

## The Rufford Foundation Final Report

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Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to [jane@rufford.org](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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Grant Recipient Details	
Your name	Juan Gabriel Abarca Alvarado
Project title	In Searching of Missing Frog Species in Costa Rica: Rediscovery Critically Endangered Species in a Time of Extinction
RSG reference	13534-1
Reporting period	From 04/25/14 to 12/25/15
Amount of grant	£5993
Your email address	antinosedal@yahoo.es
Date of this report	02/02/2016

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Spend 4 nights at Reserva Cerro Dantas.			X	We found 119 individuals of 14 species of frogs, 3 Critically Endangered, 2 Vulnerable. But, any target species was found.
Spend 4 nights at Tapanti National Park			x	A specimen of <i>Isthmohyla tica</i> was found in the Tapanti Park. This species was not observed in that area since the 1980s.
Spend 3 nights in Punta Banco			x	The number of populations of <i>Craugastor taurus</i> increased because we found three other streams in the area with many specimens of that species.
Spend 4 nights at Cerro Uthyum			x	We surveyed the Cerro Uthyum three times and spent between 3 to 5 days each time. We found several specimens of salamanders belonging to two species, both of them new to science (actually under description). Also we found a species of tink frog related to <i>Diasporus hylaeformis</i> and probably a new species. At the end we collect topotypes related to <i>Craugastor podiciferus</i> to establish the status taxonomic of this complex clade.
Re-survey William Gabb first Costa Rican herpetology transect between Suretka to Cerro Kamuk (1871)		x		We surveyed the peak of Cerro Kamuk and the first 1000 m from Suretka to the top of the hill. We gathered topotypes for several species of amphibians and reptiles to establish taxonomic status of other populations of those species in the country. Also we found <i>Diasporus tigrillo</i> , a tink frog not seen since its discovery in the 1970s. Several new observations on the natural history of the species observed are in preparation to be published. The absence of water between 1000-2000 m made it difficult to continue the survey.
Spend three days in the páramo of Cerro Ena			X	Cerro Ena is the next peak to the east of Cerro de la Muerte and Cerro Chirripó. We collected salamanders for this area to determine the divergence between this populations and the salamanders of the former peaks related to <i>Bolitoglossa</i>

				<i>pesrubra</i> , the only declining species of salamanders in the country. We finished the genetics and morphological analysis. We will prepare a manuscript in relation to this work.
Spend 3 days in Cerro Echandy			X	We collected several specimens of two species of salamanders in the páramo of this peak. One of them is related to a smaller species of salamander in the country and it is only known for the specimens collected in the 1980s. The other belongs to a species only known close to 1000 m below this new locality, representing a new record of altitude for this species.
Spend 4 nights at Volcan Turrialba			?	The ash eruption of the volcano Turrialba prevented the surveys
Searching information for all target and disappearing species.			X	From 27 missing species, we have information of 13 species which reappear in different places in Costa Rica. Of our original target species only we have information of <i>Isthmohyla pictipes</i> . We are in process to prepare the manuscript with that information.
Make a documentary of all species re-appeared.		X		All fieldwork of video-recording species, sites and people was fully completed. We are in process of editing one extensive TV documentary in which we show our investigation of searching for missing species, and more information about the conservation status of Costa Rican frogs.

**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

Mason Ryan could not travel to Costa Rica so the Turrialba Volcano surveys could not occur. The first survey at Cerro Uthyum was to build a trail to reach the Atlantic versant of the peak. During the survey we trekked through the paramo vegetation for many hours until we reached the Atlantic forest. The absence of potable water in the area made this much more difficult.

Several participants in the project left the country to pursue their doctorate or master's degrees and we had fewer people to carry out field trips. Therefore we could not visit Turrialba Volcano and Tapanti National Park. We decided to revisit other sites with relict populations with a film crew to document their population status and capture video images. The objective is to use the video documentary as a conservation and capacity building tool to highlight the importance of amphibian

conservation to a broader community of people and researchers. This documentary will be presented at national and international level.

Because no target species were found, we remain dedicated to the task of collecting further information on all species that have been reported missing. This is resulting in more reports of missing species observations in other parts of the country. This information was gathered through collaborations with scientists other areas of the country included Heinz Hoffmann, Bryan Kubicki, José F. González–Maya, Hector Zumbado, Twan Leenders, Mark Wainwright and Gilbert Alvarado. The results of the data allow us to show an overview of these species in the country, since despite having many reports of re-emergence of species, these are anecdotal and not all observations are published or collected in a single article.

### **3. Briefly describe the three most important outcomes of your project.**

#### **1. Search for lost species:**

In Cerro Dantas we recorded 14 amphibian species, five of which are highly threatened or endangered according to the IUCN. The populations of these species appear to be very restricted and small, due to the low number of individuals detected. This suggests that there is a great need for more sampling and study to determine accurate management and protection of their habitats. The most important species at Cerro Dantas are *Incilius holdridgei*, *Isthmohyla rivularis*, *I. angustilineata* and *Lithobates vibicarius*. I found the presence of adults, juveniles and tadpoles of *I. rivularis*, providing evidence of successful reproduction and recruitment into the population. This finding provides hope of natural recovery in fast flowing rivers and montane habitats where this and many other species disappeared. The presence of this species opens the possibility of finding more in the same habitat in the future, as it seems they are repopulating the sites but very slowly.

The population status of *Craugastor taurus* from Punta Burica is in very good condition. This species is present in many streams and in all of them there are many individuals.

The presence of *Isthmohyla tica* in Tapanti National Park increase the number of populations of decline species discovery in the country.

#### **2. Summary of rediscovered species.**

A compilation of data was done everywhere we sampled and studied to identify amphibian species in decline areas. We compiled published references, personal observations and personal communications from reliable sources. The collection of information, either items or personal references, was obtained for the 27 species that had been mentioned as with small populations as of 1980, of which 13 species have been rediscovered in recent years. This leaves 14 species of which there are no indications or recent observation in Costa Rica.

The re-appearing species in Costa Rica are:

*Agalychnis annae*, *A. lemur*, *Atelopus varius*, *Craugastor fleischmanni*, *C. ranoides*, *C. taurus*, *Duellmanohyla uranochroa*, *Incilius holdridgei*, *Isthmohyla angustilineata*, *I. rivularis*, *I. pictipes*, *I. tica*, *Lithobates vibicarius*, and *Ptychohyla legleri*.

Species whose populations have declined and there are no reports of their presence in Costa Rica are:

*Atelopus chiriquiensis*, *A. chirripoensis*, *A. senex*, *Craugastor andi*, *C. angelicus*, *C. catalinae*, *C. escoces*, *C. gulosus*, *C. obesus*, *Incilius periglenes*, *I. fastidiosus*, *Isthmohyla calypsa*, *I. debilis*.

Data distribution and population status of each species we are preparing for the article. Missing species are listed as Critically Endangered or Extinct, and rediscovered species are listed as Critically Endangered, Vulnerable and Endangered. With current distribution data, we can make maps of the relict populations and can also make maps of the species that have not appeared, to set new search sites focusing on these species.

### **3. A documentary on the rediscovery of frogs in Costa Rica.**

With the agreement of the members of the project, we allocated funds for the completion of a television documentary to focus on amphibian conservation projects in Costa Rica. The documentary followed us to several areas of the country where endangered amphibian species exists to capture rare video footage of critically endangered species and their habitats there. We also interviewed national and international researchers, which have conservation projects or have had any relevance to the study of amphibians at or over the past years.

The audiovisual material will produce is the first Costa Rican documentary about the issue of re-appearances of amphibians in the country, the same is being done in conjunction with the LAUDI (Audiovisual Documentarism Investigative Laboratory) of the University of Costa Rica, which have collected the latest information of all the research that has been done at national level on the conservation of amphibians.

### **4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).**

The communities who live next to the frogs populations benefit from this work through education and outreach of the importance of these forested for conservation. Our reach to local communities will aid in developing capacity for monitoring and introduce residents to the importance of habitat protection and scientific research.

For the surveys to Uthyum and Kamuk peaks, some local baquianos were used for searching for amphibians in the country. They are considered as assistants in the field for other research in amphibians studies.

Also, all communities in the country will benefit from the documentary, because it will be a flow of information between scientific communities and people in general. Every conservation project managers are benefitted because with this documentary will present their programs and how they are working, so there will be a space at the national level to share their interests and knowledge.

### **5. Are there any plans to continue this work?**

Yes. We plan to continue looking for certain species that are still missing, focusing on other locations and shift some target species, looking at others more likely to be found. For example, *Incilius fastidiosus*, *Craugastor catalinae*, *Isthmohyla calypsa* or *Isthmohyla debilis* are species with a similar

ecology to other frogs rediscovered. The last two are similar cases in other leaf frogs in highlands, which have already been found in several parts of the country, making it probable that in the coming years they will appear again. We also plan to confirm the sighting of *I. pictipes* as it has only been anecdotal, through a personal communication from an official of the Ministry of Environment. And finally we have thought to look for *I. fastidiosus*, whose ecology is similar to *I. holdridgei*, in addition to its historic range is broader, and may be in similar sites that today is *I. holdridgei*. We plan to survey others streams in the Pacific versant for searching new populations of *Atelopus varius*. This species is only known from four sites in Costa Rica, but during this project we hear about other populations that it is need to confirm.

#### **6. How do you plan to share the results of your work with others?**

We plan to produce one Inglés-language article as a result of this research. Showing results of the species found, and will be published in international journal amphibian conservation. (i.e., Conservation Biology).

University of Costa Rica will produce a long video, this documentary will be presented at an open activity inside the University facilities. It will also be broadcast on Channel 15 of the University of Costa Rica and will be shared through YouTube, and several web pages associated with the various partners.

#### **7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?**

When we received the funds in June 2014 we wanted to do the expedition from November 2014 to March 2015 - the field trips Cerro Dantas were completed in March 2015.

The surveys of the peaks in the Cordillera de Talamanca were carried out during the vacation periods of the year to avoid the class time and increased the length of the time in the file. December, January and July were the months of the surveys

We were waiting for the other field trips, but many problems were not made in the dry season, so we decided to wait for the next dry season that began in December 2015. We estimated 4 weeks for each expedition, with all collaborators and it was not continuous.

Turrialba expeditions could not be performed, these delays were caused by Mason Ryan could not travel to Costa Rica, this limited organising various tours and the volcano became active and was completely restricted access. Other collaborators had to leave the country to make their Master or PhD degrees, Juan Abarca admission to a Masters in Microbiology which limited the time for field trips. Adrian Garcia left the country to take a doctorate in Brasil and Hector Zumbado also for England. Thus, the team in Costa Rica I was formed only by Juan Abarca and Gerardo Chaves participate in all the surveys to their respective cordilleras and the other researches collaborate in some of the field work.

The documentary field trips include the period from July 2014 to August 2015 and the editing process still continues.

**8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
GPS	£ 298	£ 336,78	£ -38,78	The model was no longer available budget, so we will get the most recent.
Permits	£ 127	£ 29,77	£ 97,23	Collection permits were processed through the Museum of Zoology of the UCR.
Documentary	£ 0	£ 603,24	£ -603,24	The documentary was made by mutual agreement of the project researchers, and other expenses will be used in post-production and dissemination of audiovisual material.
Batteries, light, guides.	£ 900	£ 118,12	£ 781,88	No guides were paid, but attendees paid for tours of Cerro Dantas.
Expenses trip Cerro Dantas	£ 718,75	£ 229,49	£ 489,26	Full tours of Cerro Dantas
Expenses trip Amubri Kamuk	£ 0	£ 43,42	£ -43,42	We pay one of the local guide for 5 days.
Expenses trip Echandi-Ena	£ 0	£ 694,02	£ -694,02	Purchases to go to the two hills were made at the same time. The skilled person will pay for both tours.
Expenses trip Punta Banco	£ 0	£ 229,32	£ -229,32	It includes expenses of the previous semester at the entrance of money.
Expenses trip Uthyum	£ 718,75	£ 1.041	£ -322,27	Three tours were conducted, with two local guides. The cost of the tour is calculated from the Ena and Echandi hills expenses because those bills were lost tours.
Expenses trip Tapanti	£ 718,75	£ 0,00	£ 718,75	No new to this site tours are conducted.
Expenses trip Turrialba	£ 718,75	£ 0,00	£ 718,75	No new to this site tours are conducted.
<i>Amount allocated to Mason Ryan.</i>	£ 1973	£ 0,00	£ 1973	Mason Ryan could not travel to Costa Rica so this money was not used.
<b>Total</b>	<b>£ 5993</b>	<b>£3.325,18</b>	<b>£ 2.847,82</b>	

**9. Looking ahead, what do you feel are the important next steps?**

Establish conservation status of re-appeared species. To continue search Turrialba Volcano, in other areas of Cerro Chompipe, because this search a few days only covered a small part of the Braulio Carrillo National Park, this is one of the most extensive parks. In addition, further searches in new areas in the Pacific sector of the Cordillera de Talamanca. For example, in places like Las Tablas and the canton of Dota, to look to other species previously mentioned. The next step is to show the community the results of the documentary and establish a network of partners to report new species discovered.

**10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?**

Yes. In the distribution of the documentary, when we edit it, we will be made in the acknowledgments to the Rufford Foundation, and in short to be made before editing it.

**11. Any other comments?**

In addition to the scientific objectives, we could make collaboration with several researchers for the development of audiovisual material that will be shown to the general public, when the documentary is finished. Frog populations that have been found are those with high priority for conservation efforts in Costa Rica. Although there is still hope and some sites have yet to visit, species that have not been found definitely be considered really missing and possibly extinct. In the course of several years, we have detected the presence of 14 species that are slowly recovering, so we expect for the coming years other lost species will meet again, as soon as they make greater efforts sampling at old and new locations.

