Final Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF 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 – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please DO NOT fill in and submit this form until the project has been completed.

Complete the form in English. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	Chung Van Hoang
Project Title	Exploration of Distribution pattern and community structure of amphibians in Bat Xat Nature Reserve, Lao Cai Province, Vietnam
Application ID	43835-1
Date of this Report	09/12/2025

1. 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
Discovery of new species or new distribution records of amphibians for Vietnam and studied sites.			X	Two new species (*Leptobrachella batxatensis* Hoang, Pham, Phan, Do, Wang, Jiang, and Nguyen, 2025 and *Amolops cuongi* Pham, Hoang, Tapley, Nguyen, Nguyen, La, Ziegler, Rowley, Nguyen, and Le, 2025) of amphibians discovered at the research site. We have not detected any new distributions for any of the species observed at present. Six individuals of *Leptobrachella batxatensis* and three additional individuals were collected for analysis. All specimens were preserved and designated as the holotype and paratypes. All holotype and paratype samples were taken from tissue samples. Tissue samples (liver) were preserved separately in 70% ethanol prior to fixation.
Providing an updated checklist of amphibians in Bat Xat Nature Reserve, Lao Cai Province.			X	An updated amphibian inventory in Bat Xat Nature Reserve, Lao Cai province has been provided to managers. Conservation area managers can use this updated list in comprehensive reports on animal populations within the conservation area, the number and list of rare and endangered species, etc., thereby proposing

				a general conservation strategy for the entire conservation area to higher levels of government.
Providing data on phylogenetic relationships of some cryptic or complex groups, supporting taxonomic clarification of the species complexes.		X		We provided data on the phylogenetic relationships of two complex groups (*Leptobrachella* and *Amolops*), and helped clarify the classification of these two groups. However, during the project, we found that there are still some other species groups that have not been studied in the study area.
Providing updated data about distribution patterns, and similarity in the species composition of the amphibian communities based on geographic sites, habitat types, and altitudinal gradient.		X		The results of the analysis of the amphibian distribution model at the study site reveal an interesting pattern: amphibian species diversity is concentrated in the high-elevation belts on the mid-mountain slopes (1200–2200 m a.s.l.), where the forest canopy remains dense and well-covered. The higher belts near the mountain peaks and summits show lower amphibian species diversity; however, these areas harbor interesting and rare species that are restricted to these elevations. However, there are still issues that require closer clarification. For instance, why is there a species (*Leptobrachella batxatensis*) that is distributed in the mid-altitude belt but has only a single population within such a small area? In addition, where is the actual boundary between two morphologically similar species (*Amolops cuongi* and *A. minimus*).
Identification of important sites for			X	We identified protected areas such as streamside habitats in

conservation.				the mid-elevation belts and wet areas on the mountain tops (>2400 m a.s.l.).
Evaluate major threats to the amphibian in Bat Xat Nature Reserve, Lao Cai Province.			X	Cardamom cultivation by local people and tourism activities are the main threats to amphibians in Bat Xat Nature Reserve.
Providing recommendations for conservation measures.			X	We conducted statistical analyses of ecological data from the study area. The results indicated that the abundance of large trees was the primary factor influencing amphibian diversity in the area. However, this factor is strongly affected by cardamom cultivation activities in the study site. Several conservation measures have been proposed to the authorities. However, two key measures require immediate action: restricting the expansion of cardamom cultivation and promoting sustainable green tourism. Mountain climbing tourism indirectly affects amphibian populations through its negative impact on the natural environment. Cardamom cultivation is not the primary livelihood in the area. However, it provides a significant short-term source of income for local people.

2. Describe the three most important outcomes of your project.

a). A new species of *Leptobrachella* is described from Vietnam based on morphological differences and genetic divergences in 16S rRNA mitochondrial gene sequences. The new taxa are distinguished from each other and from other species of the genus *Leptobrachella* in body size, head width/length ratio, tympanum

morphology, dorsal skin texture, the presence/absence of fringes on toes, color of dorsal and ventral body, and iris color. The two new species are also divergent from each other and from other congeners by a 4.14% or greater uncorrected genetic distance. *Leptobrachella batxatensis* is genetically closest to *L. shiwandashanensis* and *L. wuhuangmontis* from China. This species is currently known only from Bat Xat Nature Reserve in Lao Cai Province, Vietnam. All specimens of the new species were only found on leaves of shrubs near a small stream in the evergreen forest at elevations of 1 328 m a.s.l.. *Leptobrachella batxatensis* occurs sympatrically with *L.* cf. *ventripunctata* and *L. bourreti*. Other amphibian species found at the sites included *Odorrana nasica* (Boulenger), *Zhangixalus feae* (Boulenger), *Boulenophrys rubrimera* (Tapley, Cutajar, Mahony, Chung, Dau, Nguyen, Luong, and Rowley), and *Gracixalus yunnanensis* Yu, Li, Wang, Rao, Wu, and Yang.

b). A new species of the genus Amolops is described from the Hoang Lien Range, northwestern Vietnam as Amolops cuongi sp. nov. While morphological and molecular data assign these individuals to the Amolops mantzorum group, the new species is distinguishable from its congeners on the basis of a combination of the following diagnostic characters: size small (SVL 33.9–36.9 mm in males; 37.9–44.4 mm in females); head longer than wide; vomerine teeth absent or weakly developed; snout short (SE/SVL 0.15–0.17 in males; 0.14–0.16 in females); tympanum small (TD/ED 0.26–0.37 in males; 0.25–0.35 in females); the absence of circummarginal groove on the first finger; disc of finger III larger than tympanum; supratympanic fold present; dorsolateral fold absent; webbing formula I0–1II0–1III0–1IV1–0V; the presence of a band of small spinules and/or tubercles running from below nares, along upper lip, around lower half of eye, between tympanum and eye and rear axis of mandibles; granular skin on flanks and ventral surfaces of body; in life, dorsal body colouration of dark brown with diffuse-edged blotches of bluish grey, copper and yellowish green or pale green and copper; ventral surface of throat, chest and belly pale cream with white dots; males without vocal sacs; and nuptial pad velvety without spines. In the phylogenetic analysis using a combination of mitochondrial 16S ribosomal RNA, ND2, and cytochrome b (cyt b) genes, the new species is strongly supported as the most genetically distinct member of the Amolops mantzorum group with genetic distance ≥ 1.53% in the 16S rRNA, ≥ 8.70% in ND2, and ≥ 8.56% in cyt b compared to other members within the genus Amolops.

c). On 63 transects from 700 to 3049 m a.s.l. during rainy seasons in 2025, total 41 species of amphibians were recorded. Results of the Canonical correspondence analysis (CCA) indicated That a significant correlation existed between what species richness and environmental variables (Monte Carlo permutation tests, n = 999, p = 0.001). The first axis and second axis accounted for 28.81% and 24.35%, alternate. A significant relationship was discovered between amphibian assemblages and the environmental variables by the CCA, after forwarding the selection of environmental variables with Monte Carlo permutation test (n= 999; p = 0.001; Figure 5.2.3). Elevation (0.98), distance to road (0.75), distance to human settlement (0.71) were highly correlated with or contributed to the axis 1, and water velocity (0.81) and air humidity (0.81) had the highest correlation with or contribution to axis 2. In conclusion, the species composition and distribution pattern of amphibians in the Bat Xat Nature Reserve are influenced by microclimate, habitat and disturbance factors, as well as changes in altitude. In addition, in the light of the research results above, the

conservation countermeasures and suggestions for amphibian diversity in Bat Xat Nature Reserve have been forwarded.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

An unforeseen difficulty for this project was that it coincided with the political reforms taking place in Vietnam, which resulted in very slow project disbursement as we spent a considerable amount of time determining which procedures belonged to the commune level and which belonged to the provincial level. We had to self-fund the project's operations and constantly adjust disbursement procedures to ensure that the project remained on schedule.

4. Describe the involvement of local communities and how they have benefitted from the project.

We received enthusiastic support from local people as well as local forest rangers. They participated in guiding us, thanks to which we were able to reach mountain peaks and old-growth forests that were otherwise difficult to access.

Project members along with local forest rangers

5. Are there any plans to continue this work?

We still plan to continue this work in the coming years. However, we are quite concerned about the current disbursement procedures in Vietnam. We hope that, following the reform, the process will become smoother. If possible, alternative disbursement channels may be considered to avoid delays.

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

We have been working with the local forest rangers since the early days of the establishment of the Bat Xat Nature Reserve. Therefore, we have our own communication channel for exchanging information related to our work. The

proposed conservation measures were communicated to the director of Bat Xat Nature Reserve, local forest rangers, local communities, and fellow colleagues. The local forest rangers play a significant role in sharing our results with local communities, as well as reporting to higher levels of government.

We intend to publish the results of our study, especially those concerning new species, in peer-reviewed journals such as *Asian Herpetological Research* and *ZooKeys*. I also shared the project on my social media page.

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

I believe that the next crucial step is for us to work alongside local rangers to raise awareness among the local community about wildlife in general and wild amphibians in particular. The goal is to help them understand that amphibians, and wildlife more broadly, are an integral part of human life. The disappearance of any species represents a great and irreplaceable loss.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?
We used the Rufford Foundation logo in the permit applications that we submitted to the relevant authorities. Additionally, I used this logo on my Facebook page to promote the fund.

9. Provide a full list of all the members of your team and their role in the project.

TT	Name of members	Role in the project
1.	Chung Van Hoang	team leader
2.	Hai Ngoc Ngo	member
3.	Hoa Thi Ninh	member
4.	Yen Huong Thi Vu	member
5.	Linh Hoang Tu Le	member
6.	Hai Tuan Bui	member

10. Any other comments?

No, thank you very much!

ANNEX – Financial Report

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Leptobrachella botsfordi (Rowley, Dau, and Nguyen, 2013)	*Oreolalax sterlingae Nguyen*, Phung, Le, Ziegler, and Böhme, 2013
	
Bombina maxima (Boulenger, 1905)	*Leptobrachium ailaonicum* (Yang, Chen & Ma, 1983)

Endangered, rare, and precious forest Amphibian species have been recorded.

TT	Species name	Vietnamese Species name	List				
			IUCN/ 2025	SĐVN/ 2007	NĐ06/ 2019	NĐ160/ 2013	CITES/ 2025
	Amphibia	**Lớp ếch nhái**					
	Anura	**Bộ không đuôi**					
	Megophrynidae	**Họ cóc bùn**					
1.	*Leptobrachium ailaonicum* (Yang, Chen & Ma, 1983)	Ếch gai hàm ai-lao	NT				
2.	*Leptobrachella pluvialis* (Ohler, Marquis, Swan & Grosjean, 2000)	Cóc mày mưa	EN				
3.	*Leptobrachella botsfordi* (Rowley, Dau, and Nguyen, 2013)	Cóc mày bốt-pho	CR				
4.	*Atympanophrys gigantica* (Liu, Hu, and Yang, 1960)	Cóc sừng sọc lớn	VU				
5.	*Oreolalax sterlingae* Nguyen, Phung, Le, Ziegler, and Böhme, 2013	Cóc núi s-tec-ling	CR				
	Bombinatoridae	**Họ cóc tía**					
6.	*Bombina maxima* (Boulenger, 1905)	Cóc tía		CR			
	Bufonidae	**Họ cóc**					

7.	*Bufo luchunnicus* (Yang and Rao, 2008)	Cóc suối lu-chun	CR				
	Dicroglossidae	**Họ ếch nhái chính thức**					
8.	*Quasipaa verrucospinosa* (Bourret, 1937)	Ếch gai sần	NT				
9.	*Nanorana yunnanensis* (Anderson, 1879)	Ếch gai vân nam	EN				
	Ranidae	**Họ ếch nhái**					
10.	*Amolops minutus* Orlov & Ho, 2007	Ếch bám đá nhỏ	EN				
11.	*Amolops cucae* (Bain, Stuart & Orlov, 2006)	Ếch bám đá cúc	EN				
12.	*Odorrana chapaensis (Bourret, 1937)*	Ếch hôi sa pa	NT				
13.	*Odorrana jingdongensis* Fei, Ye & Li, 2001	Ếch hôi jing-dong	VU				
	Rhacophoridae	**Họ ếch cây**					
14.	*Gracixalus jinxiuensis* (Hu in Hu, Fei & Ye, 1978)	Nhái cây jin-xiu	VU				
15.	*Zhangixalus dorsoviridis* (Bourret, 1937)	Ếch cây lưng xanh	DD				

16.	*Zhangixalus feae* (Boulenger, 1893)	Ếch cây phê	LC	EN			
17.	*Theloderma bicolor* (Bourret, 1937)	Ếch cây sần hai màu	EN				