# Conservation Leadership Programme Final Report

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| **CLP project ID & Project title** | **03283816, Conservation of the Vulnerable Rufous-Spotted Torrent Frog in China** |
| **Host country, site location and the dates in the field** | **China, Liziping National Nature Reserve, April 2016 ~ September 2017** |
| **Institutions invovled** | **Chengdu Institute of Biology, The Management Bureau of Liziping National Nature Reserve, Shimian County Office of Education, IDEA WILD** |
| **Overall aim** | **To resume Rufous-spotted Torrent Frog's population, even to other amphibians in Liziping Reserve** |
| **Authors** | **Yuzhou Gong, Yulong Li, Guocheng Shu & Yiwei Zeng** |
| **Permanent contact address, email and website** | **Herpetological Research Department, Chengdu Institute of Biology, No. 9, 4th Section, Renminnanlu Street, Chengdu, 610041, P.R.China. 164890307@qq.om & gongyz@cib.ac.cn** |
| **Date when the report was completed** | **30-November-2018** |

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**Project Partners & Collaborators**

Chengdu Institute of Biology (CIB): Facilitated the initial contact between the project team and the Management Bureau of Liziping National Nature Reserve, covered the administrative costs, provided places for team member training, monitored the project funds, reported the aim and actions of the project on its website and provided leave that allowed the team members to participate in the field surveys, considering all the members were postgraduate students of CIB when conducting the project.

The Management Bureau of Liziping National Nature Reserve: Provided the necessary permits for the team to conduct all forms of conservation activities within the range of the reserve, helped team members to contact local media and authorities of education.

Shimian County Office of Education: Provided permits for the team to hold education activities in local schools and sent officers to accompany team members during those activities to secure corresponding order and regulations concerning school interaction were complied.

IDEA WILD: Provided extra water test equipments that team members used in the habitat's aqueous environment survey.

Jay Redbond: Amphibian conservation expert from Wildfowl & Wetlands Trust (WWT) in UK. Gave advices for on-ground amphibian conservation activities and data analysis.

Bilizi Ou & jingguzi Ou: Two local residents of Gongyi Village who held great enthusiasm toward wildlife conservation and volunteered in our nocturnal surveys.

## Section 1:

### Summary (max 200 words)

The rufous-spotted torrent frog is an endemic amphibian species that declines in population and the project area, Liziping reserve geographically belongs to Himalayan-Hengduan Mountainous Area, where is a global key biodiversity spot. The aim of this project is to maintain or even increase the population of the frog in the reserve through winning the support of local stakeholders to protect the species and its habitat. We collected distribution, habitat and population information of the focal species through line transect sampling and the method has been recommended to the director of the management bureau of the reserve. Questionnaire surveys and multiple education forms have been undertaken to evaluate local people's dependence on harvesting and consuming the frog and to raise their knowledge on amphibians, as well as conservation awareness. We found that the intensity of human interference moderated and the detectable population density of the frog increased in 2017. Most villagers abandoned collecting the frog for food and some farmers decided to decrease using of chemical fertilizers and pesticides. Future amphibian conservation activities, including regular monitoring and public education has been planned by the local authority. Overall, the project shed light on conservation of vulnerable amphibian species in remote mountainous area.

### Introduction (max 500 words)

The rufous-spotted torrent frog (*Amolops loloensis*) is an endemic anuran species to southern Sichuan province and has been categorized as vulnerable (VU) in IUCN Redlist. The population of it has been experiencing countionous declines, with one population known to have declined by more than 50% (Fei & Ye, 2004). The typical habitat of the frog consists of small mountain streams and waterfalls at elevations of 1840-3700m interspersed within mixed broadleaf-conifer forests. By conducting population and habitat surveys, helping local wildlife conservation authority to establish monitoring protocols and undertaking multiple activities of public education to raise conservation awareness, not only does the project resume the rufous-spotted torrent frog's population, but also it benefits other amphibians or aquatic organisms via ameliorations of the habitat environment.

Although the distribution range of rufous-spotted torrent frog in Shimian County overlaps with Liziping National Nature Reserve, there are factors threatening the species' sustainability, like habitat destruction and degradation caused by continuing infrastructure development for human settlement, significant water pollution caused by pesticide and chemical fertilizer runoff from surrounding fields and plantations, over-collection for food usage among local Yi minorities who have a long history of using wildlife and increasing environmental stress brought by boosted eco-tourism. Information about the rufous-spotted torrent frog of local related stakeholders is comparatively insufficient, because generally people underestimate the ecological value of amphibians and think these humble and lesser-known animals do not deserve conservation priorities. Only if all the above disadvantages toward rufous-spotted torrent frog are relieved, will this project succeed its objectives.

The project site was in Liziping National Nature Reserve in Shimian County of Sichuan Province in south-western China. The reserve was primarily established for the protection of Panda (*Ailuropoda melanoleuca*) and Chinese Yew (*Taxus chinensis*) and its location, south-western Sichuan where geographically belongs to Himalayan-Hengduan Mountainous Area, is considered to be a global key biodiversity area, also a hotspot for biodiversity conservation (Mittermeier *et al*, 1999).

The key partners include Chengdu Institute of Biology, which has surveying wildlife and assessing ecosystem function in western Sichuan Province for many years, played an intermediary role between the project team and local governmental authorities and provided numerous in-kind supports, like fieldwork expertise suggestions and space for team members to hold group meetings in Chengdu. The Management Bureau of Liziping National Nature Reserve and Shimian County Office of Education were active participants of the project, not only did they sign permits to allow field investigations and public education activities, but also they assigned commissioner to secure and facilitate these conservation actions. IDEA WILD was another valuable partner for supplying the project team water analyzing portable equipments, which helped habitat survey.

Figure 1. An aerial view lifted of the project field survey region (green line indicates the line transect; red dot indicates the hotspring opening; yellow dot indicates the Gongyihai wildlife protective station) zoomed from the map of Shimian County, where locates in south-western Sichuan Province.

**Project members**

| Name (age) | Qualifications | Experience | Current occupation & employer | Main role in the project |
|---|---|---|---|---|
| Yuzhou Gong (28) | MSc Zoology (reproductive ecology and ethology of amphibian) | Volunteer herpetological exhibition commentator, participant of amphibian monitoring, habitat investigator, local resident interviewer, animal breeder and specimen maker | Doctoral candidate, Chengdu Institute of Biology, Chinese Academy of Sciences | Team leader, data collector, finance and material coordinator, local authorities engager, report complier |
| Guocheng Shu (30) | PhD Zoology (taxonomic and systematic study of amphibian) | Volunteer herpetological exhibition commentator, participant of amphibian monitoring, phylogenetic and taxonomic researcher, ethological observer and recorder | Research assistant, Chengdu Institute of Biology | Methodology designer, tadpole identifier, population and habitat surveyor |
| Yulong Li (28) | MSc Zoology (biogeographic divergence of amphibian) | Research assistant, conservation activities organizer, specimen collector, photographer, acoustic and molecular data analyzer, birdwatcher | Field surveyor, State key laboratory of Bio-museum, Sun Yat-sen University | Bio-statistical analyzer, photographer, educative activities mobilizer |
| Yiwei Zeng (25) | MSc Zoology (histological study of anuran cutaneous gland) | Teacher of elementary schools, tutoring, histological research experimenter | Biology teacher, Qingdao Golden Stone Education Co., Ltd. | Stakeholder liaison, public education facilitator, poster and badge designer |

## Section 2:

### Aim and objectives (max 200 words)

The overall goal of this project was to resume rufous-spotted torrent frog's population, even to all the amphibian species within the proposed site, through awareness-raising of all related stakeholders, especially local residents. By implementing this project, one would expect an immediate outcome that the habitat of the rufous-spotted torrent frog is improved and population of the species maintains or even converts to increase. The project aim will only be achieved if all the objectives are fulfilled via combining the efforts of the project team and supports of multiple local stakeholders. The project objectives which contribute to the aim are specifically stated as follows:

1. Collecting the information on the population and habitat of the rufous-spotted torrent frog in Liziping National Nature Reserve.
2. Improving knowledge on this species among all the front-line staffs of the reserve and help them to build a monitoring methodology.
3. Understanding the local villagers' dependence on using rufous-spotted torrent frogs as food resource and raise their conservation awareness of the species by multiple public education forms.
4. Ameliorating the quality of the species habitat by multi-stakeholders integrated activities.

These objectives remained unaltered as have been described in the original project application.

### Changes to original project plan (max 200 words)

The project duration was extended to the end of September, 2017 and the hand-in date of final report was delayed for eight months. We're deeply sorry about the unpunctuality.

We added 3 line transects to gather more habitat information. We introduced field surveys in August of 2017, which made the data more comparable between two years.

To fulfill demand of the reserve's management bureau, two more schools located in Shimian County have been chosen to conduct conservation awareness-raising activities. And we revisited Liziping township elementary school to assess the effect of school interaction.

The original intention was to training all staffs in Gongyihai wildlife protective station, but some staffs were occupied by giant panda monitoring. We had 9 staffs in our workshop, which was more than half of the crew. We prepared extra manuals for the untrained staffs and gave the workshop PPT to leaders of the management bureau to encourage them organizing training themselves.

The questionnaires we collected in 2016 was 180, in 2017 was 150, which were less than we expected (280 in the original plan). We found that people resides in the village were not as many

as the government file documented.

**Methodology (max 500 words)**

An amphibian inventory was compiled by visual encounter surveys (Heyer *et al*., 1994) in ten days of June, 2016. We then set nine line transects which involved lotic environment. Biotic and abiotic characteristics of the line transects were recorded at daytime in August of 2016 and 2017. Transect sampling to estimate the population density of the frog ( $D_i = \frac{N_i}{L \times B}$ , $N_i$ means the number of individuals of species i observed in the line transect, $L$ means the length and $B$ means the width of the line transect) were conducted at night. The nocturnal transect surveys were held in April, June and August of 2016 and 2017, a line transect was sampled repeatly for 3 times in a survey month, other amphibians were also documented for calculating the relative population density of the rufous-spotted torrent frog ($RD_i = \frac{D_i}{\sum D_k}$ , $\sum D_k$ means the sum of population densities of all amphibian species in a line transect).

Information on amphibian species within the reserve were uesed in designing workshop PPTs and amphibian quick identify illustrated handbook. Workshops with 9 front-line staffs of the reserve for building their capabilities in amphibian identification and monitoring were held in August, 2016. The Nine line transects' scheme was a result of discussions with staffs. Four front-line staffs participated in our nocturnal surveys.

One hundred and eighty villagers were questioned in October of 2016 about their basic knowledge on amphibians, dependences on using the frog as food resource and attitudes toward conservation of amphibian species. Twenty-four posters and 260 amphibian quick identify illustrated handbooks were disseminated in Gongyi village and Liziping township elementary school, as well as reusable bags and badges with a frog image. Lectures on concept and main characteristics of amphibians, threats to the rufous-spotted torrent frog and importance of protecting it has been given at 3 schools in 2016 and 2017, interactive games that involved conservation knowledge were initiated in two elementary schools. Children were encouraged to transfer conservation awareness to their families. In September of 2017, we questioned 150 villagers and revisited the Liziping township elementary school and questioned the class which we had held education activities in 2016.

Twenty signages were installed in the reserve. In November of 2016, we paid 87 local farmers a home visit and explained the water pollution caused by pesticide and chemical fertilizer runoffs, encouraged them to decrease the use of those substances. Two villagers have volunteered in our transect sampling. We invited local media to report our school education activities, the news was broadcasted in "Evening news of Shimian County" on September 26th, 2017. Line transect 8 and 9 were designed to assess how the hotspring affect frogs' distribution, it turned out that the population density of the rufous-spotted torrent frog near the hotspring was low, so we suggested the management bureau exploiting the hotspring with caution. In January of 2018, we drafted an amphibian monitoring protocol and sent it to the director of the

management bureau, he approved to organize amphibian monitoring regularly in the future.

**Outputs and Results (max 500 words)**

Ten amphibian species (Figure 2) has been inventoried in a handbook, which we printed 320 copies and disseminated. The information of 9 line transects were given in Table 1 and Table 2. In general, water qualities were good, only transects near the hotspring burdened slightly higher sulfide concentrations. Yet the form and degree of human interference varied between transects. The population density and relative population density of each survey month were listed in Table 3. Comparison between years was illustrated in Figure 3. The results showed that more rufous-spotted torrent frogs have been observed at line transect 3, 5, 6, 7, 8 and 9 in 2017, whereas line transect 1, 2 and 4 distributed no rufous-spotted torrent frog in both years.

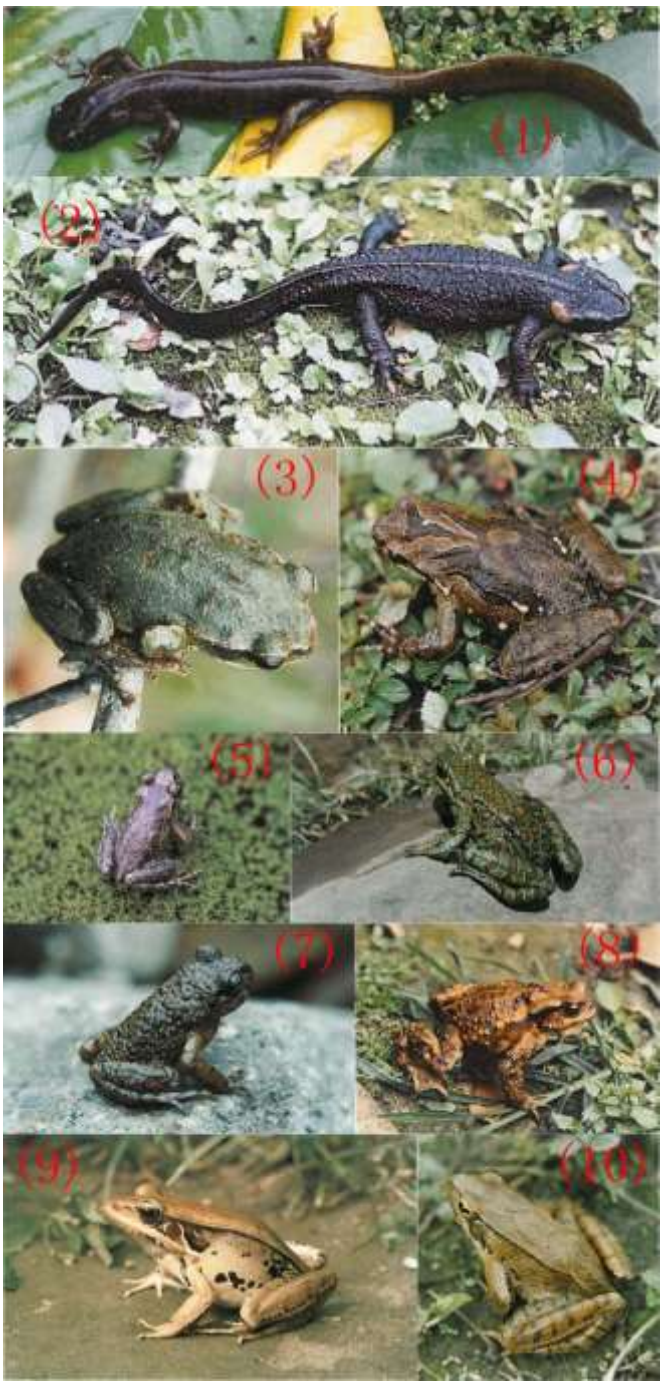



Figure 2. Amphibian species within Liziping National Nature Reserve. (1) *Batrachuperus pinchonii* (Stream salamander); (2) *Liangshantriton taliangensis* (Taliang crocodile newt); (3) *Rhacophorus dugritei* (Baoxing treefrog); (4) *Megophrys shapingensis* (Shaping horned toad); (5) *Oreolalax schmidti* (Webless toothed toad); (6) *Amolops loloensis* (Rufous-spotted torrent frog); (7) *Oreolalax rugosus* (Warty toothed toad); (8) *Bufo gargarizans andrewsi* (West China toad); (9) *Boulengerana guentheri* (Guenther's frog); (10) *Rana chaochiaoensis* (Chaochiao brown frog).

Table 1. Information of line transects designed for investigating rufous-spotted torrent frog.

| No. | Descriptive name | Longitude and latitude, elevation of the starting point | Longitude and latitude, elevation of the ending point | Length | Width | Habitat type |
|---|---|---|---|---|---|---|
| 1 | Creek near the nursery garden | N29.028110° E102.383472°, 2020.69 m | N29.027747° E102.384050°, 2046.12 m | 100 m | 2 m | Creek in a forest |
| 2 | Creek near the cesspool | N29.028858° E102.383591°, 2018.50 m | N29.028785° E102.384473°, 2077.48 m | 100 m | 2 m | Creek in a forest |
| 3 | Upstream of the hydropower station | N29.026227° E102.381276°, 2017.82 m | N29.028141° E102.381790°, 2000.79 m | 250 m | 5 m | River flows over open land |
| 4 | Downstream of the hydropower station | N29.028635° E102.381214°, 1988.66 m | N29.029273° E102.380747°, 1979.06 m | 100 m | 5 m | River flows over open land |
| 5 | Stream near Gongyihai station | N29.024606° E102.384412°, 2043.47 m | N29.024017° E102.385772°, 2060.77 m | 150 m | 4 m | Stream in a forest |
| 6 | Upstream of the panda enclosure | N29.021630° E102.390360°, 2106.15 m | N29.020500° E102.393440°, 2107.38 m | 350 m | 5 m | River in a forest |
| 7 | Downstream of the panda enclosure | N29.021083° E102.390816°, 2089.23 m | N29.020897° E102.389746°, 2115.31 m | 130 m | 5 m | River in a forest |
| 8 | Downstream of the hotspring opening | N29.024028° E102.387054°, 2093.37 m | N29.024771° E102.390659°, 2156.97 m | 400 m | 4 m | Stream in valley |
| 9 | Upstream of the hotspring opening | N29.024831° E102.391242°, 2204.55 m | N29.024595° E102.391716°, 2208.56 m | 150 m | 3 m | Stream in valley |

Table 2. Comparisons of the environmental parameters and human interferences of line transects between 2016 and 2017.

| | No. of line transect | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Items | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | |
| | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 |
| Air temperature (℃) | 20.2 | 25.2 | 18.4 | 26.4 | 19.4 | 18.7 | 19.6 | 32.9 | 20.9 | 26.7 | 21.6 | 22.6 | 25 | 13.5 | 20.5 | 27.9 | 18.8 | 22.1 |
| Air humidity (%) | 75.3 | 73.3 | 82.9 | 63.9 | 78.2 | 64.4 | 75.8 | 54.5 | 81.8 | 72.3 | 70.1 | 56.3 | 72.1 | 65.9 | 75.9 | 61.4 | 81.5 | 73.9 |
| Water temperature (℃) | 15.6 | 18 | 14.1 | 16.4 | 14.2 | 16.3 | 14.1 | 17.5 | 15.6 | 19.1 | 20.3 | 17.8 | 16 | 17.5 | 15.9 | 19.0 | 15.2 | 17.9 |
| TDS (ppm) | 16 | 12 | 20.2 | 12 | 18.9 | 17 | 19.1 | 18 | 28.3 | 23 | 18.6 | 17 | 19.9 | 16 | 28 | 27 | 22.2 | 19 |
| pH | 7.24 | 7.14 | 7.46 | 7.39 | 7.51 | 7.55 | 7.5 | 7.38 | 7.55 | 6.89 | 7.02 | 7.5 | 7.36 | 7.49 | 7.63 | 7.91 | 7.51 | 6.49 |
| Ammonia | 0.01 | 0.06 | 0 | 0.06 | 0 | 0.03 | 0 | 0.01 | 0 | 0.05 | 0 | 0.03 | 0.01 | 0.03 | 0 | 0.08 | 0 | 0.03 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| nitrogen (mg/L) | | | | | | | | | | | | | | | | | | |
| Dissolved oxygen (mg/L) | 7.55 | 7.65 | 7.74 | 7.68 | 7.96 | 9.18 | 7.46 | 9.01 | 7.25 | 12.05 | 8.3 | 9.14 | 7.79 | 8.86 | 7.82 | 10.64 | 7.76 | 9.07 |
| Nitrite (mg/L) | 0 | 0 | 0 | 0 | 0 | 0.037 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Phosphate (mg/L) | 0.01 | 0.087 | 0 | 0.129 | 0.045 | 0.063 | 0.002 | 0.05 | 0.027 | 0.119 | 0.006 | 0.036 | 0.014 | 0.037 | 0.02 | 0.078 | 0.021 | 0.087 |
| Sulfide (mg/L) | 0 | 0.006 | 0.005 | 0.007 | 0.005 | 0 | 0.006 | 0.002 | 0.004 | 0.006 | 0.008 | 0 | 0.004 | 0 | 0.015 | 0.012 | 0.009 | 0.005 |
| Alkalinit | 40 | 35 | 37 | 39 | 41 | 35 | 40 | 35 | 38 | 35 | 34 | 32 | 36 | 32 | 36 | 38 | 32 | 30 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| y (mg/L) | | | | | | | | | | | | | | | | | | |
| Total hardness (mg/L) | 0 | 0 | 54 | 22 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Velocity range (m/s) | 0.416~0.554 | 0.095~0.419 | 0.636~0.869 | 0.131~0.565 | 0.205~1.469 | 0.027~0.629 | 0.046~0.581 | 0.298~0.861 | 0.502~0.924 | 0.471~1.132 | 0.159~0.744 | 0.220~1.044 | 0.299~0.706 | 0.292~0.814 | 0.731~1.129 | 0.132~1.072 | 0.673~1.093 | 0.018~0.71 |
| Human interference and its intensity | Deforestation for reclamation, medium | Deforestation for reclamation, weak | Deforestation for reclamation, medium | Deforestation for reclamation, medium | Infrastructure for hydroelectricity, strong | Infrastructure for hydroelectricity, strong | Infrastructure for hydroelectricity, strong | Infrastructure for hydroelectricity, strong | Solid waste pollution, strong | Solid waste pollution, weak | Fishing or harvesting, strong | Fishing or harvesting, none | Fishing or harvesting, strong | Fishing or harvesting, none | Tourism development, strong | Tourism development, medium | Tourism development, strong | Tourism development, medium |

Table 3. Comparisons of the population density (D) and relative population density (RD) of the rufous-spotted torrent frog in each line transect between 2016 and 2017.

| | | No. of line transect | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | |
| Items | | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 |
| D | April | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0033 | 0 | 0.0091 | 0.0015 | 0.0169 | 0 | 0 | 0 | 0 |
| | June | 0 | 0 | 0 | 0 | 0 | 0.0016 | 0 | 0 | 0 | 0 | 0.0063 | 0.0154 | 0.0215 | 0.0275 | 0 | 0 | 0 | 0 |
| | August | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0017 | 0.0017 | 0.0074 | 0.0086 | 0.0092 | 0.02 | 0 | 0.0013 | 0 | 0.0044 |
| RD | April | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| | June | 0 | 0 | 0 | 0 | 0 | 0.2857 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.9474 | 0 | 0 | 0 | 0 |
| | August | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.9286 | 0.9375 | 1 | 0.9286 | 0 | 1 | 0 | 1 |

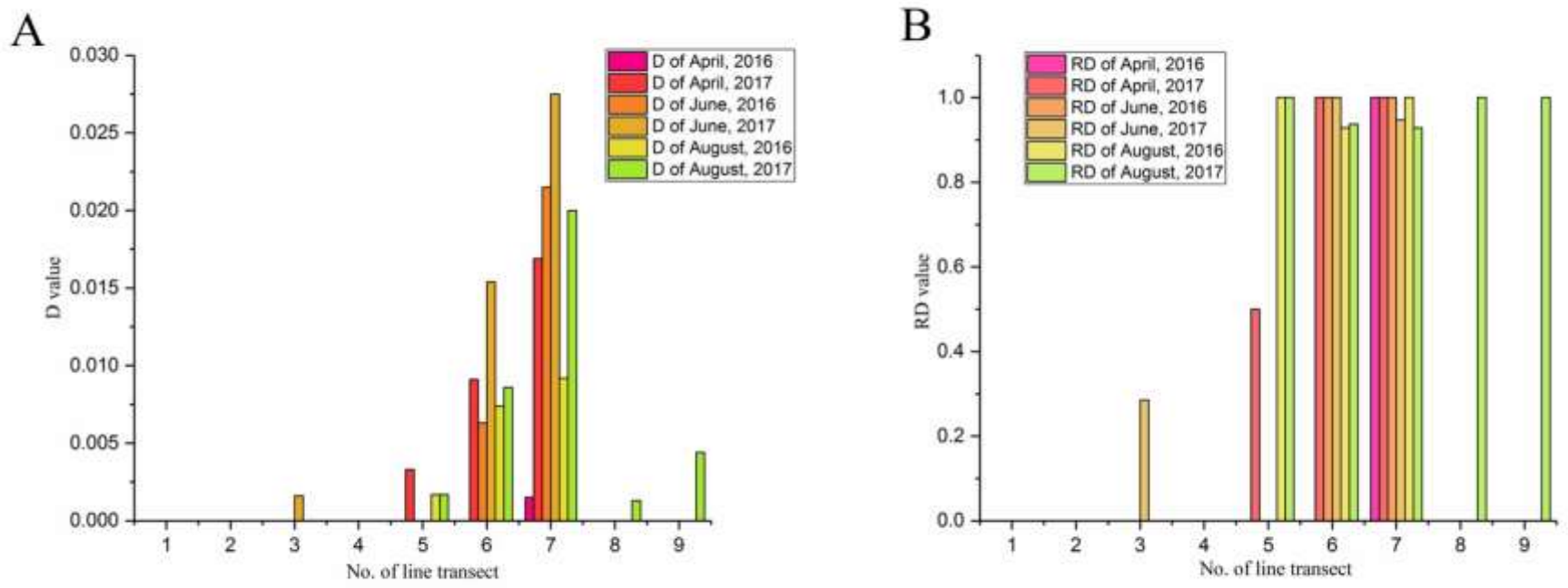



Figure 3. Poplutaion density (D) and relative population density (RD) of each line transect in each survey month. (A) Variations of the D of the rufous-spotted torrent frog among survey months between two years; (B) Variations of the RD of the rufous-spotted torrent frog among survey months between two years.

Nine front-line staffs have been trained in 2016. Before the workshop, none of them knew the name “rufous-spotted torrent frog”. We introduced the methods of amphibian monitoring and handed out the amphibian quick identify handbooks. In 2016 and 2017, 4 staffs participated in our nocturnal surveys. In 2017, we questioned all the 9 front-line staffs who have attended our workshop, their accuracies in identifying 10 amphibian species within the reserve were 100%.

We questioned 180 villagers in 2016. Knowledge toward amphibians that they had acquired before was limited. Thirty-two villagers admitted that they have harvest the frog, 44 have eaten the species and 68 confirmed that the frog is a common bushmeat in the village, nobody realized that it was under state protection. Fifty-six interviewees didn’t grow crops, whereas the rest 124 did, and all farmers used chemical fertilizers, even pesticides and herbicides. As for the conservation attitude towards amphibians, 48 thought conservation efforts are unnecessary, 30 held a neutral opinion, and 102 reckoned that the frog deserves protections. In 2017, the number of villagers took our questionnaires was 150, and 78 of them also had been inquired last year. In the interviews of 2017, 128 villagers could at least identify one amphibian species. Only 2 people have harvested the rufous-spotted torrent frog in 2017, 137 were aware that the species is under protection by the government. Twenty-five of the in total 113 farmers told us they have decreased using of chemical fertilizers and pesticides. The villagers who hold a positive attitude towards amphibian conservation has increased to 133, number of neutrals was 12, only 5 people believed the frog has no conservation value (Figure 4). We held conservation education activities at 3 schools, in total 193 students were directly influenced.

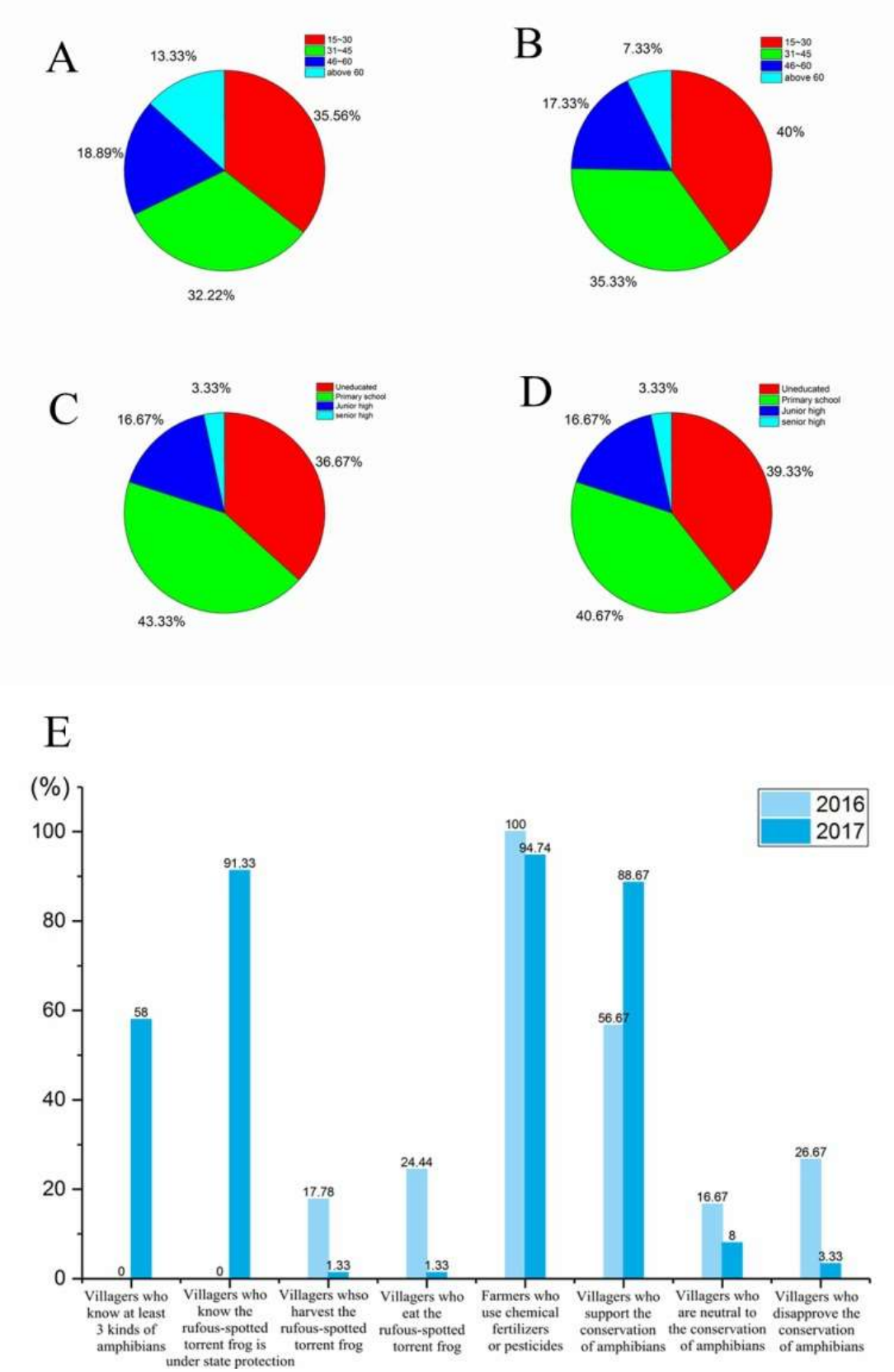



Figure 4. Comparison of questionnaire surveys' results between 2016 and 2017. (A) Age structure of the interviewees in 2016; (B) Age structure of the interviewees in 2017; (C) Educational background structure of the interviewees in 2016; (D) Educational background structure of the interviewees in 2017; (E) Multiple comparisons between the interviewees that we questioned in different years.

Twenty-four posters, 20 signages, 350 reusable bags and 300 badges were made to help public conservation awareness raising. Fifty-four farmers have made a verbal promise to decrease the using of chemical fertilizers and pesticides. Two villagers have joined in our fieldworks. News about our project was broadcasted on Shimian County Television. An amphibian monitoring protocol has been drafted and sent to the management bureau of Liziping National Natural Reserve, as well as our advices on not to further exploit the hotspring within the reserve as a tour attraction.

**Communication & Application of results (max 200 words)**

Meetings were held with officers from the management bureau regularly to update the local authority with project progress. Two articles about our conservation education activities in local schools were presented on the website of Shimian County and Chengdu Institute of Biology, and news on our project was broadcasted on Shimian County Television on September 26th, 2017.

Our field surveys gave us fundamental information on designing amphibian monitoring protocols directing at the situation in Liziping reserve. The 9 line transects used in this project were chosen mainly for rufous-spotted torrent frogs. It's necessary to add line transects which are not along the stream but in the forest, as well as other kind of monitoring methods to broaden monitoring range for amphibians. A scheme with 12 line transects and 8 pitfall traps for amphibian monitoring in the reserve was designed and presented to the director of the management bureau. Through questionnaire surveys, we found that many villagers don't consider the frog as necessary food resource, they harvest it for its flavor or as a tradition, and most importantly, they aren't aware it is a protected species. So we suggested the local wildlife management and protection authority enhancing publicity of Wildlife Protection Act.

**Monitoring and Evaluation (max 200 words)**

Our nocturnal survyes indicated a increase in the population of the frog during the implementaion of the project. More frogs have been observed at line transect 3, 5, 6, 7, 8 and 9 in 2017 than in 2016. For line transect 3, 8 and 9, 2017 was the first time for seeing the species. During our diurnal surveys in 2017, we noticed that the human interferences against some line transects were mitigated. In June, 2016, we discovered a fish poisoning incident at line transect 6 and 7, no such severe human interference was detected in 2017.

In 2017, we interviewed the front-line staffs who have attended our whokshop in 2016. Their accuracies in identifying 10 amphibian species within the reserve were 100% and all of them could tell 3 kinds of amphibian monitoring methods.

The questionnaire surveys toward local villagers in 2017 showed that their knowledge on amphibians and conservation awareness have raised, whereas behaviors of harvesting, consuming the frog and using chemical agricultural substances have decreased.

Revisit to the Liziping township elementary school and questioned children who have participated in our conservation education activities before showed that they remembered the rufous-spotted torrent frog and meaning of protecting amphibians.

**Achievements and Impacts (Max 500 words)**

The distribution, habitat environment and population density of the rufous-spotted torrent frog and other amphibian species within the reserve have been explored essentially through this project. All these data could be used as background information in designing scientific and effective amphibian monitoring methodology which will be one of the fundamental factors to persuade the director of local wildlife management and protection authority to organize regular monitoring activities focused on amphibians. Whereas another key factor of facilitating such activities was the well-trained front-line staffs of the reserve that have mastered the basic knowledge toward amphibians and monitoring skills. We believed that our workshop and fieldwork have helped the Liziping reserve to acquire suitable human resources in conducting amphibian monitoring. Combining the executable protocol and ideal candidates for the operation, director of the management bureau of Liziping National Nature Reserve decided to apply regular amphibian monitoring actions. The meaning of such policy change was substantial to the survivals of the rufous-spotted torrent frog and other amphibians, the habitat and population variations of those creatures will be noticed more quickly and directly. Regular patrolling along the line transects will also intimidate people who want to harvest wildlife and damage the environment in the reserve.

Public conservation awareness raising has been achieved via multiple forms of educational activities. Questionnaire surveys toward local villagers and home visit paid to field owner or planter did not just help us to understand local residents' dependences on consuming the rufous-spotted torrent frog, using chemical fertilizers and pesticides to boost yields and attitudes toward amphibian conservation, but also gave us great opportunities to disseminate the basic knowledge on amphibians, the ecological importance of them and the message that the rufous-spotted torrent frog along with some other amphibian species are under state protection. After knowing the advantages in protecting amphibians and the legal status of the rufous-spotted torrent frog, people will reconsider if they should take risks in harvesting the frog as extra meat or protein resource. The willingness of collecting the frog has dropped in 2017. Local school conservation education activities were a very important part of our project. By interactions with students, we expected a direct effect that lesser children would try to capture amphibians during their holidays, as well as an indirect effect that they would cast a positive influence to their families. We have met many families with kids had attended our lectures in school and spoken to their parents about our work, which facilitated our interview processes. Media publicity was an efficient resort to enlarge the project's influence, so we took advantages of it. Via watching news, people who live in city may realize that the lesser-known amphibian species and their habitats need to be preserved and choose to be a well-behaved visitor during sightseeing. The posters and signages we designed and installed in the reserve had the same reminding effect.

**Capacity Development and Leadership capabilities (Max 250 words)**

| Team member | Development |
|---|---|
| Yuzhou Gong | Project management and leadership skills, flora and fauna identification and inventories, water quality detection, data analysis and interpretation, local authority engagement, reports and protocol compilation, finance and equipment coordination. This CLP project is the first conservation project that I participate in as a team leader, it gives me precious experience in conducting on-ground approaches to amphibian conservation. |
| Guocheng Shu | Project management, methodology design and feasibility analysis, relevant data gathering and classification, tadpole identification, fieldwork expertise, interpersonal communication and team working ability. |
| Yulong Li | Improved ability of collecting and analyzing data from the real world, project management experience, multiple stakeholders interaction skills, knowledge on identifying more amphibian and reptile species. |
| Yiwei Zeng | Benefited in learning about the power dynamics around nature and between people through the sharing of knowledge and doing questionnaire surveys. Hands on field work skills. Learnt more about stakeholder engagement through practical experience. Improved understanding of restoring amphibian habitats and population. Passion and enthusiasm toward wildlife conservation projects and activities. |

## Section 3:

**Conclusion (max 250 words)**

The implementation of this project has brought positive influences toward the survival of the rufous-spotted torrent frog. While local stakeholders focused their attentions on the preservation of giant panda and Chinese yew, the majority of them did not know the name of the frog, let alone the abundance of amphibian species in the area. By integrating fieldwork with public conservation awareness-raising activities, we succeeded in reminding people the existences and ecological functions of amphibian species that are easily to be ignored.

Line transect sampling has been proved to be effective in measuring the distribution and population of indigenous amphibians. Seeing people walking along river banks gives a clear signal to local villagers that fishing is prohibited. Knowledge and conservation awareness about amphibians have been promoted through kinds of education forms. Despite the average poverty of local families, they did not take the frog as indispensable meat or protein sources, the collection and consumption was more like a tradition. Once they are informed that the rufous-spotted torrent frog is a protected species, over-collection issues will be resolved. No construction was allowed in the reserve and the management bureau abandoned the idea of exploiting the hotspring. The signages we installed would notify visitors to cherish the natural

environments. Conservation education alone was not persuasive enough to alter farmers' behaviors. Exploring livelihoods alternatives is of great importance to address agricultural waste runoffs.

Future filed conservation actions and community interactions are needed, to ultimately, reverse the declining trend of the rufous-spotted torrent frog's population.

**Problems encountered and lessons learnt (max 500 words)**

- *Which project activities and outcomes went well and why?*

  Habitat and population surveys, workshop with front-line staffs, poster and signage designing and installation, compilation and dissemination of the amphibian quick identify illustrated handbook and school conservation education activities went well. Our expertise in amphibian taxonomy and monitoring, experience in science popularization, skills on graphics software and keen support from local wildlife management and school education authorities all played important roles in smoothing these activities.

- *Which project activities and outcomes have been problematic and in what way, and how has this been overcome?*

  Questionnaire surveys toward local villagers have been problematic. First, we didn't acquire expected number of questionnaires that we had planned in the original application. To increase sampling size, in 2017 we also questioned villagers who haven't been questioned before. Second, some villagers refused to accept interview. When this situation happened, we explained our purpose patiently and told the villager the survey won't be long, as well as handed out cigarettes, reusable bags or badges as small gifts. Thirdly, we realized some villagers didn't answer our question honestly, when we asked about frog harvesting and consuming, they giggled and said never hunt or eat the rufous-spotted torrent frog, but the translator that we hired who also lived in the village reminded us their answers was not true. If we suspect the answer, we will tell the interviewee that we don't punish people who collect and eat frogs, we're simply gathering information, and sometimes people heard that then admitted eating the frog.

- *Briefly assess the specific project methodologies and conservation tools used.*

  Visual encounter survey was applied to help the flora and fauna inventories, and it has been proved to be a convenient and effective method. Line transect sampling was suitable for detecting the rufous-spotted torrent frog due to the species' lotic distribution. The multi-parameter water tester (W-Ⅱ, Octadem Technology Co, Ltd, Wuxi, China) we used in the habitat surveys seemed to be insensitive in reading the total hardness value of the water sample. Results of the villager questionnaires may give us a lower number of people who harvest or eat the frog than the actual situation. The materials

we prepared for the workshop and conservation education activities were appropriate, the management bureau asked us to share the PPTs with them and to hold activities in two schools located in Shimian County.

- *Please state important lessons which have been learnt through the course of the project and provide recommendations for future enhancement or modification to the project activities and outcomes.*

  We find line transects 1 and 2 have very low amphibian density, which suggested that apparently suitable environment doesn't guarantee animal appearance. In June and August, constant rainfall may cause the rising of water level, and nocturnal surveys could become very dangerous, so the line transect sampling of these survey month should be arranged on days with good weathers.

  The 9 line transects scheme were not qualified to detect all amphibian species we discovered through broad range visual encounter surveys. More transects which possess different habitat environment should be involved in a amphibian monitoring protocol targeting at more species, as well as other monitoring methods.

  Questionnaire design should bring in some irrelevant questions apart from the rufous-spotted torrent frog to avoid raising suspicion or alert from the interviewees, and then they would answer the question of harvesting and eating the frog more honestly.

**In the future (max 200 words)**

We drafted an amphibian monitoring protocol which included 12 line transects and 8 drift fences and pitfall traps, and this protocol was approved by the director of the management bureau of the reserve. Continued amphibian monitoring activities will be carried out by trained front-line staffs in terms of our protocol in the area. The local wildlife management authority has also shown commitment to conserving amphibians by raising awareness in the community and with visitors.

We have participated in another amphibian conservation project funded by the local government targeting at a class Ⅱ species under state protection, the Taliang crocodile newt (*Liangshantriton taliangensis*). An artificial breeding pool has been designed and dug near the Gongyihai station to provide the species a suitable reproductive site which is influenced by temporary drought at minimal degrees. We still go to the reserve to check the utilization situation of the pool by amphibian species nowadays.

We introduced our project's experience to the Gonggashan, Anzihe and Wanglang National Nature Reserve and sought for cooperation conservation opportunity with the Gonggashan reserve which locates geographically near the Liziping reserve, so the rufous-spotted torrent frog might distribute there and face similar threats.

## Financial Report

| Itemized expenses | Total CLP Requested (USD)* | Total CLP Spent (USD) | % Difference | Details & Justification (Justification must be provided if figure in column D is +/- 25%) | Proposed Spending (Preliminary Report Only) |
|---|---|---|---|---|---|
| **PHASE I - PROJECT PREPARATION** | | | | | |
| Communications (telephone/internet/postage) | 290.00 | 297.75 | 3% | | 7.75 |
| Field guide books, maps, journal articles and other printed materials | 100.00 | 96.23 | -4% | | -3.77 |
| Insurance | 310.00 | 293.86 | -5% | | -16.14 |
| Visas and permits | | | | | |
| Team training | 40.00 | 41.70 | 4% | | 1.7 |
| Reconnaissance | 300.00 | 296.13 | -1% | | -3.87 |
| Other (Phase 1) | 335.00 | 325.38 | -3% | | -9.62 |
| **EQUIPMENT** | | | | | |
| Scientific/field equipment and supplies | 1,480.00 | 1519.49 | 3% | | 39.49 |
| Photographic equipment | 300.00 | 298.16 | -1% | | -1.84 |
| Camping equipment | | | | | |
| Boat/engine/truck (including car hire) | 266.00 | 244.64 | -8% | | -21.36 |
| Other (Equipment) | | | | | |
| **PHASE II - IMPLEMENTATION** | | | | | |
| Accommodation for team members and local guides | 2,000.00 | 2426.08 | 21% | | 426.08 |
| Food for team members and local guides | 3,222.00 | 2892.72 | -10% | | -329.28 |
| Travel and local transportation (including fuel) | 1,200.00 | 1294.57 | 8% | | 94.57 |
| Customs and/or port duties | | | | | |
| Workshops | 470 | 442.13 | -6% | | -27.87 |
| Outreach/Education activities and materials (brochures, posters, video, t-shirts, etc.) | 1,427.00 | 1361.17 | -5% | | -65.83 |
| Other (Phase 2) | 330.00 | 301.30 | -9% | | -28.7 |
| **PHASE III - POST-PROJECT EXPENSES** | | | | | |
| Administration | | | | | |
| Report production and results dissemination | 230.00 | 40.12 | -83% | No manuscript concerning this project has yet been submitted to any research journal, so the publication charge was zero. | -189.88 |
| Other (Phase 3) | 200.00 | 247.89 | 24% | | 47.89 |
| **Total** | **12,500.00** | **12,419.32** | | | **-80.68** |
| | | | | | |
| *These figures should be the same as those listed in the original proposal | | | | | |

**Section 4:**

**Appendices**

- *Appendix 1. CLP M&E measures table*

| Output | Number | Additional Information |
|---|---|---|
| Number of CLP Partner Staff involved in mentoring the Project | 0 | |
| Number of species assessments contributed to (E.g. IUCN assessments) | 0 | |
| Number of site assessments contributed to (E.g. IBA assessments) | 0 | |
| Number of NGOs established | 0 | |
| Amount of extra funding leveraged ($) | 0 | |
| Number of species discovered/rediscovered | At least 2 | During the visual encounter survey, the warty toothed toad (*Oreolalax rugosus*) and webless toothed toad (*O. schmidti*) were found to distribute in the reserve, this is the first witness of the two amphibian species in the area. As for the plant we documented, we don't know if they have been reported to be growing in the reserve before. |
| Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation) | 0 | |
| Number of species/sites legally protected for biodiversity | 9 | All the amphibian species we observed except the Baoxing treefrog (*Rhacophorus dugritei*) are legally protected by Chinese government, among them the Taliang crocodile newt (*Liangshantriton taliangensis*) is a class Ⅱ protected species, others are included in the list of terrestrial wildlife under state protection, which are |

| | | |
|---|---|---|
| | | beneficial or of important economic or scientific value. |
| Number of stakeholders actively engaged in species/site conservation management | 7 | Four front-line staffs of the reserve, 2 local villagers and the director of the management bureau. |
| Number of species/site management plans/strategies developed | 1 | The amphibian monitoring protocol designed specifically for Liziping reserve. |
| Number of stakeholders reached | More than 500 | Fifteen officers from the management bureau, 9 front-line staffs in Gongyihai Station, 252 villagers who took our questionnaires, and 193 school children who participated in our conservation education interactions, and people who read or watched media reports about our project via Internet or television. |
| Examples of stakeholder behaviour change brought about by the project. | 1 | No fish poisoning incident was detected in 2017. |
| Examples of policy change brought about by the project | 1 | Regular amphibian monitoring action was been approved by the management bureau of Liziping reserve. |
| Number of jobs created | 2 | We hired a local translator to facilitate our questionnaire surveys and a driver who have a van to transport us to local schools. |
| Number of academic papers published | 0 | |
| Number of conferences where project results have been presented | 0 | |

- *Appendix 2. Raw field data*

*2.1 Line transect sampling*

| | No. of line transect | | |

*2.2 Villager questionnaire survey*

| Items | | Year | |
|---|---|---|---|
| | | 2016 | 2017 |
| Total number of effective questionnaires | | 180 | 150 |
| Sex of interviewers | Male | 104 | 92 |
| | Female | 76 | 58 |
| Age range | 15~30 | 64 | 60 |
| | 31~45 | 58 | 53 |
| | 46~60 | 34 | 26 |
| | Above 60 | 24 | 11 |
| Education background | Uneducated | 66 | 59 |
| | Primary school | 78 | 61 |
| | Junior high school | 30 | 25 |
| | Senior high school | 6 | 5 |
| Knowledge toward amphibians and the rufous-spotted torrent frog | Know more than 3 amphibian species | 0 | 87 |
| | Know that the rufous-spotted torrent frog is a protected species | 0 | 137 |
| Exploit the rufous-spotted torrent frog | Capture | 22 | 2 |
| | Eating | 44 | 2 |
| Chemical substances runoffs issue | Farmers | 124 | 113 |
| | Who uses chemical fertilizers or pesticides | 124 | 107 |
| Attitude toward amphibian conservation | Negative | 48 | 5 |
| | Neutral | 30 | 12 |
| | Supportive | 102 | 133 |

- *Appendix 3. Copies of any newspaper/magazine articles relating to the project.*

(above) Web news of our team cooperated with the local wildlife management and protection authority to conduct amphibian conservation education activities in schools of Shimian County, see at http://www.shimian.gov.cn/NewsInfor.aspx?id=86850.

中国科学院成都生物研究所
CHENGDU INSTITUTE OF BIOLOGY, CHINESE ACADEMY OF SCIENCES

English | 中国科学院

ARP | 所内邮箱 | 人才招聘 | 招 生 | 仪器共享

首 页 | 机构概况 | 组织机构 | 科研成果 | 人才队伍 | 信息资源 | 学术期刊 | 党群工作 | 科学传播 | 信息公开

新闻动态
- 综合新闻
- 头条新闻
- 科技前沿
- 科研动态
- 媒体关注
- 图片新闻
- 通知公告
- 图片展示
- 视频

当前位置 > 首页 > 新闻动态 > 综合新闻

## 成都生物所Conservation Leadership Programme获奖团队在石棉县中、小学开展保护两栖动物科普宣传活动

发表日期： 2017-09-29　　作者： 龚宇舟　　文章来源：两爬室

打印　文本大小 大 中 小

9月26日，荣获2016年Conservation Leadership Programme（“动植物保护先锋项目”）Future Conservationist Award奖项支持的成都生物研究所博士研究生龚宇舟、舒国成及硕士毕业生李玉龙（获奖课题名称“Conservation of the Vulnerable Rufous-spotted Torrent Frog in China”）等3人联合石棉县林业局、栗子坪国家级自然保护区及石棉县野生动物保护协会前往石棉县新棉镇小学及石棉县民族中学开展题为“保护中国易危物种——棕点湍蛙”的两栖动物科普宣传活动。

活动为期一天，科普形式多样，包括现场讲授、视频播放、互动游戏、知识问答及科普纪念品发放等环节，通过向总计约100名小学生及60名中学生普及两栖动物相关知识及介绍中国科学院成都生物研究所在两栖爬行动物保护研究方面所做出的努力，科普团队增进了石棉当地中、小学生对身边不甚起眼的两栖动物的了解，使得大家拓宽了野生动物保护的视野，从而更好地为我国生态文明建设进程中生物多样性的维护贡献力量。本次活动同时受到“石棉之窗”石棉县人民政府门户网站等媒体的报道。

Conservation Leadership Programme项目领队龚宇舟向中学生介绍棕点湍蛙保护工作

(above) Web news about how did our team conduct conservation education activities in local school of Shimian County, see at http://www.cib.ac.cn/xwdt/zhxw/201709/t20170929_4866505.html

(above) A screenshot of the video that introduced our CLP project and conservation education activities which was broadcasted in “Evening news of Shimian County” on September 26th, 2017.

- *Appendix 4. Papers published or manuscripts proposed based on project data*

  None.

**Bibliography**

*References*


1. Fei L, Ye C Y. 2004. Amolops loloensis. The IUCN Red List of Threatened Species. Version 3.1. <www.iucnredlist.org>.

2. Fei L, Ye C Y and Jiang J P. 2012. Colored Atlas Chinese Amphibians and Their Distributions. Sichuan, China: Sichuan Publishing House of Sciences & Technology.

3. Heyer W R, Donnelly M A, Mcdiarmid R W, Hayek L C, Foster M S. 1994. Measuring and monitoring biological diversity: standard methods for amphibians. Washington and London: Smithsonian Institution Press.

4. Mittermeier R A, Robles Gil-P, Hoffman M, Pilgrim J, Brooks T, Mittermeier CG, Lamoreux J, Fonseca GA B, Seligmann PA, Ford H. 1999. Hotspots - Earth's Biologically Richest and Most Endangered Terrestrial Eco-regions. Mexico City: CEMEX / Conservation International.

# 关于栗子坪国家级自然保护区开展两栖动物监测活动的建议

The amphibian monitoring protocol focused on Liziping National Nature Reserve

编者：Conservation Leadership Programme "保护中国易危物种——棕点湍蛙"项目团队

2018-03-10



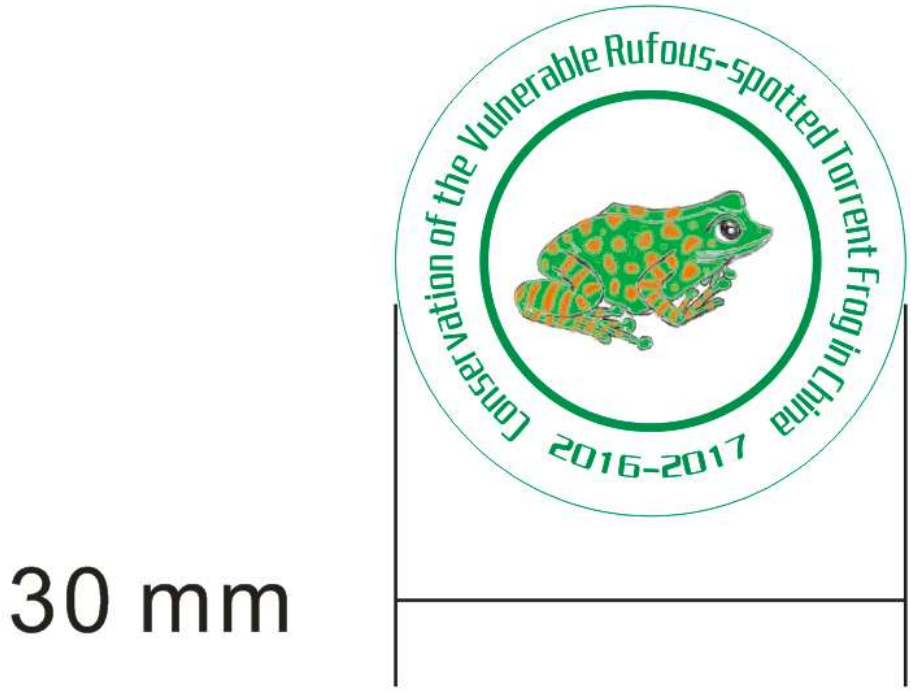
The PDF file we embedded here is the amphibian monitoring protocol that we designed for the Liziping reserve specifically.

We desigend and made the banner for our project.

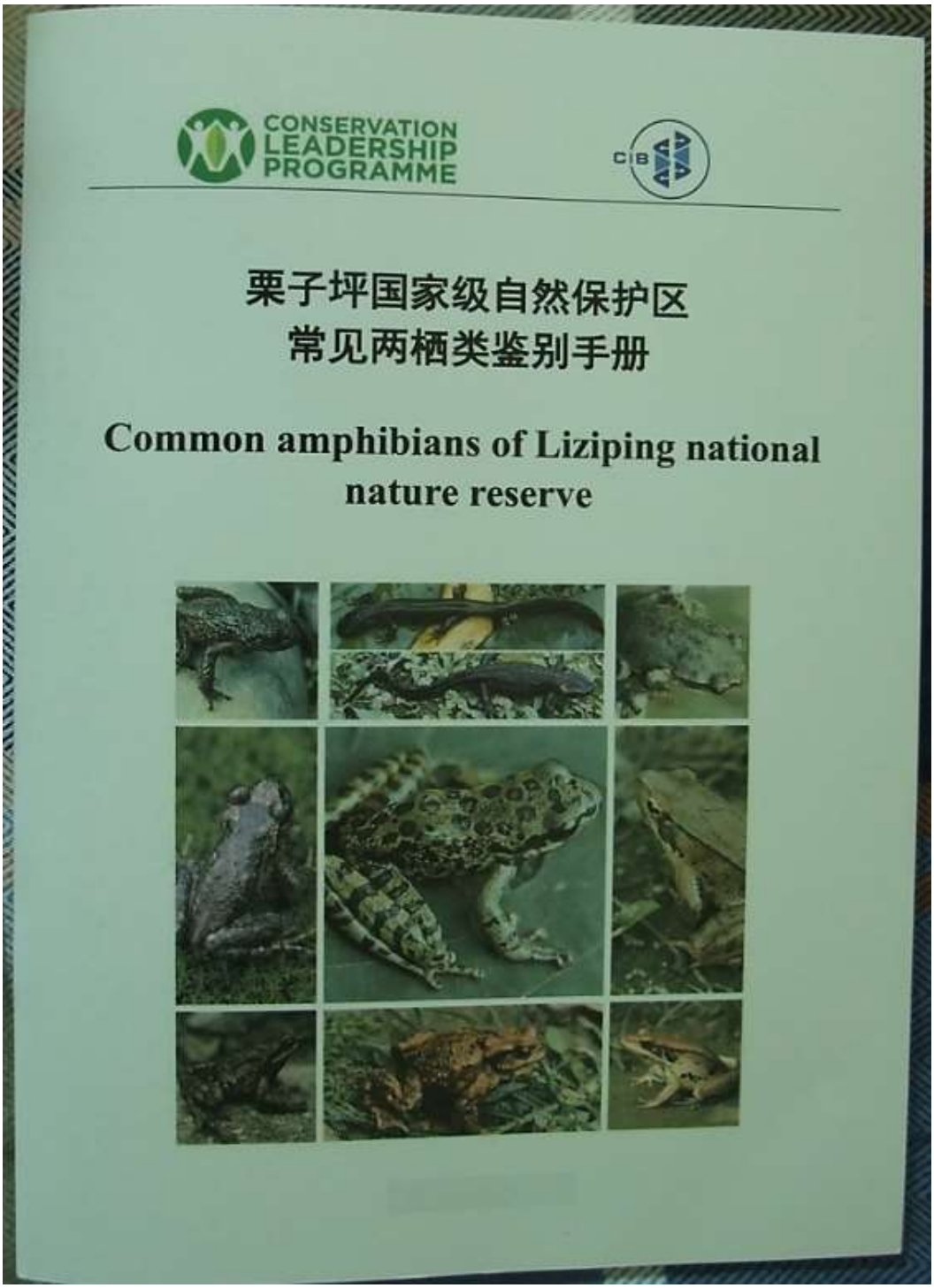
We designed, made and installed two types of signages for the project.

We designed and posted posters of 4 themes.

The reusable bag we designed and disseminated during the project.



The badge we designed and disseminated during the project.




The amphibian quick identify illustrated handbook.

| | 编号 | 科名 | 拉丁名 | 中文名 |
|---|---|---|---|---|
| 2 | 1 (1) | Urticaceae | Elatostema cuspidatum Wight | 赛尖楼梯草 |
| 3 | 1 (2) | Polygonaceae | Polygonum thunbergii Siebold & Zucca | 戟叶蓼 |
| 4 | 1 (3) | Urticaceae | Elatostema obtusum Weddell | 钝叶楼梯草 |
| 5 | 1 (4) | Apiaceae | Oenanthe thomsonii subsp. stenophyll | 窄叶水芹 |
| 6 | 1 (5) | Apiaceae | Oenanthe thomsonii subsp. stenophyll | 窄叶水芹 |
| 7 | 1 (6) | Apiaceae | Oenanthe thomsonii subsp. stenophyll | 窄叶水芹 |
| 8 | 1 (7) | Dryopteridaceae | Dryopteris rosthornii (Diels) C. Chr | 川西鳞毛蕨 |
| 9 | 1 (8) | Polypodiaceae | Lepisorus bicolor (Takeda) Ching | 二色瓦韦 |
| 10 | 1 (9) | Poaceae | Fargesia sp. | 箭竹属 |
| 11 | 1 (10) | Oxalidaceae | Oxalis griffithii Edgeworth & J. D. | 山酢浆草 |
| 12 | 1 (11) | Oxalidaceae | Oxalis griffithii Edgeworth & J. D. | 山酢浆草 |
| 13 | 1 (12) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 14 | 1 (13) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 15 | 1 (14) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 16 | 1 (15) | Rosaceae | Fragaria gracilis Losinskaja | 纤细草莓 |
| 17 | 1 (16) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 18 | 1 (17) | Pteridaceae | Coniogramme rosthornii Hieronymus | 乳头凤丁蕨 |
| 19 | 1 (18) | Dryopteridaceae | Dryopteris rosthornii (Diels) C. Chr | 川西鳞毛蕨 |
| 20 | 1 (19) | Asteraceae | Adenocaulon himalaicum Edgeworth | 和尚菜 |
| 21 | 1 (20) | Rosaceae | Rubus rubrisetulosus Cardot | 红刺悬钩子 |
| 22 | 1 (21) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 23 | 1 (22) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 24 | 1 (23) | Saxifragaceae | Astilbe rivularis var. myriantha (Di | 多花落新妇 |
| 25 | 1 (24) | Onagraceae | Epilobium kermodei Raven | 锐齿柳叶菜 |
| 26 | 1 (25) | Onagraceae | Epilobium kermodei Raven | 锐齿柳叶菜 |
| 27 | 1 (26) | Polygonaceae | Polygonum cathayanum A. J. Li | 华神血宁 |
| 28 | 1 (27) | Plantaginaceae | Plantago asiatica Linnaeus | 车前 |
| 29 | 1 (28) | Plantaginaceae | Plantago asiatica Linnaeus | 车前 |
| 30 | 1 (29) | Balsaminaceae | Impatiens siculifer J. D. Hooker | 掌叶凤 |
| 31 | 1 (30) | Polygonaceae | Polygonum cathayanum A. J. Li | 华神血宁 |
| 32 | 1 (31) | Rosaceae | Rubus setchuenensis Bureau & Franche | 川莓 |
| 33 | 1 (32) | Asteraceae | Anaphalis margaritacea (Linnaeus) Be | 珠光香青 |
| 34 | 1 (33) | Rosaceae | Rubus rubrisetulosus Cardot | 红刺悬钩子 |
| 35 | 1 (34) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 36 | 1 (35) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 37 | 1 (36) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 38 | 1 (37) | Rosaceae | Rubus rubrisetulosus Cardot | 红刺悬钩子 |

| | 编号 | 科名 | 拉丁名 | 中文名 |
|---|---|---|---|---|
| 39 | 1 (38) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 40 | 1 (39) | Rosaceae | Fragaria gracilis Losinskaja | 纤细草莓 |
| 41 | 1 (40) | Dryopteridaceae | Dryopteris rosthornii (Diels) C. Chr | 川西鳞毛蕨 |
| 42 | 1 (41) | Dryopteridaceae | Dryopteris rosthornii (Diels) C. Chr | 川西鳞毛蕨 |
| 43 | 1 (42) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 44 | 1 (43) | Clusiaceae | Hypericum wilsonii N. Robson | 川鄂金丝桃 |
| 45 | 1 (44) | Clusiaceae | Hypericum wilsonii N. Robson | 川鄂金丝桃 |
| 46 | 1 (45) | Clusiaceae | Hypericum wilsonii N. Robson | 川鄂金丝桃 |
| 47 | 1 (46) | Clusiaceae | Hypericum wilsonii N. Robson | 川鄂金丝桃 |
| 48 | 1 (47) | Asteraceae | Sinosenecio sp. | 蒲儿根属 |
| 49 | 1 (48) | | | 苔藓 |
| 50 | 1 (49) | | | 苔藓 |
| 51 | 1 (50) | | | 苔藓 |
| 52 | 1 (51) | | | 苔藓 |
| 53 | 1 (52) | | | 苔藓 |
| 54 | 1 (53) | Dryopteridaceae | Dryopteris rosthornii (Diels) C. Chr | 川西鳞毛蕨 |
| 55 | 1 (54) | Asteraceae | Artemisia lactiflora Wallich ex Candl | 白苞蒿 |
| 56 | 1 (55) | Asteraceae | Artemisia lactiflora Wallich ex Candl | 白苞蒿 |
| 57 | 1 (56) | Asteraceae | Artemisia lactiflora Wallich ex Candl | 白苞蒿 |
| 58 | 1 (57) | | | 苔藓 |
| 59 | 1 (58) | | | 苔藓 |
| 60 | 1 (59) | | | 苔藓 |
| 61 | 1 (60) | | | 苔藓 |
| 62 | 1 (61) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 63 | 1 (62) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 64 | 1 (63) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 65 | 1 (64) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 66 | 1 (65) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 67 | 1 (66) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 68 | 1 (67) | Rosaceae | Potentilla smithiana Handel-Mazzetti | 西蜀委陵菜 |
| 69 | 1 (68) | Rosaceae | Potentilla smithiana Handel-Mazzetti | 西蜀委陵菜 |
| 70 | 1 (69) | | | 苔藓 |
| 71 | 1 (70) | Pteridaceae | Pteris cretica Linnaeus | 欧洲凤尾蕨 |
| 72 | 1 (71) | Pteridaceae | Pteris cretica Linnaeus | 欧洲凤尾蕨 |
| 73 | 1 (72) | Dennstaedtiace | Hypolepis punctata (Thunberg) Metten | 鳞盖 |
| 74 | 1 (73) | | | 苔藓 |
| 75 | 1 (74) | Urticaceae | Chamabainia cuspidata Wight | 锥柱麻 |

| | 编号 | 科名 | 拉丁名 | 中文名 |
|---|---|---|---|---|
| 76 | 1 (75) | Betulaceae | Betula utilis D. Don | 糙皮桦 |
| 77 | 1 (76) | Ranunculaceae | Anemone sp. | 银莲花属 |
| 78 | 1 (77) | Ranunculaceae | Anemone sp. | 银莲花属 |
| 79 | 1 (78) | Betulaceae | Betula utilis D. Don | 糙皮桦 |
| 80 | 1 (79) | Betulaceae | Betula utilis D. Don | 糙皮桦 |
| 81 | 1 (80) | Balsaminaceae | Impatiens rostellata Franchet | 短喙凤仙花 |
| 82 | 1 (81) | Balsaminaceae | Impatiens rostellata Franchet | 短喙凤仙花 |
| 83 | 1 (82) | Pinaceae | Tsuga dumosa (D. Don) Eichler | 云南铁杉 |
| 84 | 1 (83) | Pinaceae | Tsuga dumosa (D. Don) Eichler | 云南铁杉 |
| 85 | 1 (84) | Rosaceae | Fragaria vesca Linnaeus | 野草莓 |
| 86 | 1 (85) | Urticaceae | Elatostema cuspidatum Wight | 赛尖楼梯草 |
| 87 | 1 (86) | Athyriaceae | Deparia okuboana (Makino) M. Kato | 大久保叶蕨蕨 |
| 88 | 1 (87) | Aquifoliaceae | Ilex pernyi Franchet | 猫儿刺 |
| 89 | 1 (88) | Aquifoliaceae | Ilex pernyi Franchet | 猫儿刺 |
| 90 | 1 (89) | Liliaceae | Maianthemum henryi (Baker) LaFrankie | 管花鹿药 |
| 91 | 1 (90) | Liliaceae | Maianthemum henryi (Baker) LaFrankie | 管花鹿药 |
| 92 | 1 (91) | Liliaceae | Maianthemum henryi (Baker) LaFrankie | 管花鹿药 |
| 93 | 1 (92) | Poaceae | Fargesia sp. | 箭竹属 |
| 94 | 1 (93) | Poaceae | Fargesia sp. | 箭竹属 |
| 95 | 1 (94) | Poaceae | Fargesia sp. | 箭竹属 |
| 96 | 1 (95) | Balsaminaceae | Impatiens rostellata Franchet | 短喙凤仙花 |
| 97 | 1 (96) | Balsaminaceae | Impatiens rostellata Franchet | 短喙凤仙花 |
| 98 | 1 (97) | Urticaceae | Elatostema obtusum Weddell | 钝叶楼梯草 |
| 99 | 1 (98) | Urticaceae | Elatostema obtusum Weddell | 钝叶楼梯草 |
| 100 | 1 (99) | Apiaceae | Oenanthe thomsonii subsp. stenophyll | 窄叶水芹 |
| 101 | 1 (100) | Apiaceae | Oenanthe thomsonii subsp. stenophyll | 窄叶水芹 |
| 102 | 1 (101) | Poaceae | Anisolytron treutleri (Kuntze) Soják | 肉穗草 |
| 103 | 1 (102) | Poaceae | Anisolytron treutleri (Kuntze) Soják | 肉穗草 |
| 104 | 1 (103) | Poaceae | Anisolytron treutleri (Kuntze) Soják | 肉穗草 |
| 105 | 1 (104) | | | 苔藓 |
| 106 | 1 (105) | | | 苔藓 |
| 107 | 1 (106) | Polypodiaceae | Lepidomicrosorium buergerianum (Miqu | 鳞果星蕨 |
| 108 | 1 (107) | Polypodiaceae | Lepidomicrosorium buergerianum (Miqu | 鳞果星蕨 |
| 109 | 1 (108) | | | |
| 110 | 1 (109) | | | |
| 111 | 1 (110) | Rosaceae | Rubus setchuenensis Bureau & Franche | 川莓 |
| 112 | 1 (111) | Rosaceae | Rubus setchuenensis Bureau & Franche | 川莓 |

| | 编号 | 科名 | 拉丁名 | 中文名 |
|---|---|---|---|---|
| 113 | 1 (111) | Rosaceae | Rubus setchuenensis Bureau & Franche | 川莓 |
| 114 | 1 (112) | Saxifragaceae | Astilbe rivularis var. myriantha (Di | 多花落新妇 |
| 115 | 1 (113) | Saxifragaceae | Astilbe rivularis var. myriantha (Di | 多花落新妇 |
| 116 | 1 (114) | Saxifragaceae | Astilbe rivularis var. myriantha (Di | 多花落新妇 |
| 117 | 1 (115) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 118 | 1 (116) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 119 | 1 (117) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 120 | 1 (118) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 121 | 1 (119) | | | 苔藓 |
| 122 | 1 (120) | Asteraceae | Artemisia lactiflora Wallich ex Candl | 白苞蒿 |
| 123 | 1 (121) | Asteraceae | Artemisia lactiflora Wallich ex Candl | 白苞蒿 |
| 124 | 1 (122) | Asteraceae | Anaphalis sureuloua (Handel-Mazzetti | 硫华香青 |
| 125 | 1 (123) | Rosaceae | Rubus setchuenensis Bureau & Franche | 川莓 |
| 126 | 1 (124) | Saxifragaceae | Astilbe chinensis (Maximowicz) Franch | 落新妇 |
| 127 | 1 (125) | Saxifragaceae | Astilbe chinensis (Maximowicz) Franch | 落新妇 |
| 128 | 1 (126) | Ericaceae | Rhododendron lutescens Franchet | 黄花杜鹃 |
| 129 | 1 (127) | Rosaceae | Rubus rubrisetulosus Cardot | 红刺悬钩子 |
| 130 | 1 (128) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 131 | 1 (129) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 132 | 1 (130) | Clusiaceae | Hypericum wilsonii N. Robson | 川鄂金丝桃 |
| 133 | 1 (131) | Dryopteridaceae | Dryopteris rosthornii (Diels) C. Chr | 川西鳞毛蕨 |
| 134 | 1 (132) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 135 | 1 (133) | | | 苔藓 |
| 136 | 1 (134) | | | 苔藓 |
| 137 | 1 (135) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 138 | 1 (136) | Asteraceae | Aster trinervius subsp. ageratoides | 三脉紫菀 |
| 139 | 1 (137) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 140 | 1 (138) | Asteraceae | Carpesium cernuum Linnaeus | 烟管头草 |
| 141 | 1 (139) | Asteraceae | Sinosenecio sp. | 蒲儿根属 |
| 142 | 1 (140) | Asteraceae | Cirsium sp. | 蓟属 |
| 143 | 1 (141) | | | 苔藓 |
| 144 | 1 (142) | Boraginaceae | Cynoglossum furcatum Wallich in Roxb | 琉璃草 |
| 145 | 1 (143) | Rosaceae | Fragaria gracilis Losinskaja | 纤细草莓 |
| 146 | 1 (144) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 147 | 1 (145) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 148 | 1 (146) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 149 | 1 (147) | Betulaceae | Betula utilis D. Don | 糙皮桦 |

| | 编号 | 科名 | 拉丁名 | 中文名 |
|---|---|---|---|---|
| 149 | 1 (148) | Asteraceae | Anaphalis margaritacea var. angustif | 线叶珠光香青 |
| 150 | 1 (149) | Asteraceae | Anaphalis margaritacea var. angustif | 线叶珠光香青 |
| 151 | 1 (150) | Cyperaceae | Carex sp. | 苔草属 |
| 152 | 1 (151) | Polygonaceae | Polygonum runcinatum Buchanan-Hamil | 羽叶蓼 |
| 153 | 1 (152) | Ranunculaceae | Ranunculus sieboldii Miquel | 扬子毛茛 |
| 154 | 1 (153) | Ranunculaceae | Ranunculus sieboldii Miquel | 扬子毛茛 |
| 155 | 1 (154) | Ranunculaceae | Ranunculus sieboldii Miquel | 扬子毛茛 |
| 156 | 1 (155) | Cyperaceae | Carex sp. | 苔草属 |
| 157 | 1 (156) | Rosaceae | Padus sp. | 稠李属 |
| 158 | 1 (157) | Rosaceae | Padus sp. | 稠李属 |
| 159 | 1 (158) | Rosaceae | Padus sp. | 稠李属 |
| 160 | 1 (159) | Rosaceae | Padus sp. | 稠李属 |
| 161 | 1 (160) | Asteraceae | Carpesium sp. | 天名精属 |
| 162 | 1 (161) | Asteraceae | Carpesium sp. | 天名精属 |
| 163 | 1 (162) | Adoxaceae | Sambucus javanica Blume | 接骨草 |
| 164 | 1 (163) | Adoxaceae | Sambucus javanica Blume | 接骨草 |
| 165 | 1 (164) | Adoxaceae | Sambucus javanica Blume | 接骨草 |
| 166 | 1 (165) | Rosaceae | Duchesnea indica (Andrews) Focke | 蛇莓 |
| 167 | 1 (166) | Fagaceae | Castanopsis sp. | 锥栗属 |
| 168 | 1 (167) | Fagaceae | Castanopsis sp. | 锥栗属 |
| 169 | 1 (168) | Ericaceae | Rhododendron lutescens Franchet | 黄花杜鹃 |
| 170 | 1 (169) | Ericaceae | Rhododendron lutescens Franchet | 黄花杜鹃 |
| 171 | 1 (170) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 172 | 1 (171) | Betulaceae | Alnus cremastogyne Burkill | 桤木 |
| 173 | 1 (172) | Polygonaceae | Polygonum thunbergii Siebold & Zucca | 戟叶蓼 |

Inventory of plants along the line transects has been compiled.

The PPTs we designed and used in the workshop and school educations.

We designed and made the headgear for school interactive games.

*Papers being prepared for publication by project members*

Gong Y Z et al., 2019, Reproductive ecology of the Taliang crocodile newt (Liangshantriton taliangensis). In Acta Ecologica Sinica. It's a Chinese manuscript with english abstract.

**Address list and web links**

Liuyang He, Liziping National Nature Reserve (517161929@qq.com), commissioner of exterior communication subdivision, collaborator for stakeholder liaison in Shimian County and fieldworks.

Jay Redbond, Wildfowl & Wetlands Trust (WWT) (jay.redbond@wwt.org.uk), advisor for on-ground amphibian conservation and data analysis.

Feng Xie, Chengdu Institute of Biology (CIB) (xiefeng@cib.ac.cn), professor in zoology, supervisor to 3 team members and advisor for herpetological studies.

Bo Xu, Chengdu Institute of Biology (CIB) (xubo@cib.ac.cn), associate professor in ecology, advisor in botanic classification and identification.

State Forestry Administration (www.forestry.gov.cn), published the list of terrestrial wildlife under state protection, which are beneficial or of important economic or scientific value.

The People's Government of Shimian (www.shimian.gov.cn), permitted our application of fieldwork research and local residents' interaction, posted news about our school conservation education activities.

Chengdu Institute of Biology (www.cib.ac.cn), No. 9, 4th Section, Renminnanlu Street, Chengdu, the alma mater of all team members, reported activities of the project on its website and provided leave that allowed the team members to participate in fieldworks.

**Distribution list**

The management bureau of Liziping National Nature Reserve.

Chengdu Institute of Biology, Chinese academy of sciences.