

Xe Bang Fai Cave Survey and Mapping



Prepared for the project: Integrated Nature Conservation and Sustainable Resource Management in the Hin Nam No Region

Draft

Final Report

January 2016

Objective: To conduct an in-cave survey of cave passages not surveyed in 2008 to produce a completed high quality map of the Xe Bang Fai Cave. The completed map can serve as basis for management of the cave in terms of conservation of its geological and biological richness as well as its future use as a tourism destination.

Background

The Hin Nam No National Protected Area (HNN-NPA) covers 82,000 ha of mainly limestone karst landscape where the Central Indochina Limestone meets the Annamite Mountain Chain, in the central Lao province of Khammouane. The German Government supported Hin Nam No Project assists the HNN-NPA authorities in developing a co-management system, where local communities share responsibilities for and share benefits from sustainable management of the biodiversity and geological resources in the NPA.

Tourism development is seen as one of the key sources for sustainable financing over the long term for the maintenance of such a co-management system. The Xe Bang Fai Cave is seen by the provincial authorities as the main focus for tourism development in HNN-NPA. The HNN Project supports the development of a sustainable tourism development plan around the cave. A high quality map of the cave is needed as a basis for such a management plan.

The Xe Bang Fai River has cut a 6.4 km underground course through the limestone karst, creating one of the largest active river cave passages in the world. The active river passage averages 76 m in width and 53 m in height, with a maximum width of 200 m and a maximum height of 120 m. In addition to the size of the cave passages, the cave is superbly decorated with speleothems, including many large and beautiful stalagmites, flowstone draperies, cave pearls and gour pools, including a 61 m long gour basin considered to be the world's largest single gour pool to have formed in a cave.

A North American team of expert cavers visited the cave in 2008 to produce a high quality map and photographs of the Xe Bang Fai Cave. The team was comprised of some of the best cave mappers, cartographers and photographers in North America. They mapped 9.7 km of passage to a high standard and produced a provisional map of excellent quality and detail. However, the map was not yet complete, as the team encountered more cave than could be surveyed in the time available. The photographs of the large cave passages and speleothem formations were first published on the National Geographic website [1] later in 2008, revealing the splendors of the cave to the world. A complete magazine article with more photos and a detailed map of the cave was published in 2009 [2]. Several copies of this magazine article were provided to the IUCN and the Lao World Heritage Committee at that time. A number of these photos have been widely distributed and republished on the internet and on calendars and posters in Laos. The article, map and photos contributed substantially to raising awareness of the significance of the Xe Bang Fai Cave (and HNN-NPA more generally), and to increasing interest in ecotourism visitation to the cave.

A return survey trip to the cave was proposed in 2014, which the Hin Nam No Project offered to support in-country. The same survey team returned to HNN-NPA from 5-14 January 2015 to finish the in-cave survey. Processing the survey data and drafting the final map required another year, and was completed in January 2016.

Cave Exploration, Survey and Documentation Program

The 2015 cave survey work entailed surveying the Tham Bing dry passage on the downstream end of the cave, and the maze area on the upstream end of the cave. The field campaign was co-financed between the GIZ implemented Hin Nam No Project and the cave experts themselves who provided for their own airline tickets and labour. The logistics within

Laos were arranged and financed through the Hin Nam No Project. The field campaign was led and facilitated by the tourism team of the Management Unit of Hin Nam No NPA.

Cave Survey Team

The cave survey field team was comprised of the international cave experts, Hin Nam No Project staff, and local villagers. The international cave experts were:

- John Pollack, North American team organizer / leader (Canada)
- Bob Osburn, cave survey, lead cartographer (USA)
- Patricia Kambesis, cave survey, lead surveyor and mapper (USA)
- Aaron Addison, cave survey and GIS (USA)
- David Sawatzky, cave exploration and survey (Canada)
- Terry Bolger, cave exploration and survey, liaison with HNN project (Australia/Laos)

The Hin Nam No Project tourism team included Mr Khamphao, Mr Bounlong, and Ms Vanhxay. Mirjam de Koning, Joost Foppes and Ronny Dobbelsteijn joined the team over the weekend to see and participate in the project first-hand.

The villager support team from Ban Nongping included six villagers who supported the upstream camp throughout the 6 days there, and another 8 villagers who helped carry supplies and equipment to the upstream camp.

Field Campaign Schedule

The field campaign was conducted during the period 3-15 January, 2015 as outlined below:

Date	Activity
January 3, 2015	North American cave experts arrive in Vientiane
January 4, 2015	Travel from Vientiane to Thakek in the afternoon
January 5, 2015	Travel from Thakek to Boualapha and on to Ban Nongping
January 6, 2015	Begin surveying Tham Bing (downstream dry side passage)
January 7, 2015	Finish surveying Tham Bing (downstream dry side passage)
January 8, 2015	Move to the upstream cave entrance and establish camp
9-13 January, 2015	Survey upstream maze passages
14 January 2015	Walk back to Ban Nongping and travel to Thakek
15 January 2015	Briefing meeting with PONRE, travel to Vientiane

Two teams were formed to conduct the cave survey. On most days the international cave experts were accompanied in the cave by Hin Nam No Project staff and villagers, who learned about the cave, its conservation and management, and the basic principles of cave surveying.

The cave survey was done using laser distance meter, compass and clinometer to measure distance, direction, and elevation change from each survey station to the next, and to measure the passage dimensions (distance to walls, ceiling and floor). This information was recorded and used to draw a detailed sketch to scale (1:1000) of the cave passages and their features. A sketch of the Tham Bing passage is presented as an example (Photo 1). After the field campaign, the cave survey data was processed and the updated cave map was drawn using specialized cave survey and mapping software.

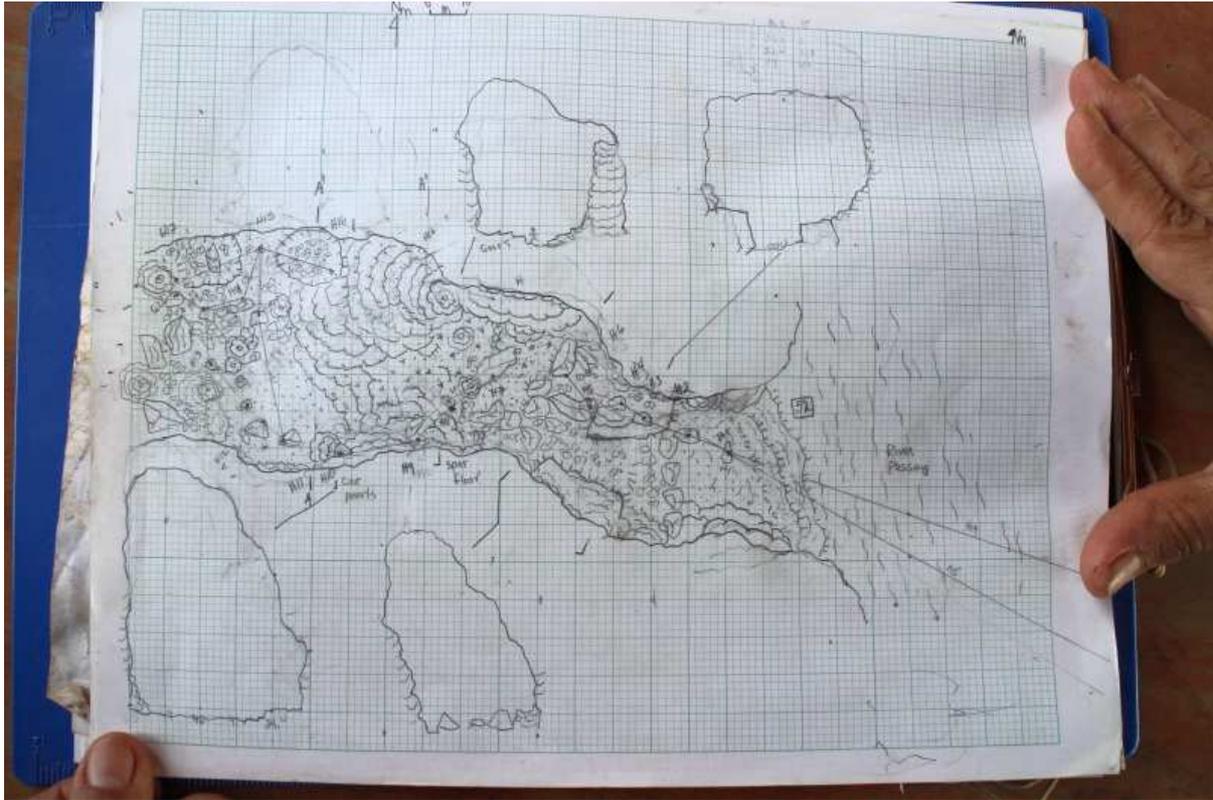


Photo 1. Sketch of the Tham Bing Passage

Cave Description and Map

The Tham Bing passage had a survey length of 570 m from the entrance slope to where it drops 61 m to join the main river passage. This large passage is well-decorated with large stalagmites, columns and gour basins (see photo on cover page, lower left).

The exploration and survey of the upstream maze area is now essentially complete (up to several water-filled pools), with an additional 4.4 km of cave passage surveyed in this section of the cave (Photo 2). The larger passages in this section are 70-130 m wide. The large passages are often areas of steeply sloping breakdown with mountains of large rocks up to 100 m high in them, along with some areas containing speleothem formations (Photo 3). The upstream maze area is probably an old underground course of the Xe Bang Fai River.

The survey of the Xe Bang Fai Cave is now complete, as far as is known. Analysis of the survey data reveals that the total length of the cave is 14.7 km, with the main river passage being 6.4 km long between the upstream and downstream entrances. Drafting of the English language version of the final map is complete and includes profile as well as plan views. A Lao language version of the map will be produced soon, in collaboration with the Hin Nam No Project. A digital version of the cave map is provided as Annex 1, and publications and presentations resulting from this mapping project (to date) are listed in Annex 2.



Photo 2. Drafted map section of the upstream maze area of the cave

Preliminary Assessment of Cave Resources

The survey team confirms that the Xe Bang Fai Cave is one of the great river caves of the world, and a key attribute of the Outstanding Universal Value of Hin Nam No NPA with respect to World Heritage criterion viii: “Be outstanding examples representing major stages of Earth’s history, including the record of life, significant ongoing geological processes in the development of landforms, or significant geomorphic or physiographic features”.

Large bats were observed in both Tham Bing and the main river passage, and white fish, probably the cave-adapted species *Bangana musaei* [3], were observed in pools in the upstream maze area of the cave. These observations may add to, or confirm the important biodiversity contained in the cave. A comprehensive study of the cave biodiversity is recommended to determine its contribution to Outstanding Universal Value with respect to World Heritage criterion x: “Contain the most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation”.



Photo 3. Large cave passage in the upstream maze with breakdown and large formations

Management Guidelines and Recommendations

The Tham Bing passage is large and well-decorated, but also delicate. A defined walkway through this passage should be established before tourism to this part of the cave begins, to limit the impacts of tourism.

The upstream maze area of the cave is remote, and with the presence of an endemic, globally threatened cave fish [3], tourism is not recommended to this area of the cave. Further, Maurice Kottelat (personal communication) recommends that the location, and even occurrence, of the cave adapted fish in the cave be kept secret, lest they be looted to supply the aquarium-fish trade. This has happened for all cave fishes of Thailand, regardless of the difficulty of access to the fish.

The team did not notice any significant impacts on the cave from tourism since their visit in 2008. The Hin Nam No NPA has an opportunity to establish baseline surveys and ongoing monitoring of the geological, hydrological and biological resources of the cave before tourism (and associated impacts) increases, or before further developments occur in the watershed area upstream of the cave.

The detailed cave map is an essential information resource for managing and monitoring the cave and its resources. A description of the main caves, with maps, is generally a part of the World Heritage nomination documentation for any karst site. In addition, tourists like to know how long a cave is, where it goes (even if they don't go all the way), and where they will go/have been in the cave. In this regard, the completed, high quality cave map can also be used as an interpretation device.

Other management guidelines and recommendations for the Xe Bang Fai Cave, which go beyond the scope of this project, can be found in the reports referenced as [4] and [5] below.

References

1. Dave Bunnell. *Photos: Gigantic River Cave Revealed in Laos*. October 2008.
<http://news.nationalgeographic.com/news/2008/10/photogalleries/river-caves-photos>
2. John Pollack *et al.* *Tham Khoun Xe – The Great Cave on the Xe Bang Fai River*. NSS News 67(7): 4-18. July 2009.
3. Maurice Kottelat and Helmut Steiner. *Bangana musaei, a new cave fish from central Laos*. Ichthyological Exploration of Freshwaters 21(4): 313-322. December 2010.
4. Terry Bolger. *Xe Bang Fai Cave Assessment for Sustainable Tourism Development*. Global Environment Facility Small Grants Programme. October 2012.
5. Terry Bolger. *Xe Bang Fai Cave Tourism Development Workshop Report*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. November 2013.

DRAFT

Annex 1. Map of the Xe Bang Fai Cave

A digital version of the Xe Bang Fai Cave map has been provided as a separate file: xebang_1_08_2016 with profilefor raster.jpg

Annex 2. Publications and Presentations (to date)

John Pollack. 2015 *Tham Khoun Xe mapping project, Xe Bang Fai river, Khammouane Province, Laos*. *The BC Caver* 29(1): 19-21. Winter 2014-15.

John Pollock *et al.* 2015 *Tham Khoun Xe mapping project, Xe Bang Fai river, Khammouane Province, Laos*. *NSS News* 73(7): 6-7. July 2015.

John Pollack. 2015 *Tham Khoun Xe mapping project, Xe Bang Fai river, Khammouane Province, Laos*. *Canadian Caver* 81: 11-14. 2016 (In press).

Pat Kambesis and Terry Bolger. *Tham Khoun Xe—One of the World's Great River Caves*. Presentation at the National Speleological Society (USA) 2015 Convention, Waynesville, Missouri, USA. July 2015.

DRAFT