

Saving Endangered Amphibians from the Ecuadorian Andes through *ex situ* conservation and local community involvement

MARTÍNEZ RIVERA, CARLOS C., PhD.

3400 W Girard Ave. The Philadelphia Zoo, Philadelphia, PA 19104 USA

martinezrivera.carlos@phillyzoo.org; carlos@amphibianark.org

Abstract. The Philadelphia Zoo's Amphibian Conservation Program was established in 2008 as a response to the global amphibian extinction crisis. Our program aims to: (1) understand the causes of declines and extinctions; (2) document amphibian diversity, and how it is changing; (3) develop and implement long-term conservation programs, and (4) be able to respond to immediate crises (IUCN 2005, Amphibian Conservation Action Plan). We concentrate our efforts on endangered amphibians from the Caribbean and Andean regions working closely with many partners including Amphibian Ark, ALPZA (Latin American Association of Zoological Parks and Aquariums), and local museums and governments. We collaborate with local researchers and engage in capacity- building, and ecological research of these amphibian populations with the help of and villagers. We also try to establish captive breeding programs both at the Zoo and in the field. Here we share some news on our efforts on conserving endangered amphibians from Ecuador.

Introduction. Ecuador ranks third among New World countries in number of amphibian taxa of conservation concern. Most are frogs and toads that inhabit pre-montane and montane forest and high altitude habitats where deforestation, habitat degradation and the lethal fungus *Batrachochytrium dendrobatidis* (*Bd*) all seem to combine and negatively impact amphibian fauna. In some cases, single populations of some of the most critically endangered amphibians species, is all that remains.

The dire reality that the amphibians of this mega diverse, small South American country are facing, prompted us to begin working with local and international partners to save its most critically endangered amphibians.



The San Lucas Marsupial frog (*Gastrotheca pseustes*) is one of the amphibians kept on our *ex situ* assurance colonies; it was once very abundant at Cajas National Park, however it is now steadily declining. We are testing all of the known amphibian species in the park for the presence of the fungal pathogen *Bd* as a possible cause of amphibian decline. Outreach and educational programs carried by Zoo Amaru's education staff make sure that children learn the roles of amphibians in the environment and how their health is connected to the health of amphibians and the forest in general.

The Amphibian Conservation Center – Mazán Forest was created to save four critically endangered amphibians: the green Cajas harlequin toad, *Atelopus exiguus* (B. above and top right); the black Cajas harlequin toad, *Atelopus nanay* (second top right); the San Lucas marsupial frog, *Gastrotheca pseustes* (above) and the Andean rocket frog, *Hyloxalus vertebralis* (D. above). We have established assurance colonies and species survival plans for each for these species and are continuously monitor wild populations through *in situ* research to prepare for the eventual re-introduction phase. This project began as an initiative from the local Zoo Amaru and Cajas National Park to help rescue the park's endangered amphibians with an in-range, ex-situ breeding and research facility located inside the Mazán Forest adjacent to the park in the Andean Mountains near the city of Cuenca, Ecuador. The Philadelphia Zoo joined in 2008 as the main financial supporter and scientific collaborator engaged in research, captive breeding, and management of wild populations. Our goals are to: (1) Identify and mitigate the specific causes of population collapse for each species at the landscape level; (2) Repopulate wild populations of these species via ark/rescue *ex situ* conservation; (3) Monitor existing and repopulated populations to observe their progress in the wild; and more importantly, (4) work with park rangers and the local urban and rural communities to increase awareness of the amphibian extinction crisis and engage locals in Ecuador and Zoo public here in Philadelphia to help us gather data and directly conserve these critically endangered species.

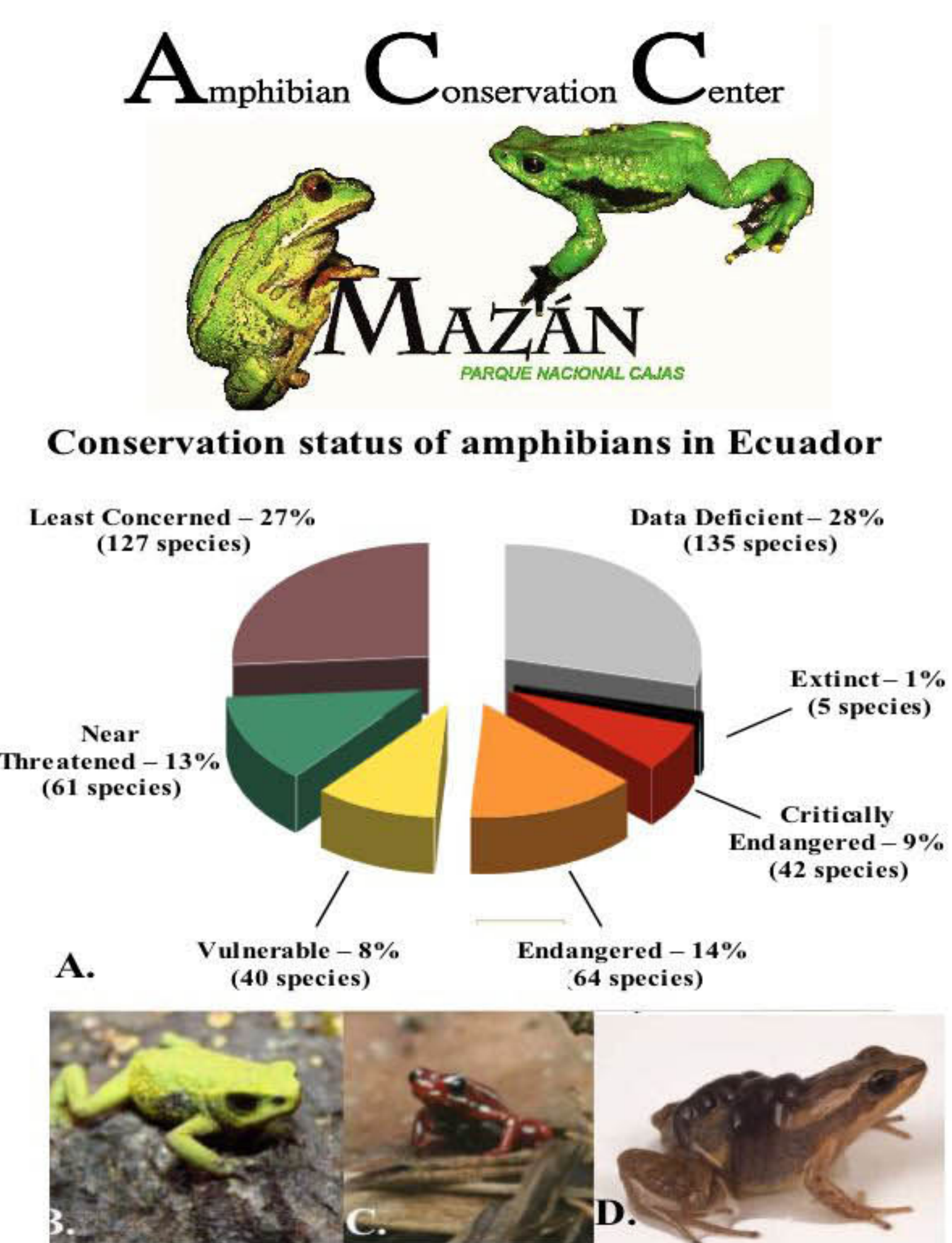


Photo Credits: Teresa Camacho (B); Carlos C. Martínez (C); Luis Coloma (D)
The Amphibian Conservation Center-Mazán Forest; Cajas National Park, Ecuador. A. Conservation status of the 474 known amphibians in Ecuador. B. Green Cajas harlequin toad *Atelopus exiguus* (Critically endangered), C. Tri-color poison frog *Epipedobates anthonyi* (Near threatened); D. Andean Rocket frog *Hyloxalus vertebralis*, male carrying tadpoles (Endangered).



Green Cajas harlequin toad



Black Cajas harlequin toad



Pastaza harlequin toad



Jambato Collarejo



Wampukrum

The Endangered Harlequin Toads of Ecuador. Disney's Worldwide Conservation Fund, helped us study these five critically endangered harlequin toads. Surveys were carried together with students from Universidad de Loja and Universidad del Azuay and with local villagers from Tiink and Patul communities. The Green Cajas harlequin toad and the Black Cajas harlequin toad, which are also part of the Amphibian Conservation Center – Mazán Forest were studied in this project. Working with local researchers and training local villagers to conduct community based searches for these frogs was the key to our success. Unfortunately, harlequin toads are in such critical condition, that many hours of field search are required to find even one individuals. Our work simply would have not been possible without this collaborative approach. The Pastaza harlequin toad, thought to be extinct since 1980 and the jambato collarejo, last seen in 1985, were re-discovered by our team on 2009. The colorful Wampukrum is yet to be described by science, however data gather by our native Shuar field technicians suggest a significant decline possibly due to the deadly *Bd* fungus.

The Wampukrum and the community of Tiink. In recent years, two populations of a yet un-described species of harlequin toad, known by the local Shuar as Wampukrum, were reported from mid elevation forests of the Cordillera del Cóndor Morona Santiago province, Ecuador. Unfortunately, one population was eliminated; the area immediately above their main breeding site was cleared for construction and is now part of a new inter-provincial highway. The other only known population has been the focus of our study for the past two years and consists of five different localities near the native Shuar community of Tiink. Our work has been possible, by working closely with the native Shuar community of Tiink. Noting the pressing needs to keep this species alive, we have decided to continue monitoring Wampukrum.



Atelopus wampukrum
Limón harlequin toad
Sapito wampukrum



We continue to monitor the only known remaining population of Wampukrum to map its habitat to discern its ecological requirements and also to determine if the presence of *Bd* is having a species threatening effect and its effect on this charismatic harlequin toad and other amphibians. Our team engages in outreach and capacity building at Tiink, the Shuar community where Wampukrum lives. Germán Petsaín works with us, gathering data and monitoring the only five localities known for this species. We are working closely with Germán and Nature and Culture International to make Germán's life long dream a reality and designate the habitat of the Wampukrum as a recognized protected area within Cordillera del Condor in Southern Ecuador.

