UNIVERSITY OF YAOUNDE I
Faculty of Sciences,
Laboratory of Zoology
P.O. Box 812 Laboratory of Zoology, Yaoundé, Cameroon
Arnaud Marius Tchassem Fokoua. Phone +237 693 97 71 90
Email: arnaudtchassem@yahoo.fr /

Final Report 2020
Project 182520003

CONSERVING THE CRITICALLY ENDANGERED, EDGE-LISTED BAMBOUTOS EGG FROG, *LEPTODACTYLODON AXILLARIS* ON MOUNT BAMBOUTOS, CAMEROON

Prepared by

TCHASSEM FOKOUA Arnaud Marius

Final Report 2020

Ministry of Scientific Research & Innovation (MINRESI) permit #:
(13/MINRESI/B00/C00/C10/C10)

Ministry of Forestry & Wildlife (MINFOF) permit #:
(629PRS/MINFOF/SG/DFAP/SDVEF/SC)

Donors

Acknowledgements
The project thanks the Cameroon government, through the Ministry of Scientific Research & Innovation and the Ministry of Forestry and Wildlife. The communities of Fido, the main village around Mount Bamboutos, are also thanked for their hospitality and assistance for this work to happen.

Title page image: *Leptodactylodon axillaris,* Mount Bamboutos, West Region, Cameroon.

INTRODUCTION

1. Project background/justification/context:

Cameroon is one of the most diverse countries in terms of amphibians (IUCN 2017). The Bamenda Highlands (the northern highlands of Cameroon), which include Mount Bamboutos, are an area of exceptionally high amphibian diversity and endemism. It harbors at least 100 species of amphibians. The mountains is home to 50% of all the threatened amphibians known to occur in Cameroon (Bergl *et al*., 2007). Unfortunately, increasing pressures from surrounding communities seriously threatens the biological resources of the mountain. Recent surveys indicate that threatened species still exist in the area but their habitats are fast disappearing (Tchassem *et al.,* 2018).

The Bamboutos Egg Frog, *Leptodactylodon axillaris,* can be found only on Mount Bamboutos. Its restricted geographic range has led to the listing of the species as Critically Endangered (IUCN 2019). Interestingly, even on Mount Bamboutos, the egg frog can be found within very limited elevation range (between 2450 - 2600 m a.s.l.).

Despite it being an Alliance for Zero Extinction site, none of the natural habitats on Mount Bamboutos are officially protected. The mountain range has a high human population density, leading to historically extensive habitat loss. All habitats have been reduced in size or disturbed through various forms of human activities. The remnant forest habitat on the mountain which is so critical to the frog's survival is undergoing rapid conversion and degradation. Forest conversion and degradation is caused by agricultural activities by local farmers such as shifting cultivation, and bush fires. In addition, disturbance by cattle in the frog's riparian habitat is causing soil erosion and further degrading the frog's terrestrial and aquatic habitat. More recently, amphibian declines on Mounts Manengouba and Oku have been linked to disease infestation (chytrid fungus) that may be interacting with possible changes in climate (Hirschfeld et al., 2016, Doherty-Bone & Gvoždík 2017). This is consistent with certain species not being found on Mount Bamboutos (Tchassem et al 2019).

Knowledge of the frog's habitat requirement and population is important to be able to develop robust scientific intervention to save this species. However this information is very limited. A recent survey e found this species to be closely associated with forest habitat but detail information on population size and other autecological data is so far lacking (Tchassem *et al*. 2019).

Social Context

Communities are key to developing and successfully implementing any successful conservation intervention that can save this species. The surrounding population constitutes over 1000 people belonging to two main groups: the natives and the non-natives, all subject to the administrative authority of the government's sub-divisional officer. The government structures notwithstanding, these local populations are have allegiance and respect for their traditional chiefs. The natives, mainly farmers and students, live in villages located around the mountain at an altitude of around 2,000 m.

The non-natives are mainly Fulani or Mbororos who are mostly exclusively breeders and live at high altitude, on the slopes of the mountain around 2500m where fresh grass that constitutes the basic food of their cows, sheep and goats, is available three quarters of the year (Gountié *et al.,* 2012).

Poverty and unemployment remain the major driver behind unsustainable exploitation of the remnant forest along the slopes of this mountain. Thus, the local people have no choice but to exploit the resources of the mountain in a very unsustainable manner. They survive from the cutting and sale of firewood, and farming. Farming requires deforestation in order to create and extend cultivable lands and/ or establish pastures for overgrazing (Zephania, 2014). Being aware that the natural resource available from Mount Bamboutos is limited, there are few conflicts between breeders and farmers. Who the winners and losers are in this struggle is unclear. Irrespective of who the winner or loser is there is always a survival experience that no group can escape. On Mount Bamboutos, no "invisible" or marginalized group is identified, because here all the members of these different groups always have the right to own property, that is to say the same chance of owning cultivable land pertains for everyone. It is a matter of first come first served.

During this project, I worked closely with local communities to assess their knowledge and jointly develop conservation intervention. In addition, I discussed with them and we demarcated together strategic degraded areas of *Leptodactylodon axillaris* that need urgently to be restored. Awareness and sensitization allowed us to obtain abandon some sections of these strategic areas for the reproduction of target species that have been occupied by four families of farmers. Specifically, I organized sensitization events attended by local authorities and locals, during which we talked about amphibian conservation successes around the world and encouraged them, especially the farmers and shepherds, to be the champions of conservation on Mount Bamboutos. In addition to raising locals as champions for amphibian conservation, I counted on their involvement to identify priority areas for conservation of the target species (*Leptodactylodon axillaris*) and its habitats.

The main objective of the Project was to assess the population and habitat of *Leptodactylodon axillaris* in the Bamenda highlands and create a conservation action plan to protect it.

Specifically, the objectives of the Bamboutos Project were as follows:

- Re-evaluate the severity of known threats (e.g. deforestation, degradation, and overgrazing) and identify any new threats (such as amphibian chytrid fungus);
- Educate the local communities on the importance of conserving and preserving the biological diversity of Mount Bamboutos;
- Present the objectives of the project to the local communities, its expected results and the beneficiaries of the project as well as its sustainability;
- To seek opinions and supports from the localities related to the project;
- Establish a distribution map of *Leptodactylodon axillaris* by combining a literature search, fieldwork data, MaxEnt modelling;

- Establish the conspecificity of the two populations on Mount Oku and Mount Bamboutos through molecular taxonomy and conservation prioritization;
- Identify priority areas for the species' conservation in the study area;
- Produce a conservation action plan for this species.

PERSONNEL

Tchassem Fokoua Arnaud Marius – Principal investigator, working to ensure planned work program and technicians are supported, as well as conceiving much of work activities;

Idesse, Bruno Takou, Pako (farmers), Souleymane, Djibril, Adamou (Sherpherds) – have been recruited to work (temporarily or permanently) in the project logistical support and field assistants; their involvement has been so important because they are the main relay agents within the communities;

Dr Thomas Doherty-Bone – Project advisor. A researcher with the Royal Zoological Society of Scotland, Edinburgh Zoo, Edinburgh, Scotland, U.K. with extensive experience in the study of the amphibians of Cameroun particularly in the fields of ecology and conservation.

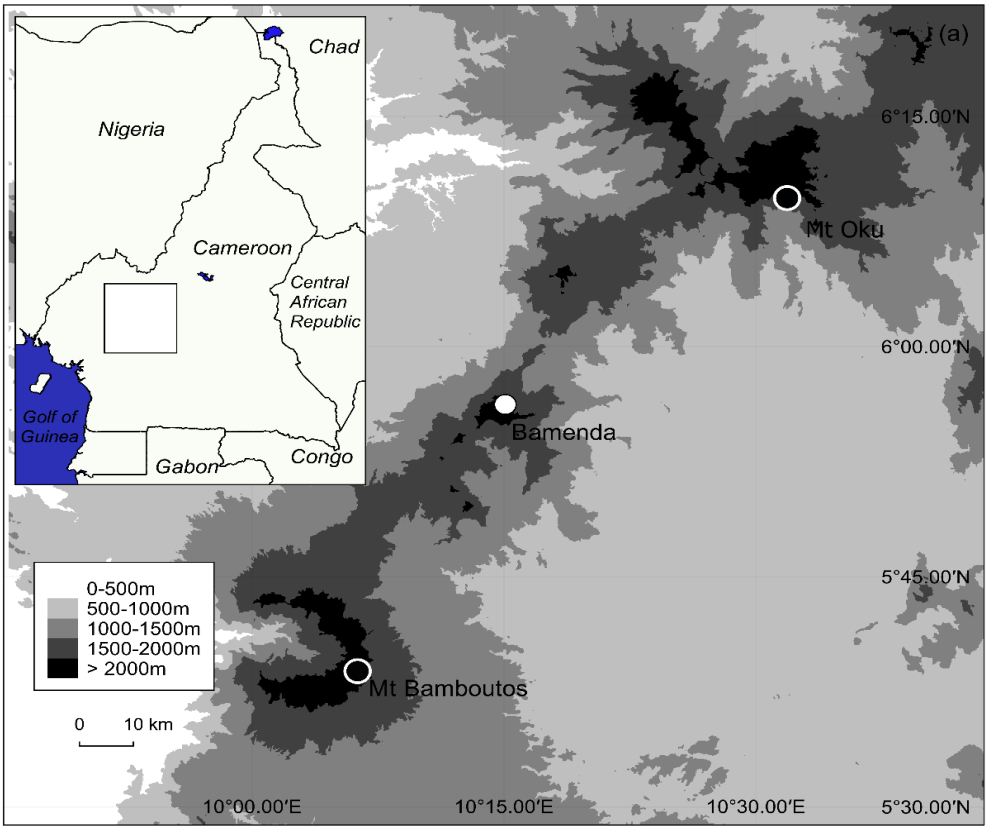

Fig 1. Map showing a) the topography of the Bamenda Highlands

How our objectives have been accomplished.

This project was carried out in gallery forest on Mount Bamboutos. These forests occur throughout the distribution range of *Leptodactylodon axillaris* and serve as important refuge for the species (Amiet, 1980, Cruz et al., 2013, Tchassem *et al.,* 2018).

1- To Re-evaluate the severity of known threats (e.g. deforestation, degradation, and overgrazing) on the *L. axillaris* population,

- Identify priority areas for the species' conservation in the study area;

Visual acoustic encounter survey techniques, listening to the frog calls and opportunistic observation approach in all suitable habitat types have been carried out (Rödel & Ernst, 2004). We searched for the frog by surveying in every microhabitat type along available streams, using the above-mentioned techniques at the same time. Eleven forest patches have been visited once a month for sixteen months. In each monthly field visit, we have spent around 12 days (day and night surveys) conducting fieldworks in all gallery forests identified. Surveys have been conducted by three persons (two field assistants and I) for eight hours per day during rainy season (Well 1977).

Sampling have been conducted by four peoples. We moved along transects at an average speed of about 30 m/h, each day from 6:00 to 11:00 am and at night from 19:00 hrs to 12:00 hrs.

The Critically Endangered *L. axillaris* were found exclusively in forest habitats. *Leptodactylodon axillaris* was found in only one particular forest patch at 2400m altitude, sharing breeding sites in small streams with *L. perreti.* Surveys of streams in deforested areas, where *L. axillaris* had been recorded in 2006, failed to detect this species (Cruz et al., 2013).

In Order to cover all the different seasons that occur on the site, we visited the study site during the following periods.

24 February- 08 March 2019;

20 – 31 March 2019;

15 – 26 April 2019;

14 – 25 May 2019;

15 – 26 June 2019;

18 – 29 July 2019;

17 – 28 August 2019;

14 – 25 September 2019;

13 – 24 October 2019;

14 – 25 November 2019;

10 – 21 December 2019;

14 – 25 January 2020;

14 – 25 February 2020;

13 – 24 March;

13 – 24 April;

07 – 18 May;

2- To assess local attitudes and perceptions toward the species and its habitat and Raise local awareness on the species' conservation needs, and build capacity, we have developed an environmental awareness campaign about the importance of the Amphibians in general on the mount Bamboutos. This campaign has been carried out in two main surrounding villages, at different stages of the project. We had a pre/post evaluation to know the effectiveness of the activities carried out through a structured questionnaire developed and passed within the populations before the beginning of the project. The questionnaire included questions such as: what basic problems do they have?; What makes farming difficult for them?; Which crops are easier to grow and why?; Have they have been confronted with water issue?; How they organize themselves to share the lands?; What pesticides they use?; Since how long on average they exploit the mountain?; Based on the information generated from the local perception, we developed a tailored sensitization strategy with well-

targeted messages during two-hour awareness and education campaign that have been taken place in community halls of the locality.

3- To construct a distribution map of *Leptodactylodon axillaris* in Cameroon (especially the Bamenda Highlands, Geospatial data obtained (GPS Coordinates, occurrences, habitat characterization) have allowed us to map priority areas. Based on Google Earth images, the software QGIS will be used to generate a detailed map of these areas where the species' has been found or is supposed to be found as well as the proximity of threats. All the localities were projected in a Geographic Information System (GIS) for visual inspection. Duplicate occurrences with same geographical coordinates were trimmed. Coordinates of occurrence data were then exported as a .csv-formatted file for input into the Maxent software (Phillips et al., 2006).

4- Species occurrence data obtained from our field surveys and the consultation of past records of *Leptodactylodon axillaris* from the Global Biodiversity Information Facility (GBIF, gbif.org) and publications that involved sampling and/or observing *Leptodactylodon axillaris* populations across Mount Bamboutos.

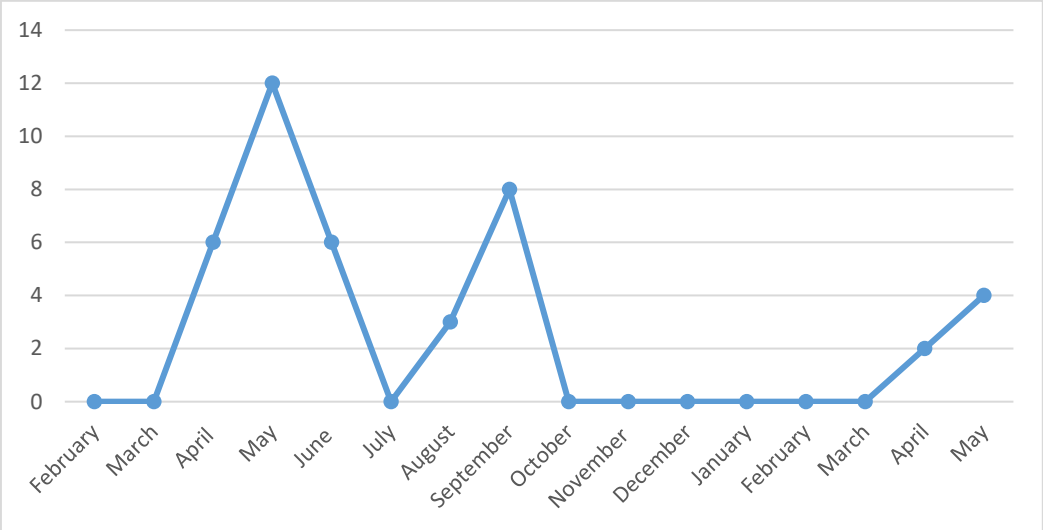

Figure 2. Relative abundance of Bamboutos Egg frog (*Leptodactylodon axillaris*) based on number of frogs caught each month since February 2019 (in only three gallery forests among eight identified).

5. Establish the conspecifity of *L. axillaris* populations on Bamboutos & Oku

Data collected has been processed by myself to compare specimens collected on Mounts Oku and Bamboutos, including DNA analyses (with assistance from the RZSS WildGenes laboratory).

- ***Biosecurity***

All field works have been carried out by respecting and adhering to biosecurity to measures to prevent the spread of harmful organisms. This will involve checking, cleaning and drying all equipment between field sites.

1- Estimate breeding population size of *Leptodactylodon axillaris* by revisiting know localities.

Many new localities around Mount Bamboutos and Oku among: Magwa, Balatchi, Bali, Ndouso'o and Fefou. *L. axillaris* was not observed at any of them. The rarity and the fragility of this species forced

us to stop capture-tagging-recapture. It has not been safe to capture and mark individuals (such as toe clipping or dye injections) for risk of causing disturbance that could derail the whole, remnant population. However, a total of 41 individuals has been observed during 2019 – 2020 survey period, June being the month where that the species would a bit more easy to find.

2- Evaluation of the severity of known threats

Livestock grazing is prominent on Mount Bamboutos, and grassland is burned widely by livestock herders. This probably has a detrimental effect on *Leptodactylodon axillaris*. Apart from indirect impacts of degradation of forest, water and prey, fire can kill less mobile amphibians. The presence of livestock potentially has adverse consequences for amphibians and their habitats through disturbance, trampling, water nutrient enrichment and changes in vegetation structure.

The forests on Bamboutos have been reduced to isolated patches separated by cultivated grassland (pasture), crop fields or plantations. On that mountain, among eleven galleries forests identified, six ((5), (7) (8), (9) (10) and (11)) would have an approximate length of 200 m x 20 - 50 m width. Five are so small, about length 30 m x 10 m width and you disappear quickly if conservation measures implemented are not respected. However *Leptodactylodon axillaris* has been observed only in three (4), (5) and (6) gallery forests making them more threatened than thought on the site. Each of these three forests are considered as the well preserved of the site although they are bordered on both sides by pasture areas. There, we have not observed any wood cut as it is the case in the rest of galleries forests and where unfortunately where fires reach and where some of them ((7) (8), (9) (10) and (11)) are visited by cattle. The pasture areas could be an ecological sink because frogs entering grassland in an attempt to reach other forest patches risk desiccation and predation. This may partly explain the limited number of observations of *L. axillaris*, which was found in only few forest patches. Long-term protection of these patches are urgent: although farmers seem avoided cutting these particular patches.

Cultivation on Bamboutos is causing visible soil erosion, probably resulting in run-off of nutrients, sediments and agrochemicals into lower streams where tadpoles of many frog species develop. Pesticides can be lethal to amphibians and we frequently observed them being applied on Mount Bamboutos without any safety measures. A constantly increasing human population with respective demand of land for agriculture, livestock and settlement likely worsen the amphibians' situation. The combined human activities are altering habitats by, e.g. opening the forest canopy with obvious adverse effects on the understory micro habitats around streams and springs, where endemic amphibians are known to live and breed. The recent threat for the specialized fauna and flora of this area is now so intense, that these mountains are currently rated as of the highest priorities for conservation in Africa.

3- Assess local attitudes and perceptions toward the species

Interviewees perceived that encroachment of cultivation had been exacerbated by new families settling on Mount Bamboutos over the previous decade. This land-use change was accompanied by increased use of agrochemicals, which we observed across cultivated areas following the planting of seeds. Chemicals used were predominately pesticides against weeds and potato blight for a list of chemicals); we did not observe use of fertilizers. Pesticides were frequently prepared within or next to streams, without protective equipment, and chemicals often spilt from the containers. The majority of interviewed farmers (92% over 188 persons in total) had not received a basic education and are thus unlikely to understand product labels on packaging relating to recommended dosages and safety measures. Although all Mbouda farmers surveyed now practise agriculture primarily as a commercial activity and Fulani being subsistence farmers. Most local people interviewed (80%) within the community, expressed favourable attitudes towards conservation and said they would be ready and happy to be involve as stakeholders. However, they were still thinking that most of amphibian species are venomous and could be dangerous. That is one of the reason why chemicals were intensively used around breeding sites to kill them. It has been reported to us that frogs are searched and killed because of that belief. Shepherds are not too implicated but they collect *A.ranoides* to cure infertility of cows.

4- Distribution map of *Leptodactylodon axillaris* in Cameroon.

Under present habitat degradation conditions and current climate conditions, the ensemble model indicated high environmental suitability for the targeted species on only two isolated sites throughout the Cameroon Volcanic Line (Mounts Bamboutos and Oku). This indicates there will be no further populations of this species on nearby mountains such as Lefo or Mbapit. Areas of environmental suitability observed from the species distribution models are those with increased annual precipitation, overall colder temperatures and at higher elevation. These environmental conditions have been found in the localities of Bamenda highlands and are highly suitable for *L. axillaris.*

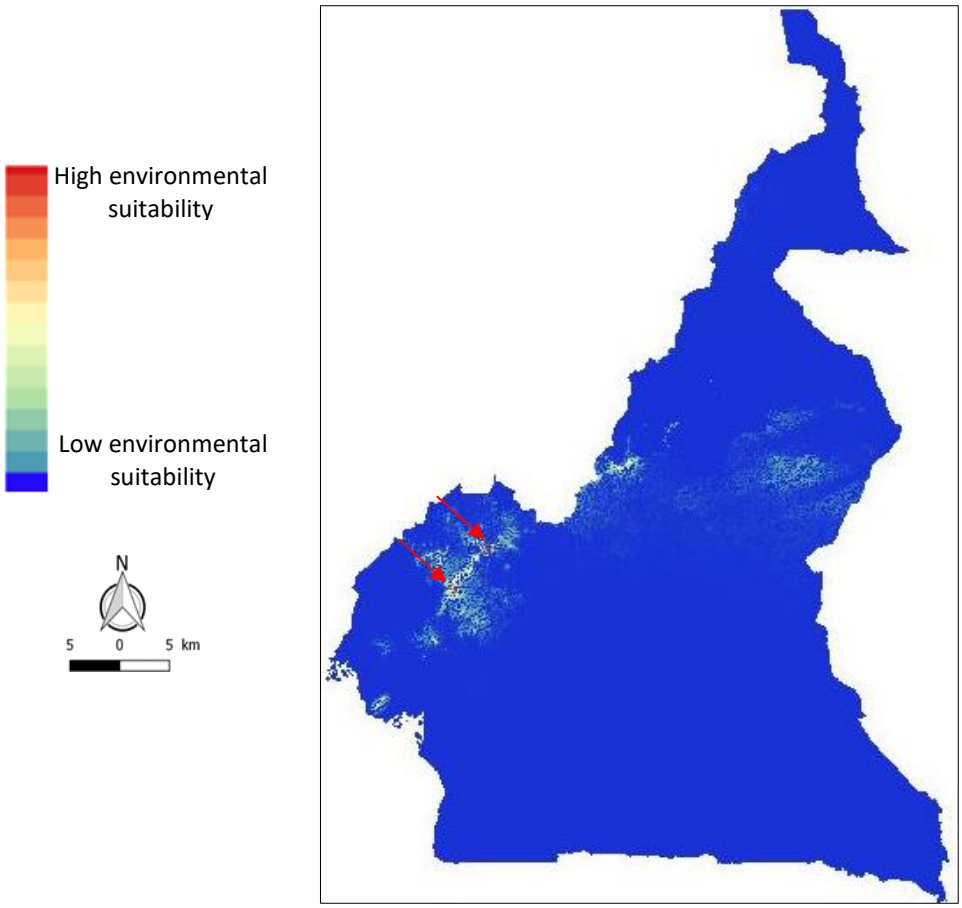

Figure 3. Environmental suitability modeled for *Leptodactylodon axillaris* under current land use.

Figure 5. Maps showing (top) the topography of Mount Bamboutos, **white** areas showing only remaining gallery forests, **Red** areas showing pasture zones and **Yellow** areas showing agricultural zones in Mount Bamboutos in the West Region of Cameroon

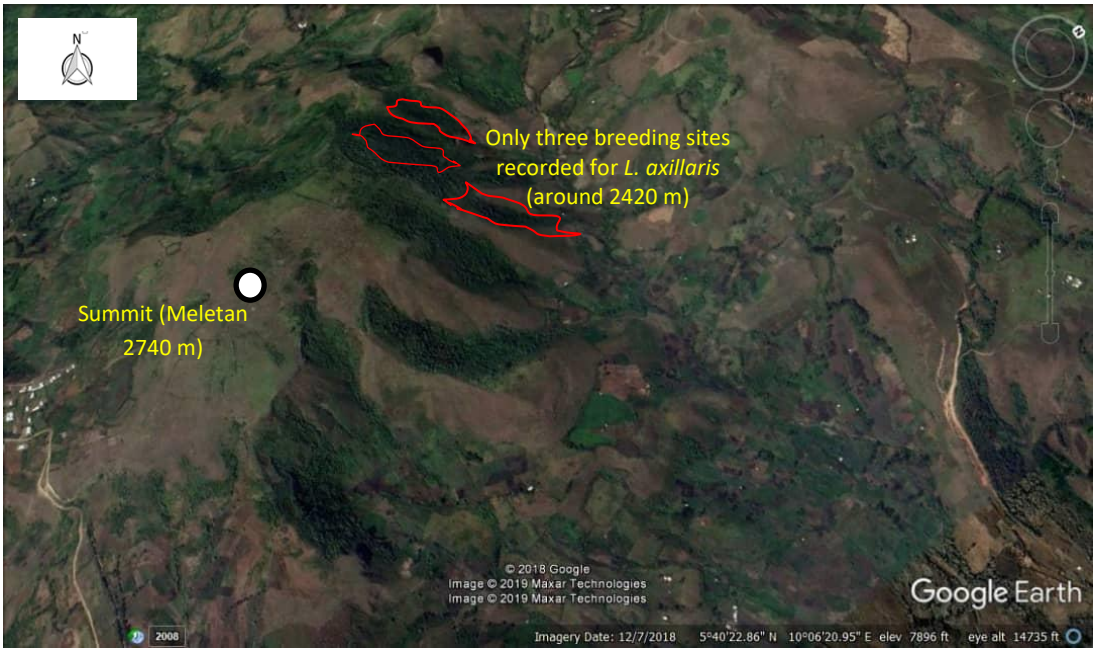

Figure 6. Map showing the topography of the distribution range of *Leptodactylodon axillaris,* (2400 – 2700 m a.s.l) Mount Bamboutos.

The species is an only survives at around 2400 m a.s.l. in forest, along slow-flowing streams. Only three breeding points of this species have been recorded on Mt Bamboutos so far, but we have confirmed this species (or a potentially new, similar species, if not, subspecies) occurs also on Mt Oku only in one pristine habitat, suggesting it might be as imminently threatened as previously thought. . Until it is confirmed as being conspecific to the Oku population, the population on Mt Bamboutos is to be treated as a separate species that is at high risk of imminent extinction.

5- Monitoring

Study sites have been monitored for environmental parameters, human use, threats and frogs. As shown during the year, the population of *Leptodactylodon axillaris* appears to peak at the end of the wet season and diminish toward the end of wet season (Fig. 2). The species is completely absent during dry season. This suggests this frog might aestivate during dry season and emerge to breed at the commencement of wet season, tadpole's metamorphosing at the end. It is also possible that this species experiences either a decline in activity toward the end of dry season, or its population becomes reduced, possibly as a result of diminished resources such as invertebrate prey. It is hypothesized that reduced run-off of nutrients from rainfall might reduce productivity of producers such as phytoplankton and in turn productivity of primary consumers such as invertebrate prey of *Leptodactylodon axillaris*. Future work will aim to test this hypothesis through study of the entire food web of streams on the Mount Bamboutos, including plankton, periphyton, invertebrates and water nutrients.

5. Establish the conspecifity of *L. axillaris* populations on Bamboutos & Oku

Frogs resembling *L. axillaris* were discovered on Mount Oku in 2016, with preliminary molecular analysis showing tissues collected earlier aligned with this species but still showing some

differentiation to the Bamboutos sequences (for 16S only). From voucher specimens collected before the civil war in Anglophone Cameroon, comparisons were made between the two mountains morphologically. This included T. Doherty-Bone examining the type series of *L. axillaris* at the Museum d'Histoise Naturelle, Geneva, Switzerland. No obvious morphological difference was noted, though there is possibly some confusion in the original description for this species for its diagnostic characterisits that we hope to resolve through revision, using molecular data. 100 tissue samples were collected from frogs from both these mountains and prepared for sequencing. This would have been achieved earlier at the Natural History Museum London, where attempts to sequence tissues showed there had been an error in the tissue preparation. Because the slot to carry out this work at the NHM had been missed and would take too long to reschedule, the tissues were taken to the RZSS WildGenes laboratory. Here, the DNA was found to be of good quality and is presently being sequenced for 12S 16S and Rag1 genes. Data will be obtained and available very soon will be processed by myself to compare specimens collected on Mounts Oku and Bamboutos.

The holotype of *Leptodactylodon axillaris*.

Conservation achievement

At the end of this project, the community outreach allowed us to pay attention to more people on the plight of the amphibians and their forest habitat. They have been made aware of the need for protection of these sites. Until now, there is still the perception amongst communities living around the Mounts Bamboutos. Through the community sensitization, we have demystified such beliefs and moved towards winning communities' love and support for amphibians. Attitudes and behaviors of shepherds to use bush fires systematically at the beginning of dry season were changed progressively to conserve the remaining gallery forests of the mountain. Farmers have been sensitized about impact of chemicals on the local biodiversity and the possibility to promote use of compost.

Production of Action Plan

An action plan has not formerly been achieved yet. This is because discussions with local representatives of the forestry & wildlife department requested more time for the community to get to know the project. This was mostly prompted by our mention of the possibility of fencing off areas for conservation. we has recently become a National conservation Fellow, with further technical support from the Ministry of Forestry and Wildlife to continue conservation on the mountain, which will allow a drafting of the action plan with the community, government and other relevant stakeholders.

Future conservation action

The amphibian fauna of Mount Bamboutos is disproportionately represented by threatened species. Some sections of the mountain could still be surveyed to seek out recently disappeared species (*Phrynobatrachus* sp., *Wolstertorffina mirei and Werneria bambutensis*). These threats can be addressed through protection of forest and high-elevation savanna with careful control of agrochemicals and biosecurity, with roles for international, national, regional and local conservation professionals and stakeholders alike. To be efficient with these actions, we plan to understand the existing agrarian socio-economic systems and Make local community competent stakeholders who consent to conservation measures around the studies sites.

Next step

We will continue to seek funds to to monitor and conserve the remnant *L. axillaris* population, to restore degraded breeding sites of *L. axillaris* through the planting of indigenous tree species; to carry out a broad investigation of the population of *Wolterstorffina mirei* (EN) a locally endemic amphibian species that seems to have disappeared on Mount Bamboutos; reinforce the involvement of stakeholders in the conservation action plan and pursue awareness on the conservation needs of the species and its habitat on the Mount Bamboutos; as well as update conservation status of these species. We plan to support and monitor the activities of the local farmers to ensure the conservation of the species and protection of the remnant gallery forests from further destruction.

Figure 7: *Leptodactylodon* cf. *axillaris* observed in of Mount Oku, 2019.

Figure 8: Pristine montane habitats of *Leptodactylodon* cf. *axillaris* amphibian species observed in recent surveys of Mount Oku, West-Region, Cameroon. This is a potential control site to compare restoration efforts on Mt Bamboutos.

Figure 9: Montane landscape of Mount Bamboutos during the dry season, with a bushfire a midst cultivation with forest patches barely visible.

Figure 10*:* *Sudanonautes* cf. *africanus* collected on Mount Bamboutos in egg frog habitat (probably predators of *L. axillaris* tadpoles)

Figure 11*:* Talking with and family chief and Shepherds living on Mount Bamboutos

Figure 11*:* newly burned gallery forest in Mount Bamboutos (February 2019)

Local farmers assemble during sensitization discussion

Chief Representation with notables

RECOMMENDATIONS

To improve the future prospects of Amphibians in the Bamboutos and Oku mountains, it is necessary to rely on adequate conservation interventions. This requires special attention from the government as well as the communtiy through the effective involvement of all stakeholders in conservation projects.

Various conservation measures such as captive breeding with the aim of reintroducing them into the natural environment could be initiated around each site to support the most fragile populations of species in critical danger of extinction. For species subservient to the forest galleries of Mount Bamboutos, restrictions should be established in order to limit any human disturbance on breeding sites that they are not full of. Environmental pollution on Mount Bamboutos should be limited in the streams where amphibians are known to reproduce through targeted and precise awareness of local populations.

For more concrete and rapid conservation actions, translocations should be envisaged in the habitats likely to host the species in order to increase the population of certain target species. Restrictions on access to specific sections of certain fast-flowing rivers in forest galleries on Mount Bamboutos should be implemented. This helps to strengthen the natural reproduction of these animals on this site. This initiative could be supported by an ex situ program of the rarest species such as *Leptodactylodon axillaris.*

The Governement should favor, encourage and assist the populations living around these sites in the creation of community forests which presently present themselves as an important bulwark for these animals. The example of "Kilum-Ijum" should be reproduced on each of these mountains in order to promote the conservation of local biodiversity. Around the mountain, income-generating activities could be encouraged in order to limit the human pressure weighing on this community forest.

	Activity	Description	Budget Estimate (US $)	Time It Will Take To Complete (Months / Weeks)	Comments
	Accident Insurance	Insurance: this budgetary allocation covers and protects all the stakeholders of the project in case of accident by helping with out-of-pocket expenses, care, following national requirements	50	16 months	**Activity completed** No change made
	Period Training workshop (05 days)	This will to allow to local people and stakeholders of the future to acquire adequate skills to help achieve the project objectives. ($2,5 for food and refreshment/participant X 50 participants X 5 workshops) + $50 for the meeting hall rental.)	675	6 weeks	**Activity completed** No change made
	Raise local awareness on the species' conservation needs, and build capacity to improve *L. axillaris*	Creating a spirit of Conservation throughout the community. Printing of workshop materials. $0,5×100) + pens and block notes –(50 pens ×$0.75/pen + 50 Blocknotes ×$1/blocknote)=	137.5	16 months	**Activity completed** No change made
	Renting projector	$20/training session and meeting × 10 meetings	200	16 months	**Activity completed** No change made
	batteries, net, buckets, plastic shade, alcohol, formaldehyde, pharmacy box,	materials for field works	200	16 months	**Activity completed** No change made

	gloves, first kit aid,				
	Camera	To take photographs of specimens in order to Illustrate and document our observations.	160	16 months	No change made
	GPS	Document position in the field as well as recording observed amphibians (latitude, longitude, altitude.	95	16 months	No change made
	Tent	For use in the tent during camping	90	16 months	No change made
	Communications	(Internet postage and local calls	120	16 months	**Activity completed** No change made
	Travel local public	From Yaounde to the study sites (Yaounde-Bafoussam- Mbouda-Mount Bamboutos). (Yaounde-Bafoussam- Mbouda-Mount Oku). ($15/person/trip x 2 persons x 16 months) x 2	960	16 months	**Activity completed** No change made
	Fencing off of breeding sites	Establishment of the fences around breeding sites at highest risk of disturbance by livestock. (Salaries(Workers): $5/day x 2 persons x 12 days/month x 6 months= $720; $0.5/meter of barbed wire x 5000 m = $2500)	3220	8 months	////// this constututes one of the most important objective of the next project. //////
	Re-evaluate the severity of known threats (e.g.deforestation, degradation, and overgrazing)	In order to determine the percentage of the local population aware of the conservation measure protecting *L. axillaris* and its ecological importance, and understand what local needs must be met for effective conservation to take place.	100	16 months	**Activity completed** No change made
	identify any new threats on the new site; assess local attitudes and	Establishment of questionnaire towards locals. Printing 500 questionnaires, brochures and flyers X $0,5=	250	16 months	**Activity completed** We spent only $250 instead of $500 as originally budgeted. Either ($0.5/, brochures and flyers)

	perceptions toward the species				
	Collect samples for amphibian chytrid fungus	Submit 41 chytrid swabs for analysis with PCR to the Institute of Zoology, London so as to determine chytrid isolates if possible. 41 chytrid swabs X $9	1260 **369**	16 months	**Activity completed** Originally, we had planned to collect 140 chytrid swabs, however only 41 swabs concerning *L. axillaris* has been collected. Only $369 have been spent.
	Estimate breeding population size of *Leptodactylodon axillaris*	(Salaries(Guides & porters): $6/day x 2 persons x 12 days/month x 16 months= $2304; Field assistant: $8/day x 1 person x 12 days/month x 16 months = $1536) =	3840 **3456**	16 months	**Activity completed** We have been able to renegotiate exceptionally Salaries for the field assistant, the porter and the guide. We spend only $2112 instead of $2304 as originally budgeted for the guide and porter. Either ($5.5/day/ person x 2 persons = $10. 12days/month x 16 months) ($7/day/ person x 1 person = $7. 12days/month x 16 months)= $1344

	visual implant elastomers	(60 ml elastomer with curing agent, up to 10 colors, mixing supplies, 200 injection syringes, VI light and field carrying case.	1100 **200**	6 months	We spend only $200 instead of $1100 as originally budgeted for visual implant Elastomers. The rest of money helped us to cover Food/per diems cost and paying some of our guides and porters.
	Food/per diems.	Food/per-diem: Money will be used for food for the principal investigator, one field assistant and two field guides. ($2.5/day/ person x 4 persons = $10. 12days/month x 16 months)	1920 **768**	16 months	Due to the limited funds, we disposed, we have been able to renegotiate exceptionally the field assistant and guides daily allowance We spend only $768 instead of $1920 as originally budgeted. Either ($1/day/ person x 4 persons = $10. 12days/month x 16 months)
			Actual amount **$7830**		

Although the original project was budgeted to: $$15 353.875, we have carry out almost all the planned activities appart the Fencing off of breeding sites, that is imperative for the prtection of *Leptodactylodon axillaris*