

2011 ANNUAL REPORT

PANAMA AMPHIBIAN RESCUE AND CONSERVATION PROJECT



A project partnership between: Africam Safari, Cheyenne Mountain Zoo, Defenders of Wildlife, Houston Zoo, Smithsonian's National Zoological Park, Smithsonian Tropical Research Institute, Summit Municipal Park and Zoo New England.



MISSION

Our mission is to rescue and establish assurance colonies of amphibian species that are in extreme danger of extinction throughout Panama. We will also focus our efforts and expertise on developing methodologies to reduce the impact of the amphibian chytrid fungus (*Bd*) so that one day captive amphibians may be re-introduced to the wild.

VISION

The Panama Amphibian Rescue and Conservation Project will be a sustainably financed, Panamanian-led organization that has stemmed the tide of extinctions caused by amphibian chytrid fungus and other threats to amphibians. We will lead successful recovery programs for Panama's endangered amphibians and serve as an exemplary model that can be replicated to address the threat of chytridiomycosis to the survival of amphibians worldwide.

EXPEDITIONS

In 2011, we conducted one expedition to Cerro Sapo in the Darien and secured an adequate founding population of toad mountain harlequin frogs (*Atelopus certus*). We also received news from collaborator Doug Woodhams that *Bd* was detected in Torti on the border of the Darien province in January 2010. We tried several times to get back to Cerro Pirre in the Darien region, but setbacks included flooding and reports of FARC activities in the area. As a result, we focused the bulk of our efforts on central Panama with eight expeditions to the Mamoni River Valley, Cerro Brewster, Cerro Bruja and Chucunaque River Valley. The primary focus was on securing a more adequate founding population for species already held at Gamboa or the El Valle Amphibian Conservation Center (EVACC).



Atelopus certus collected during 2011 expeditions now form a founding colony in an ex-situ assurance population



EL VALLE AMPHIBIAN CONSERVATION CENTER

In early 2011, the Houston Zoo and Minera Panama signed an agreement that would provide financial support to increase the capacity of EVACC by 20 percent as well as funding for rescue expeditions into the mining area. The new building, which began pre-construction activities in late 2011, will feature another bio-secure amphibian breeding area and dormitory facilities for visiting scholars and volunteers. The facility will be operational by mid-2012.

Space at EVACC remains limited, but the reproduction of amphibian species achieved new levels of success in 2011, with the breeding and rearing of offspring from ~70 percent of the priority species (nine out of 13 species). Three species of harlequin frogs were bred (variable harlequin frogs (*A. varius*), Pirre harlequin frogs (*A. glyphus*), and Limosa harlequin frogs (*A. limosus*), and reproduction occurred with three species of direct developing anurans rusty robber frogs *Strabomantis bufoniformis*, *Pristimantis museosus*, and *Craugastor tabasarae*. Horned marsupial frogs (*Gastrotheca cornuta*), banded horned tree frogs (*Hemiphractus fasciatus*), and crowned tree frogs (*Anothea spinosa*) continue to produce well, and we are pleased to report the second captive-reared generation of this species (F2) was successfully reared through metamorphosis. The remaining Panamanian golden frogs (*Atelopus zeteki*) did well and produced several clutches of eggs that did not develop. Reproducing this species is the highest priority for 2012.

William Devenport joined the EVACC team in late July 2011. A graduate of Southern Illinois University, William volunteered for the remainder of the year and provided very valuable assistance to the project during this time.

Denise Kueng, a master's student at Zurich University, developed a study on two Panamanian species of amphibians (*Centrolene prosoblepon* and *Colostethus panamensis*) and carried them out with the assistance of the EVACC team. Kueng's studied bacterial communities and antimicrobial peptides on amphibians' skin and look at how it changes after several weeks living in captivity.



AMPHIBIAN RESCUE AND CONSERVATION CENTER, SUMMIT ZOO

In 2011, we made the decision to move the amphibian rescue facility from the Summit Zoo to Smithsonian property in Gamboa. The move will facilitate provision of maintenance support, supervision of infrastructural improvements, volunteer housing and access to the scientific community. As a result we commissioned architectural drawings for the new facility which will be located in the Santa Cruz area of Gamboa. Phase I will be the installation of seven 400-square-foot modified shipping containers donated by Maersk to house the collection and to rear insects, along with a backup-generator, and waste-water treatment facility. Phase II will involve the construction of a 1,300-square-foot support building with two offices, a toilet, a lab, a quarantine area and storage to support future collections, research and reintroduction work. Securing funding for phase II is our top priority for 2012. We have conducted an environmental impact assessment and will begin phase I construction in 2012.

Our primary focus this year was on securing an adequate founding population of the chevron patterned Limosa harlequin frogs (*Atelopus limosus*). While populations have declined dramatically throughout central Panama making them very difficult to find, we were able to grow our captive population to 28 males, eight females and 10 juveniles. We have still not successfully bred this species in captivity, but believe that we will meet this milestone in 2012. Our toad mountain harlequin frogs (*Atelopus certus*) from Cerro Sapo in the Darien region are doing well. We have 49 males and 39 females, with 72 captive-bred offspring now approaching adult sizes from two clutches. We have a good founding population of 24 male and 29 female Pirre harlequin frogs (*Atelopus glyphus*) and are rearing two clutches of captive-bred tadpoles. La loma treefrogs (*Hyloscirtus colymba*) have been a more challenging species with steady loss of our founding animals due to attrition throughout the last year. We have two males and 10 females, but apart from a single breeding event in 2010 we have not had any more offspring, despite intensive efforts. We have four undescribed robber frogs *Craugastor cf punctariolus* collected during initial *Bd*-related declines in 2009, but have not found any more in the field since then.

Aracelys De Gracia, our insect keeper, left the project last year to further her education, and we welcomed Nancy Fairchild, a former volunteer, to fill her position. In terms of professional development and training, we were proud that Angie Estrada was awarded an AZA scholarship to attend the AZA amphibian husbandry training course in Toledo, Ohio. It was a rewarding experience for Angie to have exposure to a lot of different systems and ideas out there and we are grateful to Association of Zoos and Aquariums for providing this opportunity.



Captive-bred *Atelopus* tadpoles and recent *Atelopus glyphus* metamorph (above)



Jennifer Mickelberg, an animal population management expert from the Smithsonian Conservation Biology Institute, teaching principles of animal population management

POPULATION MANAGEMENT AND ASSISTED REPRODUCTION

With the commitment to take on an ex-situ population of a species comes responsibility to manage the population in a way that will preserve the genetic integrity of the species. Jennifer Mickelberg (Smithsonian Conservation Biology Institute) and Kristine Schad (Lincoln Park Zoo) recently hosted the first of what we hope will be a series of workshops training conservation technicians on amphibian population management guidelines. These guidelines aim to preserve the maximum number of genes from the original wild-caught founding animals. The conservation technicians maintain animal records in a studbook and analyze population data and optimal pairings using SPARKS and PopLink management software. In addition, we have Gina DellaTogna, a Panamanian PhD student at the University of Maryland, who is working on developing assisted reproduction methods for *Atelopus*. Gina is exploring the possibility of freezing sperm from founding animals and coordinating closely with the Amphibian Ark biobanking committee. If successful, these tools will allow us to cryobank gametes of valuable founding animals and provide further insurance to help maintain the genetic diversity of valuable founding animals well into the future.



Shawna Cikanek and Matt Becker working with the golden frog research colony established at the Smithsonian Conservation Biology Institute through the generous assistance of Project Golden Frog and the Maryland Zoo in Baltimore.

SEARCH FOR A METHOD TO CONTROL CHYTRIDIOMYCOSIS

Matt Becker, a PhD student at Virginia Tech University painstakingly tested more than 600 bacterial isolates from swabs taken from Panamanian frog species in 2011. He cultured and tested all the bacterial extracts against chytrid fungus for anti-fungal properties and found 50 isolates that inhibited chytrid growth. We prioritized those for trials and are now running experiments to test whether those bacteria can live on golden frog skin. Shawna Cikanek, a Kansas State Veterinary School student tested endocrine responses of the frogs to different probiotic treatments. Perhaps the biggest news of 2011 is that the National Science Foundation awarded a \$2 million “dimensions of biodiversity” grant to our collaborators Lisa Belden (VA Tech), Reid Harris (James Madison University) and Kevin Minbiole (Villanova University) to look at the relationships between microbe communities and chytridiomycosis in Panama. This will greatly expand our capacity to understand the emerging field of skin-microbe interactions throughout the next four years.



EDUCATION AND OUTREACH

2011 was the first year we officially celebrated August 14th as Golden Frog Day in Panama. We organized a celebration at the Summit Zoo. We also participated in a parade in El Valle followed by educational activities, a play and lectures at EVACC. Golden Frog Day legislation was only passed in 2010 and this is a major opportunity to do more effective organization and outreach involving local communities for next year. Part of the National Science Foundation research grant includes four years of funding for an education program for the project so we will increase our outreach capacity significantly in 2012.

Online: Our big achievement this year was to get our website translated and to recruit two volunteer translators to help us keep the Spanish site fresh. We received more than 25,000 unique visitors to amphibianrescue.org in 2011 (a 25 percent increase), with about 57,000 page views from 146 countries around the world. New features included an online store through Cafepress and an Amazon wishlist. Our social media strategy focused on recruiting and establishing an online relationship with constituents. In 2011, we gained 1,000 new Facebook fans for a total of 4,500. Of these, 1,800 are from Panama, versus 1,400 from the United States. Content posted to Facebook was viewed 460,000 times with 2,700 feedback actions. We doubled our Twitter following to 1,300 people and noticed that environmental conversations on Twitter are beginning to blossom as more people in environmental fields catch on to this social media tool.

Traditional media: In October we premiered an award-winning one-hour documentary on the project titled *Mission Critical: Amphibian Rescue* on Smithsonian Networks. It is available for download on iTunes and a trailer can be viewed on our website. Twenty independent [news articles](#) about the project were published in 2011, including features in Defenders of Wildlife Magazine, Zooborns, BBC, Reuters and Nature.

Volunteer program: In 2011, we recruited 11 international volunteers and 23 local Panamanian volunteers with a total of 34 “graduates” of the Panama Amphibian Rescue and Conservation Project. Highlights of the volunteer program include a draft education and outreach plan developed by Meryl Monfort and University of York volunteer Simon Nockold who conducted research showing that we could group harlequin frogs, allowing us to increase the effective holding capacity for our collection.



Panama's National Golden Frog Day celebrations in El Valle de Anton, and the Summit Municipal Park.

FINANCIAL REPORT FOR CALENDAR YEAR 2011

	FUNDING SOURCE	2011 Expenses
EVACC Staff & Supplies	<i>Houston Zoo and EVACC donors</i>	\$ 81,000
EVACC infrastructure	<i>Houston Zoo and EVACC donors</i>	\$ 27,000
Gamboa Facilities & containers		
	<i>Defenders of Wildlife</i>	\$ 9,861
	<i>Africam Safari</i>	\$ 5,731
	<i>SCBI and donors</i>	\$ 13,427
Gamboa Staff Salaries		
	<i>STRI</i>	\$ 32,000
	<i>Cheyenne Mountain Zoo</i>	\$ 41,630
	<i>Defenders of Wildlife</i>	\$ 32,000
Supplies & Expeditions		
	<i>USFWS</i>	\$ 28,632
	<i>Africam Safari</i>	\$ 17,449
	<i>Cheyenne Mountain Zoo</i>	\$ 604
Cure research & sperm freezing		
	<i>USFWS</i>	\$ 8,593
	<i>SCBI and donors - cure</i>	\$ 18,510
	<i>USS Endowment (Smithsonian)</i>	\$ 11,147
SCBI staff salary and travel	<i>SCBI and donors</i>	\$ 115,333
		\$ 442,917

Note: Income from project partners African Safari, Cheyenne Mountain Zoo, Defenders of Wildlife, Zoo New England, STRI, SCBI, was received under a 3-year MOU. Here we report expenditures in an operating budget format rather than income or grant award amounts. Zoo New England's 2011 contribution of \$35,750 was allocated to Phase I construction needs in calendar year 2012.



DONORS

In addition to the contributions from project partners, we are grateful to the following donors who have made additional contributions to the project directly or via the Houston Zoo: Anele Kolohe Foundation, Baton Rouge Zoo, Bay and Paul Foundation, Buffalo Zoo, Cleveland MetroParks Zoo, Greenville Zoo, Utah's Hogle Zoo, Anne B. Keiser, Oregon Zoo, Oklahoma City Zoo, Shared Earth Foundation, Susan and Frank Mars, Maersk, Minera Panama, Riverbanks Zoo and Garden, Sedgwick County Zoo, and the U.S. Fish and Wildlife Service.

ONLINE CONTRIBUTIONS

Our sincere thanks to the following individuals who contributed \$25 or more online:

Terri Barr, Bonnie Bell, Ron Bennett, Jennifer Bose, Emily Coronado, Melvin Davis, Reine DesRosiers, Micaela Eschman, Casey Hogle, Tarna Kidder, Pamela Kittler, Jillian Nash, Mario Rups, Louise Shelley, Sylvia Spengler, Eric Stubbs, Leonard Swift, Nicole Van Houten, Bravo Verde, Richard Wolfson, and Adelynn Woodward.

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Technical Staff – William Devenport, Matilde Pérez

STEERING COMMITTEE

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Peter Riger, Alan Pessier, Eric Baitchman, Paul Crump, William Devenport, Heidi Ross, Angie Estrada, Jorge Guerrell, Della Garelle, Roberto Ibáñez

2011 VOLUNTEERS

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ACKNOWLEDGEMENTS

We are very grateful to the following people and organizations for their invaluable assistance and advice in the design and execution of this project: Autoridad Nacional del Ambiente (ANAM), Pamela Baker-Masson, Matt Becker, Lisa Belden, Ed Bronikowski, James Carpenter, Shawna Cikanek, Andrew Crawford, Lesli Creedon, Sharon Devine, Matt Evans, Rob Fleischer, Ron Gagliardo, Reid Harris, Katherine Hope, Warren Lynch, Jerry Marantelli, Tom Mason, Roy McDiarmid, Jennifer Mickelberg, Kevin Minbiole, Don Moore, Cathi Morrison, Jim Murphy, Suzan Murray, Kevin Murphy, Luis Padilla, Rachel Page, Lou Perrotti, Allan Pessier, Vicky Poole, Rick Quintero, George Rabb, Geoff Reynolds, Louise Rollins-Smith, Oris Sanjur, Kristine Schad, Jennifer Sevin, Ed Smith, Ruth Stolk, Nicole Tarmon, Tim Walsh, Lisa Ware, Dave Wildt, Brad Wilson, Doug Woodhams, and Kevin Zippel.



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