from June 2013, including surveying to confirm actual distribution, monitoring of known populations, enforcing habitat protection measures and training for forest workers and the local community. The *in situ* methods will be conducted as a joint effort between the University of Concepción and Arauco S.A. forestry company, who are owners of the land where the species has been found.

Vanzolini’s Spiny-chest Frog was rediscovered in Chile in 2010, after not being seen since 1974.



Progress highlights

Space created for containers for the breeding facility.

Containers and terrariums purchased.

New invertebrate food species being bred.

New specimens found in the wild during field surveys.

Progress to date

To date we have advanced with the early stages of the project, primarily purchasing the containers and terrariums for the captive breeding facility, and for rearing of insects for feeding the frogs. Since this is a Critically Endangered species, we need to be sure that the facilities are in a perfect state when the animals arrive.

We have begun the work of creating the space for the containers which will be used for the breeding facility, including an extension of the area of the reproduction center, cleaning and cutting of weeds and preparation and leveling the ground for the containers. In addition, we began breeding new invertebrate species to feed the frogs such as crickets, isopods, *Tenebrio molitor* larvae and earthworms and also increased the number of fruit flies being reared for feeding Darwin’s Frogs.

We have also conducted several monitoring campaigns in the field and we found new specimens to help evaluate the status of the population. When the preparation of the facilities is complete we will bring these frogs to the breeding center.



Preparation of the breeding facilities is well underway.

Building captive husbandry techniques for Neotropical salamanders

Brian Kubicki, Costa Rican Amphibian Research Center, Guayacan de Siquirres, Costa Rica

Awarded \$4,700 in 2013

Project summary

This project’s goal is to generate much-needed information on the *ex situ* establishment and captive husbandry techniques surrounding Neotropical salamanders. In recent years, following the global awareness of amphibian declines, many *ex situ* programs have been initiated in an attempt to conserve amphibian species, but most of these efforts have been focused primarily on only one of the three living orders of amphibians, that of anurans (frogs). Very little work has been devoted to rearing and breeding any of the eleven genera and nearly 280 species of Neotropical salamanders.

Our goal is to take a step forward in this poorly entered realm by generating captive husbandry guidelines for four species of Costa Rican caudates: three species of moss salamanders of the enigmatic genus *Nototriton*, and an epiphyllous *Bolitoglossa* species, the Ridge-headed Salamander, *Bolitoglossa colonneae*. We will simultaneously apply these techniques to *Oedipina uniformis*, a Costa Rican endemic that has been assessed for rescue by the Amphibian Ark. Our hopes are that this information may be adopted and extrapolated to other taxa within Costa Rica and other countries in Latin America wanting to initiate *ex situ* management plans for their own salamander species of special concern.

“It is very exciting to have the opportunity to work with poorly known amphibian species and being able to add to the limited knowledge regarding their biology, which ultimately might help us better understand ways to appreciate and conserve them for future generations.”

also allowing us to fill in some of the many gaps regarding the general biology of these secretive little amphibians, which may play a very key role to their future survival due to a better understanding of their specific environmental and biological requirements.

In the short time since we were awarded the grant we have designed and established an experimental area within our lab for housing salamander species. This area includes several terrariums that we have designed and built, and six of the these, which are specifically designed to house moss salamanders of the genus *Nototriton*, are sitting in a closed circulating aquatic cooling system. In these six terrariums we have now established small



Nototriton tapanti.

Progress to date

With the support of the Amphibian Ark Seed Grant we have been able to establish an area dedicated specifically for exploring captive husbandry methodologies of a few selected species of salamanders in our small lab at the Costa Rican Amphibian Research Center (CRARC). This project has presented us the unique opportunity to learn not only about the captive husbandry requirements of certain species and establish potential future *ex situ* protocols, but it is

Progress highlights

Experimental area for housing native Costa Rican salamander species designed and established.

Vital information about the physical parameters of the microhabitats where the salamanders live collected by strategically placing data loggers in the wild.

Cooling system designed to simulate the important temperature fluctuations within the salamanders’ enclosures.

Small groups of salamanders collected during recent explorations to their native environments.

Salamanders established in six terrariums in the lab.

groups of selected *Nototriton* species which were collected during our explorations to their native environments during recent months.

During these explorations we also managed to gather vital information on the physical parameters specific to the microhabitats in which these salamanders live. Although we have not observed breeding activity with any of the *Nototriton* species yet, they have adapted very well to their new captive enclosures. Also included in this project, and likewise located in the salamander area in the lab, we have designed and built several other terrariums to house lower elevation epiphyllous salamander species. One of the species specifically highlighted in this project is the Ridge-headed Salamander, which is commonly observed within the private reserve of the CRARC. We have established a group of this species within the lab, and they too have shown to be adapting very well to their new captive environments. Recently we had success in the captive breeding of another species of local salamander, the Cukra Climbing Salamander, *Bolitoglossa striatula*. Although this species was not part of the specific project awarded by the Amphibian Ark Seed Grant, it was very encouraging to have had a captive breeding event with a Neotropical caudate within our lab. This event marks one of the first known successful captive breedings for this species, and of only a handful for any Neotropical salamander species.



One of the terrarium setups that were specifically built for salamanders at the CRARC lab. This particular system holds six terrariums and was specially designed to house moss salamanders.

Aura Reyes from the Costa Rican Amphibian Research Center carefully searches through moss for *Nototriton* salamanders.



Conservation plan for the Upland Coquí

Neftalí Ríos-López, University of Puerto Rico at Humacao, Puerto Rico

Awarded \$4,938.81 in 2012

Project summary

The Upland Coquí (or Coquí de la Montaña), *Eleutherodactylus portoricensis*, from Puerto Rico is a high elevation montane species designated as Vulnerable by the Puerto Rico Department of Natural and Environmental Resources and listed as Endangered by the International Union for Conservation of Nature. The species showed declining population trends during the 1990s at mid and high elevation areas at the Luquillo Mountains, presumably due to a synergism between recent climate change and the chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*). While the species was documented from elevations above 300m to the east, it had disappeared from elevations up to 450m by 1997 at El Verde Research Station in the Luquillo Mountains, and apparently from above 600m in the Central Mountain range to the west.

Little information exists on the ecology and reproductive biology of this species in general and from outside typical study areas at the Luquillo Mountains range specifically. As a result, it has been recommended that further survey work is necessary to monitor the status of populations and for the establishment of a captive-breeding program. This project is aimed at better understanding reproductive biology in captivity and the population status of the Upland Coquí in the Cayey Mountains region. We expect that these activities combined will set the basis for successful conservation of this species and the establishment of adequate regulatory mechanisms for better conservation policies for Puerto Rican *Eleutherodactylus* species.

Progress to date

After detailed discussion with Amphibian Ark staff about lengthy delays with obtaining collection permits for the original project species (*Eleutherodactylus juanariveroi*), an alternative proposal was submitted using a different species, the Upland Coquí, which is also in need of *ex situ* conservation efforts.

To date, I have received the collection permit issued by the Department of Natural and Environmental Resources, and am now waiting for final approval of the Animal Use Protocol by the University of Puerto Rico’s Institutional Animal Care and Use Committee. Institutional permit granting is at its final stage and animals should arrive in the laboratory immediately afterwards.



Calling male Upland Coquí in a curled leaf of *Cecropia peltata* hung on the leaf axil of a Sierra Palm.

Progress highlights

Permit to collect Upland Coquí issued by the Department of Natural and Environmental Resources of the Puerto Rico Commonwealth.

Quarantine and treatment protocol developed to prevent chytrid fungus being brought into the lab with wild-caught animals.

Terrariums have been designed, built and installed in the lab.

Regimes in place to control temperature and light in the lab to mimic wild conditions.

“Amphibian Ark’s Seed Grant support left us speechless and extremely grateful as it allowed a life-long dream to really come true, and has opened the doors to greater amphibian conservation projects in Puerto Rico.”

Initially, adult frogs in treatments will be feed commercially-bought house crickets, and future cultures of native crickets will be used and maintained in eighteen-gallon plastic boxes in the adjacent room in the laboratory. Cultures of these crickets are planned for initiation by the middle of September 2013, which includes supply of feeding and housing materials and collection of crickets from the field in areas already identified in a nearby town. On the other hand, recently hatched juveniles from breeding events will be fed oribatid mites which are already cultured and maintained in an adjacent laboratory at the university. In addition, the diet of juvenile frogs will include wingless flies of *Drosophila* sp. kept and raised in the laboratory.

The laboratory fittings are in their final stages, which includes electric installation of the facilities to an emergency electric power source as part of the Institution’s Emergency Plan, and a cleaning and disinfection plan to prevent health/safety issues in the building housing the captive breeding laboratory.

Installation of the watering system is complete and the system has been fully tested. Despite the fact that the design of the terraria was modified from a design to house a wetland species to an arboreal species, all terraria have finally been designed and set in their place. The laboratory housing the terraria has air conditioning and light regimes in place, and watering takes place twice each day for five minutes.

The project continues uninterrupted at the university and we expect to bring animals to the laboratory as soon as our protocols have been approved, the electric connection of the laboratory to the emergency power plant is complete, commercially bought crickets are ordered and arrive at the laboratory, and the frogs complete their treatment period.

Terrariums have been specifically designed to house the arboreal Upland Coquí at University of Puerto Rico in Humacao.



Neftalí Ríos-López with a group of his students working with *Eleutherodactylus* species in the field.

The Honduran Amphibian Rescue and Conservation Centre

Jonathan Kolby, Project Director, Honduran Amphibian Rescue and Conservation Center

Awarded \$5,000 in 2012

Project summary

The endangered amphibians of Honduras are experiencing a storm of assaults from habitat destruction, climate change, and emerging infectious diseases. A growing number of species face an uncertain future unless *ex situ* management efforts are soon implemented to ensure long-term survival. From 2006 to the present, I have been studying the amphibian populations of Cusuco National Park (CNP), a cloud forest recognized by the Alliance for Zero Extinction due to the critical habitat it provides for six species of amphibians found nowhere else in the world. Alarmingly, amphibian abundance surveys conducted from 2007 to 2011 indicated an overall decline in the presence of stream-associated amphibians in CNP.

The emerging infectious disease chytridiomycosis caused by amphibian chytrid fungus *Batrachochytrium dendrobatidis*, (Bd) has proven to be especially devastating to amphibian populations in Latin America, but the amphibians of Honduras have received little conservation attention. This project, supported in part by an Amphibian Ark Seed Grant, will ensure the long-term survival of three critically endangered species in CNP: two endemic Spike-thumb Frogs, *Plectrohyla dasypus* and *Plectrohyla exquisita*, and the Copan Brook Frog, *Duellmanohyla soralia*. The rescue efforts proposed in this project will tackle both short and long-term threats by performing a head-start program to quickly produce healthy adult animals for supplementation of wild populations while simultaneously building captive assurance populations for long-term protection and reintroduction.

Progress to date

The core project activities of the Honduran Amphibian Rescue and Conservation Center are:

- Establishment and maintenance of long-term captive assurance populations to buffer against the risk of extinction in the wild.
- Annual population supplementation via head-starting to increase the number of animals that may survive to adulthood and reproduce in the wild.
- Long-term amphibian disease monitoring in CNP to identify increased risks of extinction.

Progress highlights

Fundraising to establish the project has now been fulfilled, including funds to construct the amphibian facility.

A site within the Lancetilla Botanical Garden and Research Institute in Tela, Honduras has been confirmed for the amphibian facility.

A Memorandum of Agreement has been formulated to establish the roles and responsibilities of each of the organizations and individuals involved with the project.

“I believe amphibian conservation is a global health priority and I’m excited to be able to help prevent the extinction of amphibians in Honduras through my rescue project made possible with the support of an Amphibian Ark Seed Grant.”



Local capacity-building and public outreach are integral principles in this project, and the project will be based at Lancetilla Botanical Garden and Research Institute, in Tela, Honduras, a location with a high volume of school group visitation.

Fundraising to establish this project has now been collectively fulfilled by an Amphibian Ark Seed Grant, the Chicago Zoological Society/Chicago Board of Trade Endangered Species Fund and Rufford Small Grants for Nature Conservation. Construction of isolated amphibian rooms will take place in October 2013 at the Botanical Garden, and will soon be followed by the training of Honduran staff and preparations for the first collection of wild amphibians from CNP.

Since mid- 2012, progress has been made in the following areas:

- In June and August 2012, alpha-numeric visual implant elastomers were used to mark 109 wild adult amphibians *in situ* in CNP to assess their suitability in multi-year population monitoring efforts.
- A Memorandum of Agreement that established the roles and responsibilities of each party involved has been formulated and agreed upon.
- Staff are currently being sequestered from in-country sources to facilitate local capacity-building. In August 2013, a meeting was held at Universidad Nacional Autónoma de Honduras to begin the process of identifying students from the biology department to involve in this project.
- Jonathan Kolby and Franklin Casteñada, Regional Co-Chairs of the IUCN Amphibian Specialist Group (ASG) of Honduras, are working to revitalize the country’s ASG presence through a group meeting centered around the Honduran Amphibian Rescue and Conservation Center.
- In June 2013, the remaining funds necessary for facility construction were acquired.
- A site visit to Lancetilla Botanical Garden was performed by Jonathan Kolby in August 2012 and again in August 2013 to examine space provided for construction of the amphibian rescue facility.



Management of Harlequin Frogs in Ecuador

Luis A. Coloma, Centro Jambatu de Investigación y Conservación de Anfibios/Fundación Otonga, Ecuador

Awarded \$5,000 in 2011

Project summary

This project aims to save five extant species of harlequin frogs from the genus *Atelopus* from extinction in Ecuador, through *ex situ* breeding and management. Most harlequin frogs went extinct and most of the extant species are Critically Endangered (based on IUCN criteria) through all of their distribution. Given the threats this genus faces, *in situ* management is not enough to save the species, and at this point, *ex situ* management is an urgently needed proactive solution to save extant species from extinction.

Previous efforts to captive breed *Atelopus* have been relatively minor and unsuccessful, except for the Panamanian Golden Frog, *A. zeteki*. Some of these efforts have failed because they relied on the spontaneous breeding of amplexant pairs kept under lab conditions. Previous experience shows that breeding under such circumstances rarely occurs. Thus, our objectives and activities are directed to find additional founders, adequately equip the *ex situ* facilities for the program Arca de los Sapos of Jambatu Center, and perform essays of assisted reproduction (using hormones) of *Atelopus* sp., *A. elegans*, *A. spumarius*, *A. balios*, and *A. nanay*, on the basis of successful previous essays with two of the species. With this project we expect to produce the first descendants of future genetically viable populations of these five species. We will keep them under laboratory conditions until the causes of their declines and disappearances are better understood and mitigated in nature, so their reintroduction would be feasible.

“AArk support and our efforts to save some Harlequin Frogs from extinction are giving these creatures a light of hope.”

Progress to date

We began the management and *ex situ* breeding of assurance colonies of five extant species of harlequin frogs in Ecuador. Given the threats faced by *Atelopus* species, *ex situ* management is one of the proactive solutions to save these extant species from extinction, and assisted reproduction is a technological tool to accelerate breeding of those species, which have shown to be difficult to breed. Between June 2011 and June 2012 we further equipped the *ex situ* facilities of the program Arca de los Sapos of Centro Jambatu. We made eight field trips and collected founders of each of four species (*Atelopus* sp., *A. elegans*, *A. spumarius*, and *A. balios*), and acquired captive born tadpoles of *A. nanay* by way of a donation from Amaru Zoo in Cuenca, Ecuador.

Progress highlights

Ex situ facilities of the program Arca de los Sapos of Centro Jambatu equipped to house additional *Atelopus* species.

Eight field trips undertaken and founder animals for captive populations of four *Atelopus* species collected.

The first offspring of three species produced at Centro Jambatu.

A web page providing updated information and details of management of each of the species has been produced.

Atelopus spumarius.



Our field collecting efforts and lab-produced frogs increased the founder colonies, although current numbers are still insufficient to maintain genetically viable populations. We performed four essays of reproduction (two of them assisted with hormone treatments with human chorionic gonadotropin (HGC)) and produced the first offspring of three species (*A. elegans*, *A. spumarius* and *A. spumarius-pulcher* complex). For the first time we recorded details of an oviposition event of *Atelopus* sp. We also raised and are documenting the ontogenic color and morphological changes of four species: *A. balios*, *A. elegans*, *A. nanay*, and *A. spumarius*, based on wild-caught and lab-hatched tadpoles.

Keeping healthy individuals and successful breeding of these five species of harlequin frogs remains challenging. Assisted reproduction essays and rearing of tadpoles were generally successful, although management errors produced mortalities of *A. nanay* and metamorphs. Maintenance of wild-caught adults and lab-reared juveniles remain difficult and also produced mortalities, some of which are from yet undetermined causes.

A web page providing updated accounts, numbers of founders (parental and filial generations), and details of management of each of the species has been published on the Centro Jambatu website (www.anfibioswebecuador.ec/arcasapos/especies-abordo.aspx). Scientific publications are being prepared.

Atelopus elegans.



Atelopus nanay.



Conservation of the Alcatraz Snouted Tree Frog in Brazil

Cybele Sabino Lisboa, Curator of Reptiles, Amphibians and Invertebrates, Fundação Parque Zoológico de São Paulo, Brazil

Renata Ibelli Vaz, Masters student, Instituto de Biociências, Universidade de São Paulo, Brazil

Awarded \$5,000 in 2011

Progress highlights

Biosecure room developed at the São Paulo Zoo to house Alcatraz Snouted Tree Frogs.

Founder animals for the captive population collected from Ilha dos Alcatrazes.

First successful breeding and metamorphosis occurred.

Masters degree project started focusing on the organisms found on the skin of Alcatraz Snouted Tree Frogs.

Project summary

The Alcatraz Snouted Tree Frog, *Scinax alcatraz*, is endemic to Ilha dos Alcatrazes (Alcatrazes Island) near São Paulo in Brazil, and is listed as Critically Endangered in the IUCN Red List. Part of the island belongs to the Brazilian Navy, and it is used as a target practice by navy ships. This practice often causes spot fires on the island and consequently destroys bromeliads, the habitat of this tree frog. For this reason the establishment of an *ex situ* breeding program, as well as maintaining a viable population in captivity, is necessary and urgent.

Founders for the captive population will be housed in a captive biosecure breeding facility at the Fundação Parque Zoológico de São Paulo (São Paulo Zoo). The funds received from Amphibian Ark will be used for husbandry and care materials. Parallel to the captive program, constant monitoring of the species will be conducted to enable the investigation of possible population declines. The genetically viable and biosecure population of Alcatraz Snouted Tree Frogs maintained in captivity will be ready for possible supplementation or reintroduction. The results of this project will be published as guidelines, which can be used to ensure that amphibian conservation is a priority in public policies in Brazil.

Progress to date

The Alcatraz Snouted Tree Frog had never been maintained in captivity, so before working directly with this Critically Endangered species, the Fundação Parque Zoológico de São Paulo conducted a pilot study using a closely related surrogate species, *Scinax perpusillus* in 2008. After two years working with the surrogate, learning and developing management and reproductive techniques, it was time to apply the techniques developed to the Alcatraz Snouted Tree Frog.

“This program is raising awareness of the situation of amphibians in Brazil and serving as an example for other zoos and institutions, encouraging them to initiate programs like this with other amphibian species.”



An old room inside the Zoo was refurbished and we followed the biosecurity model recommended by the Amphibian Research Center (www.frogs.org.au). The facility at the Zoo consists of a section for permanent housing of the animals, one for culturing live foods, and a staff bathroom with a shower. Staff are required to take showers before and after working with the animals and everything that goes inside the room is disinfected before entry.

In October 2011, we conducted a five-day expedition to Ilha dos Alcatrazes, which was sponsored by Tupinambás Ecological Station. The main goal of this expedition was to continue the Conservation Action Plan for the island and to collect the founding animals for the *ex situ* conservation program. Surveys for adult frogs were conducted at night by following active calling in areas with abundant bromeliads. Eleven specimens (five males, three females and three unsexed frogs) were collected, and these became the founders of the *ex situ* program. For the remaining time we spent at the island, and during the transportation process, the specimens were maintained in cups with water and leaves.

At the end of October 2011 the founder animals were transferred directly to the biosecure room, and on 22 December 2011 we began using an ultra-sonic fogger to increase the night time humidity and to stimulate breeding. After thirty-three days, the first breeding event occurred in the enclosure housing two males and a female. The female deposited around 140 eggs.

From a total of 140 eggs, 132 tadpoles hatched, but not all survived to complete metamorphosis. From these juveniles, eighty-seven survived and continue to be maintained. A second breeding event took place in July 2013 without artificial stimulus. It was a smaller clutch, with only six tadpoles surviving, and these are still developing.

The husbandry and reproduction of *Scinax perpusillus* has proven successful in the pilot study and the skills acquired during this process were applied to the more threatened Alcatraz Snouted Tree Frog. After just three months in captivity, offspring were produced.



Alcatraz Snouted Tree Frogs in amplexus.

After this first successful experience with Alcatraz Snouted Tree Frog, new research will be conducted with the captive population in order to guarantee that it is really a safe alternative to recovering the wild population. At the beginning of 2013 Renata Vaz began a Masters degree, focusing on the cutaneous biota of *Scinax alcatraz* from both wild and captive populations. The next research will be related to genetic viability, sanitary protocols, and cryopreservation. The monitoring of the wild population and involvement with the Action Plan for Alcatrazes Island will be continued.



São Paulo Zoo staff with one of the terrariums housing Alcatraz Snouted Tree Frogs.

Frogs and toads from south-western Colombia

Jonh Jairo Mueses-Cisneros, Colombia
Awarded \$575 in 2010

Project summary

Colombia has one of the highest amphibian diversities in the world and south-western Colombia (with nearly 290 amphibian species) contributes to 40% of this diversity. However, in spite of this high diversity, the conservation efforts toward this imperilled 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 forty-five species from south-western Colombia that require immediate *ex situ* conservation actions. To help save all of the forty-five species would require an ambitious, long-term, large scale project, however, we have devised a scheme that will 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 these species.

The funds requested from Amphibian Ark will be used to train two members of our team on amphibian husbandry techniques, food-rearing, providing environmental education for local people and environmental authorities to improve the quality of existing amphibian habitats, and engaging in policy-making efforts to enact legal actions for these species and their habitats.

Progress to date

Our project received partial funding through the Amphibian Ark Seed Grant for US \$575 and matching funds from the Philadelphia Zoo in the amount of US \$600 that allowed our team to receive training and to engage in

capacity building with amphibian husbandry techniques. One of the main objectives of our project is to build an amphibian breeding and managing center called “Centro de Reproducción y Manejo de Anfibios del Suroccidente Colombiano” (Center for Reproduction and Management of Amphibians from South-west-

ern Colombia), which strives to enable a long-term project to maintain assurance colonies of endangered amphibians from south-western Colombia.



Tiger's Treefrog.

“The Amphibian Ark Seed Grant funding has truly been a germinating seed for our project, and we continue to work towards the appreciation and conservation of the amphibians of south-western Colombia.”

The interns learned very valuable techniques, and thanks to this internship we were able to improve the designs for our future amphibian breeding center. To date, the team has also been able to visit the amphibian breeding facilities at the Bronx Zoo and the Philadelphia Zoo in the US, which has further helped us clear some doubts about some aspects of the project. Since this internship, we have been able to establish our biosecurity protocols and are ready to take the next steps with the Centro de Reproducción.

In July 2011, Jonh Jairo Mueses-Cisneros won the Andrew Sabin Award for Amphibian Conservation, and this award was presented in New York City - with the money obtained from the award, we will buy the land where the Centro de Reproducción will be built. The trip to New York helped us make very interesting contacts with potential donors, some of whom demonstrated interest in providing support to our projects, not only at the Centro de Reproducción, but also for describing our new species, exploration of sites with potential new species, publishing and our educational work.

We greatly appreciate the support of Luis A. Coloma while he was working at La Balsa de los Sapos de la Pontificia Universidad Católica del Ecuador and his work team at the time. They hosted and housed our staff during most of our stay in Quito in 2011, and they shared with us many of their experiences in amphibian husbandry, management and captive reproduction. Likewise, we are in debt to Ernesto Arbeláez, Fausto Siavichay, Diego Alvarado and Amanda Vega from Zoológico Amaru – Centro de Conservación de Anfibios – CCA Mazán in Cuenca, for sharing many experiences with us. We also wish to thank Carlos Martinez for his unconditional support of our project and Teresa Camacho and Leonardo Arias and his family who supported us logistically through our stay in Ecuador.

Pristimantis farisorum, a new species recently described by the team in Colombia.

Staff training took place during October and November in 2010 at two important amphibian breeding and managing centers in Ecuador: Balsa de los Sapos, at Pontificia Universidad Católica del Ecuador, in Quito and Centro de Conservación de Anfibios Mazán, in Cuenca.

Progress highlights

Two staff trained in amphibian husbandry techniques.

Biosecurity protocols established.

Funding obtained to purchase land to build an amphibian breeding center.

Land purchased for the breeding center.



Maud Island Frog Habitat

Lynn Anderson, Orana Wildlife Park, Christchurch, New Zealand

Awarded \$3,562 in 2010

Project summary

Orana Wildlife Park in Christchurch - New Zealand's only open range zoo - will develop a state-of-the-art habitat for the Nationally Endangered New Zealand Maud Island Frog, *Leiopelma pakeka*, in 2010. Housing these frogs will support the aims of the Department of Conservation Native Frog Recovery Plan through conservation advocacy, provision of an insurance population, research, refining husbandry techniques for the species and ultimately breeding for release to the wild.

The habitat will be a nocturnal display providing an insurance population of Maud Island Frogs, allow refinement of techniques to enable captive breeding of the species, and ultimately allow breed-for-release programs to supplement surviving colonies *in situ*. The refinement of these techniques is also essential to the Department of Conservation's aim of securing and breeding Hamilton's Frog, *Leiopelma hamiltonii*, in captivity and could potentially lead to breed-for-release of this species.

“Our team is committed to raising awareness of the plight of amphibians in general and specifically New Zealand's unique native frogs.”

The Amphibian Ark funds are instrumental to enabling us to construct a facility that provides long term security of Maud Island Frogs and potentially, Hamilton's Frogs.

The Amphibian Ark funds are instrumental to enabling us to construct a facility that provides long term security of Maud Island Frogs and potentially, Hamilton's Frogs.

Progress to date

The Maud Island Frog Habitat project at Orana Wildlife Park began on time in 2010, with the following work carried out by December 2010:

- Plans have been developed and a Building Consent has been issued.
- The foundations have been excavated and prepared for the first of two concrete pours and we are currently awaiting a pre-pour inspection by the Christchurch City Council. However, we experienced delays in having the site inspected owing to the Christchurch earthquake (on 4 September 2010).
- Two of our senior keepers, Tara Atkinson and Alyssa Salton attended a New Zealand Frog Workshop in Auckland. Both staff gained a significant amount of knowledge from this workshop and have discussed outcomes that are relevant to our exhibit with key Park staff.
- The same Park staff visited native frog exhibits at Auckland and Hamilton Zoos and have also spent time with Dr. Phil Bishop at Otago University to help prepare Orana staff members for the arrival of the frogs.

Unfortunately, the devastating earthquakes around Christchurch in September 2010 caused major disruptions to our progress. Unfortunately we missed the 'window' in 2010 to collect the animals, and so our work plan for the Park's Development Team was altered to focus on creating a new exhibit at our sister attraction, Natureland Zoo (Nelson), in time for the end of year holidays. As a charitable trust we must continue to add new attractions to our facilities to attract visitors. Our Development Team was hoping to construct the outdoor building work of the frog habitat over summer.

Further delays in completing the project occurred, due to the lack of availability of contractors and council inspections since many of them were involved with the cleanup and redevelopment in Christchurch after the earthquake.

Significant progress was made and we are pleased to advise that as at October 2011, the habitat is approximately 65% complete. However, progress was halted again due to the devastating 6.3 magnitude earthquake that struck Christchurch in February 2011. Christchurch experienced another 6.3 magnitude earthquake on June 13th, followed by many other large after-shocks, including a shake on June 21st 2011, measuring 5.3.

Orana Wildlife Park is absolutely committed to completing this project and housing Maud Island Frogs. Our team plans to continue working on the habitat and as contractors become available we will finish the development. Once the project is complete, we intend to house some introduced amphibians (in completely separate habitats) and will be in contact with the New Zealand Department of Conservation to arrange a more appropriate time to transfer the animals.

Progress highlights

Two staff attended husbandry workshops and visited other amphibian facilities in New Zealand.

Habitat building partially completed, but awaiting internal fit-out.

Time-frame for completion of exhibit and collection of frogs has been confirmed.



Essentially the habitat remains on hold whilst we get through the difficult operating environment since the earthquakes. Our animal keeping staff levels have been restored to pre-quake levels but other areas remain short-staffed, particularly in our Development Team. In June 2012 the Park was closed for 10 days owing to extensive snow damage, further delaying the project. In September 2013 a gale force wind storm resulted in the most extensive damage we have ever suffered. However, we are pleased to report that the habitat is scheduled for completion within the next twelve months.



Construction of the Maud Island Frog Habitat has been held back due to a series of devastating earthquakes and storms.

Conservation of the Cuban Long-nosed Toad

Luis M. Díaz, Cuban National Museum of Natural History

Awarded \$5,000 in 2010

Project summary

The Cuban Long-nosed Toad, *Peltophryne longinasus*, is the first anuran species in which chytrid fungus has been found in Cuba, and is currently evaluated as Endangered following the IUCN categories and criteria. The main threats are the historical loss of suitable habitats and the very limited range of distribution. No further information exists about the impact of chytrid fungus on this species and other frogs that coexist in the same habitats.

Regarding the critical danger that chytrid fungus represents for amphibians, *ex situ* and *in situ* conservation efforts are necessary to avoid species extinction. Preliminary experiences with the captive breeding of this species exist, and may represent a good starting point for a long term captive program. This Amphibian Ark Seed Grant funding is intended to support for the following purposes:

Progress highlights

New facility created for Cuban Long-nosed Toads and other endangered species.

Small insect breeding room created.

- To develop a facility for *ex situ* conservation of the Cuban Long-nosed Toad in Cuba.
- To monitor wild populations of this species and co-occurring frogs, in order to assess the impact and spread of chytrid fungus, the habitat health and quality, and to gather basic information on the biology of species for long-term conservation.

Terrariums have been built for the aquatic Cuban Long-nosed Toad.

This project is expected to develop first actions to protect Cuban amphibians from extinction, combining *ex situ* and *in situ* strategies, particularly in this species in which chytrid fungus and habitat viability are critical threats for its survival in a period of less than ten years. New experiences derived from this project will provide the opportunity to complete a practical handbook about the biology and captive management of the Cuban Long-nosed Toad.

“Every day, amphibians are becoming more endangered in the West Indies due to a variety of threats. The AArk Seed Grant program is really important for supporting amphibian conservation projects.”

Progress to date

Our captive breeding and conservation program for the Cuban Long-nosed Toad began in 2003. First attempts to create husbandry protocols were only partially successful due to some problems with the toads, apparently linked to water quality (hard water in captivity versus soft water in the wild) or UVB suppression. Hypercalcemia developed in toads after two or three years of maintenance in captivity.

After support from Amphibian Ark in 2010, a new facility is being created for this and other endangered species. The first step for the starting facility was the creation of a small insect room to breed tropical house crickets, cockroaches, lesser-mealworms, springtails, and other species.

Long-nosed Toads require an aquatic habitat, with well-filtered and slightly moving water. In the new facility we are combining a fluorescent lamp designed to aid plant growth (Flora Glo) with a UV lamp (Repti Glo 5.0). Terrariums are equipped with HOBO data loggers, for long-term monitoring of humidity and temperature. Drainage systems and automatic control of lights has been installed throughout the facility.

An amplexant pair of Cuban Long-nosed Toads.

Female toads are ready to lay eggs every one or two months, with reproduction occurring throughout the entire year, but especially during the summer time (April to October). Contrary to other frogs and toads, Long-nosed Toads avoid breeding on rainy days, probably because it represents a risk when stream water flow increases in speed. Eggs are attached to submerged roots, plant stems, and pine needles. Each female lays up to 350 eggs. Tadpoles develop in one or two months and sexual maturity is reached in six to eight months.

Bolivian Amphibian Initiative

Arturo Muñoz Saravia, Museo de Historia Natural Alcide d’Orbigny, Bolivia

Awarded \$1,700 in 2010

Project summary

The Bolivian Amphibian Initiative has been working for a couple of years with Bolivian amphibians, and is now focusing efforts on the high Andean species of the aquatic frogs of the genus *Telmatobius*. All species in this genus are included in the IUCN Red List, some of them with very restricted distribution areas and with high levels of threat, and some include populations that have possibly already disappeared.

We are working in four main areas in this project: research, capacity building, raising awareness and captive breeding - working with six species of *Telmatobius* and other species that probably are new to science. Preliminary data is showing that some species are disappearing and the levels of threat are very high. We need to carry out more work in different activities of the project, especially the captive breeding aspect, where resources and equipment are needed to improve and expand the facilities that we are already using.

Progress to date

The Bolivian Amphibian Initiative is a relatively new project and already, we have been obtaining some very interesting data in the field and in captivity that is changing some ideas about a number of species and their conservation. The US Fish and Wildlife Service’s (USFWS) Wildlife Without Borders - Amphibians in Decline Program also supported us to work with this initiative by funding the research and with the captive breeding facility.

“This grant is providing vital support in the goals that I have as a conservationist and researcher.”

Progress highlights

New captive breeding facility created for endangered Bolivian Andean amphibians.

Ongoing field research into the causes of amphibian declines in Lake Titicaca.

World first captive breeding of *Telmatobius hintoni*.

Raising awareness with educational activities in local communities and at the Museum of Natural History.

In 2012 a Lake Titicaca Frog calendar was produced and distributed to local communities.



forty-five aquariums in a system that will keep controlled temperatures and habitat requirements of the different species we are holding.

We added four additional species of *Telmatobius* to our program, and other species that may not yet have been described. These species are monitored constantly to provide the best conditions and so we can obtain important data about their natural history, behavior, responses to diets, and reproductive periods and strategies.

We have produced offspring from *Telmatobius hintoni* which is the first time this species has been bred in captivity. After this success, we decided

try to breed the Titicaca Water Frog. After preparing the frogs and the aquariums, we introduced six pairs of frogs collected from Titicaca Lake some years ago. Only a matter of days later we had the first amplexus and weeks later the first eggs. After seven days the eggs hatched and after three months, in February 2013, we had tadpoles that are in good condition. This was the first time we have been able to breed the Titicaca Water Frog without the use of hormones or any artificial methods to induce breeding.

We are also developing fieldwork in the lake to study this species and we found that there are still some populations in the lake that are in good conditions but in some areas we recorded instances where almost 50% of the population was dead and other individuals were in very bad condition and very sick. There are several possible explanations but we need to increase our research to understand exactly what it is happening there.

Our captive breeding experiences are allowing us to better understand the natural history of the species and will also allow us to improve our work in the field and the conservation actions that we want to develop in the area. In the event that the wild populations decline further, we feel that we now have a better understanding of the species, which will allow us to hold a viable population in captivity for future reintroduction purposes.

We are currently working with Durrell Wildlife Conservation Trust in Jersey and Denver Zoo in the US who are working with some species or supporting the project in different ways. We are also coordinating with other Bolivian institutions and the government to have a better impact on the conservation activities of threatened species of Bolivian amphibians.

The work of the Bolivian Amphibian Initiative is possible thanks to the support of several institutions including the Amphibian Ark, Amphibian Specialist Group, Rufford Small Grants, Durrell Wildlife Conservation Trust, European Association of Zoos and Aquaria, Denver Zoo, Fresno Chaffee Zoo, Museo de Historia Natural Alcide d’Orbigny and Idea Wild among others.

For more information please visit www.bolivianamphibianinitiative.org.

Telmatobius hintoni in amplexus.



Progress highlights

Construction of a biosecure facility for keeping local species of frogs and insects.

Enrollment in an intensive two-month course on captive amphibian husbandry by five members of Mitsinjo.

Acclimating seven local frog species to captivity and conducting husbandry studies on their captive care.

Establishing a captive assurance colony of Golden Mantella Frogs and helping plan a reintroduction program for the species in restored habitat.

Establishing a captive breeding facility for Malagasy amphibians

Devin Edmonds, Mitsinjo Association, Andasibe, Madagascar

Awarded \$4,972 in 2009

Project summary

Slightly more than one quarter of Madagascar’s amphibian species are threatened with extinction. Habitat destruction and over-harvesting are the greatest factors contributing to this biodiversity crisis, but the impending threat of amphibian chytrid fungus *Batrachochytrium dendrobatidis* (Bd) is also of huge concern. To bring the potential threat of this disease into perspective, it has been called the “worst infectious disease ever recorded among vertebrates in terms of the numbers of species impacted and its propensity to drive them to extinction”.

Association Mitsinjo, a community-run organization founded by villagers in Andasibe, has launched Madagascar’s first amphibian captive breeding facility, which will maintain captive amphibian populations to help ensure the continued survival of species at the greatest risk of extinction. Amphibian Ark funds will be used to purchase supplies for live food production and equipment for field work. The real benefit from financially supporting this project however, will be our ability to demonstrate solid backing from Amphibian Ark on applications to leverage future funding opportunities.

Progress to date

Initial funding for building construction and assembly of vivaria was secured through the Association of Zoos and Aquariums (AZA) Conservation Endowment Fund and the Amphibian Ark Seed Grant, and construction began in late 2010. Following this start-up funding, the project was supported through numerous small grants, fundraising events, and the biodiversity offset program of a nearby nickel mine. By 2012, the facility was fully functional, run by a team of eight Mitsinjo technicians, who were maintaining more than 100 terraria housing eight local species, including a captive assurance colony of the Critically Endangered Golden Mantella Frog (*Mantella aurantiaca*).

As of August, 2013 major project accomplishments includes:

- Construction of a 185 m² biosecure facility for keeping local species of frogs and insects.
- Participation in a week-long training program on the basic biology and conservation of amphibians by fourteen members of Mitsinjo.
- Enrollment in an intensive two-month course on captive amphibian husbandry by five members of Mitsinjo, who are now working as technicians at the facility.
- Hosting an Amphibian Husbandry workshop to train staff from other Malagasy institutions in amphibian captive husbandry techniques.
- Acclimating seven local frog species to captivity and conducting husbandry studies on their captive care.
- Establishing a captive assurance colony of the Critically Endangered Golden Mantella Frog and helping plan a reintroduction program for it in restored habitat.

So far, two common frog species, *Boophis pyrrhus* and *Mantidactylus betsileanus* have been bred at the facility. The resulting tadpoles are being used to study the optimal husbandry requirements for the larvae of these species, which we hope can be applied to maintaining threatened frog species of similar ecological guilds should the need arise in the future. Additionally, technicians are gaining tremendously valuable experience raising tadpoles and frogs in captivity, and are developing a unique set of skills to aid future *ex situ* conservation action in Madagascar.

The Golden Mantella Frog is one of Madagascar’s most threatened amphibian species. To safeguard against extinction and help mitigate the loss of the mantella frog breeding sites found on the footprint of the recently established Ambatovy Nickel and Cobalt Mine, a captive assurance population of the Golden Mantella was established at the Mitsinjo breeding facility in February 2012. Initially, we collected 162 frogs and they were housed individually or in male-female pairs in a quarantine room for sixty days, isolated from other captive frogs.

Following quarantine, twenty-five breeding groups were established in separate terraria. Breeding started soon after establishing the groups and the first eggs were discovered in late June, 2012. Since then more than 200 egg clutches have been produced with all twenty-five established groups producing fertile eggs. Offspring from thirteen different groups have been held back to help maintain the captive population throughout the lifespan of the project, which is for a maximum of ten years.

In 2013, the Zoo Med Amphibian Academy Scholarship was awarded to the lead technician at the breeding facility, Justin Claude Rakotoarisoa, allowing him to attend the Amphibian Academy in Toledo, USA. Justin Claude began work with Mitsinjo in 2002 and in 2010, he stepped down as Conservation Officer to become the Lead Technician at the amphibian facility. His experience at the Amphibian Academy was extremely beneficial to his professional development and in furthering the mission of the Mitsinjo captive breeding center.

The frog team at Association Mitsinjo in Madagascar.

“The AArk Seed Grant made our project possible and launched what has become Madagascar’s first biosecure amphibian captive breeding facility.”

We are extremely grateful to AArk for helping us launch our project, and to the additional organizations which have supported the continued development of the facility since receiving the AArk Seed Grant in 2009: Woodland Park Zoo, Understory Enterprises, Ambatovy Minerals S.A., Cleveland Metroparks Zoo, Cleveland Zoological Society, Conservation International, Biopat, DGHT, SACAS, Toronto Zoo, the Wildlife Conservation Society, American Frog Day, Dendrobatiidae Nederland, Colchester Zoo, Chester Zoo, Tree Walkers International, and Durrell.

The Golden Mantella Frog is one of Madagascar’s most threatened amphibian species.



Amphibian Ark, 2013

www.AmphibianArk.org