Phong Nha-Ke Bang National Park

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Viet Nam
Inscribed in: 2003
Criteria: (viii) (ix) (x)

The Phong Nha-Ke Bang National Park, inscribed on the World Heritage List in 2003, covered 85,754 hectares. With this extension, the site covers a total surface area of 126,236 hectares (a 46 % increase) and shares a boundary with the Hin Namno Nature Reserve in the Peoples Democratic Republic of Laos. The Park’s landscape is formed by limestone plateaux and tropical forests. It features great geological diversity and offers spectacular phenomena, including a large number of caves and underground rivers. The site harbours a high level of biodiversity and many endemic species. The extension ensures a more coherent ecosystem while providing additional protection to the catchment areas that are of vital importance for the integrity of limestone landscapes.

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SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

SIGNIFICANT CONCERN

While the very core of the site’s Outstanding Universal Value – the karst landscape and inherent examples of Earth’s history – is secure from degradation on a scale that would diminish this value, there is a trend for economic opportunity to overshadow the protection of the karst values represented by the caves. The existing show-caves require remedial works to repair what damage can be repaired and more importantly, they need infrastructure and policy development to minimize ongoing damage from poor visitation management. The opening of additional caves without adequate planning and development controls and opening wild caves in the Strictly Protected Zone for tourism, without developing detailed management prescriptions for those caves, is particularly concerning.

It is of concern that a clear benefit-sharing for local communities is still not in place, and that there is a rise in over-dependency on revenue from tourism.

The biodiversity values of the forest are being severely impacted by invasive plants and although recent law enforcement efforts are reported to have led to a significant reduction in offenses, poaching and other illegal resource use remains an ongoing threat to the World Heritage site. Of great concern are also the unknown impacts of roads within the site and the loss of large mammals.
Phong Nha-Ke Bang National Park - 2020 Conservation Outlook Assessment
FULL ASSESSMENT

Description of values

Values

World Heritage values

► Outstanding karst landforms  
Phong Nha is part of a larger dissected plateau, which also encompasses the Ke Bang and Hin Namno karsts. The limestone is not continuous but demonstrates complex interbedding with shales and sandstones which, together with the capping of schists and apparent granites has led to a striking series of landscapes ranging from deeply dissected ranges and plateaux to an immense polje. The plateau, which extends into neighbouring Laos, is one of the finest and most distinctive examples of a complex karst landform in Southeast Asia (World Heritage Committee, 2012).

► Scientifically significant caves  
Phong Nha-Ke Bang displays an impressive amount of evidence of earth's history. It is a World Heritage site of great importance for increasing our understanding of the geologic, geomorphic and geochronological history of the region. The site contains around 140km of known caves making it one of the most outstanding limestone karst ecosystems in the world. The karst formation has evolved over some 400 million years and as such is the oldest major karst area in Asia. The caves demonstrate a distinct series of events which left behind various levels of fossil cave passages (formerly buried and now uncovered palaeokarst); evidence of major changes in the routes of underground rivers; changes in the solutional regime; deposition and later re-solution of giant speleothems and unusual features such as sub-aerial stromatolites. There is evidence of at least one period of hydrothermal activity in the evolution of this ancient karst system (World Heritage Committee, 2012).

► Spectacular diversity of cave types  
The long and complex karst formation process has led to the creation of not only underground rivers but also a variety of cave types including: dry caves, terraced caves, suspended caves, dendritic caves and intersecting caves (World Heritage Committee, 2012).

► Ongoing development of ecosystems  
The World Heritage site hosts many important ecological and evolutionary processes both above and below the ground, particularly so in as much as the isolation of the caves from one another provides opportunity for speciation of cave fauna. Its cave ecosystems and habitats are unique with high levels of endemism and adaptations displayed by cave-dependent species (World Heritage Committee, 2015). The guano deposits of some 40 species of bats found in the forests and caves provide important ecosystem benefits for invertebrate, fish and bird populations and the nine species of primates, which occur in the forests, help spread seeds within the site. The site and its connectivity with the Him Namno, Phou Hin Poon and the Nakai-Nam Theun National Biodiversity Conservation Areas in Laos provides opportunity for many rare and endangered South-east Asian species to move across the landscape thus facilitating opportunity for ongoing evolutionary processes (Worboys, 2012).

► Habitat diversity  
The World Heritage site includes globally significant ecosystems within the Northern Annamites Rainforests and Annamite Range Moist Forests priority ecoregions. With a forest cover estimated to reach 94%, including 84% primary forest, it is one of the largest remaining relatively intact moist forests on karst in Indochina (World Heritage Committee, 2015). The vast majority (almost 75%) of the Phong Nha-Ke Bang (PNKB) area is covered by tropical dense
moist evergreen forest on limestone below 800 m.a.s.l., however, there are another 10 recognized vegetation types including low tropical limestone montane evergreen forest above 800 m.a.s.l., tropical dense moist evergreen forest on hills above 800 m.a.s.l., low tropical montane forest on hills above 800 m.a.s.l., tree/shrub savannah on limestone, tree/shrub savannah on hills, riverine forest, bamboo forest, two types of degraded forest and a small area of cultivated land (State Party of Viet Nam, 2003).

**Floral diversity**

The World Heritage site is home to over 2700 species of vascular plants, including 133 globally threatened plant species and over 400 species endemic to Vietnam (World Heritage Committee, 2015), as well as one endemic to the site (Hopea hongayanensis, CR). The floral assemblage, being centrally located is transitional between the northern and southern floristic zones of the country; it includes a wide diversity of families. There are 38 species listed in the Red Data Book of Vietnam Plants and 25 species were listed in the IUCN Red List of Threatened Plants although with new species continually being discovered this data needs to be updated. There is also a 50km2 forest (on limestone) of about 2,500 Calocedrus rupestris (EN) and Calocedrus macrolepis (VU) trees, most of which are 500–600 years old (State Party of Viet Nam, 2003; UNEP-WCMC, 2011). The area also holds important agro-biodiversity values that have co-existed and co-evolved with wider floral diversity.

**Significant species of fauna**

The World Heritage site is home to over 800 species of vertebrates, including 38 animal species endemic to the Annamite range. Several new species to science have recently been found, including cave scorpions, spiders, fish, lizards, snakes and turtles, and more species are likely to be discovered. Significant mammals include the endangered Large-antlered Muntjac, Clouded Leopard, and the critically endangered Saola, as well as important populations of primates, including Hatinh langur (EN) endemic to Vietnam and Lao PDR, the black form of the Hatinh langur, sometimes considered as a separate species, red-shanked douc langur (EN) and the largest remaining population of white-cheeked gibbon (World Heritage Committee, 2015). Other primates include the pygmy slow loris (VU), northern pigtailed, stump-tailed, Assam and rhesus macaques. The Laotian rock rat has been recorded at the site. Other smaller mammals include Sunda pangolin (EN), smooth-coated otter (VU), Owston’s civet (VU) and the recently discovered Annamite striped rabbit. Ten species of bat which occur here are listed in the IUCN List of Threatened Species. Significant birds include 15 species which are listed in the Vietnam Red Data Book and 20 in the IUCN Red List of Threatened Species. They include two species of pheasant, Siamese fireback and crested argus. There are wreahted, rufus-necked, brown and great hornbills while other uncommon birds found are the chestnut necklaced partridge, red-collared woodpecker, the recently rediscovered endemic sooty babbler, short-tailed scimitar babbler and the bar-bellied pitta. Significant reptiles and amphibians include 18 species that are listed in the Vietnam Red Data Book and 6 that are listed in the IUCN Red List of Threatened Species. Among these are the Chinese three-striped box-turtle (CR) and keeled box turtle (EN). The 72 fish species quoted in the nomination include four locally endemic including Chela qaungbinhensis, but 162 additional species have subsequently been identified (UNEP-WCMC, 2011).

**Assessment information**

**Threats**

**Current Threats**

The site’s geological values are relatively immune from any real threat. However, poor visitor management and inappropriate tourism developments downgrade the image desired for a World Heritage site, although they might not significantly impact on the geological values. The caves of the site are significant and spectacular, however, poor management of the show-caves is damaging those caves (and surrounding areas) which are being used. Quarrying in the buffer zone might become a serious threat, particularly to the scenic values of the area.

Biodiversity values of the site, however, are significantly threatened by poverty on the Park boundary and increasing access opportunity via the G20 Road for commercial hunters and forest product gatherers from
throughout Viet Nam. Increasing tourism access to remote areas of the site is further disturbing habitat use by significant species of fauna. The reported modification of habitat by free-ranging cattle requires management investigation and intervention.

Of greatest concern is the invasive plant Merremia boisiana, which represents a significant management challenge and a severe threat to the biodiversity of the site, as it covers large areas where it completely smothers other native vegetation. Despite being a native species, Merremia is an invasive species and is causing significant damage to the ecosystem of the site.

▶ **Water Pollution**

(Fuel/oil spills from tour boats, general litter accumulation in the forest waterways)

The rapidly expanding tourism activity has provided opportunity for more and more boat operators transporting tourists within the site. While the operation of motors within caves has been stopped there is still the risk of fuel and oil being spilled inside the caves. Plastic bags, bottles and cans as well as cigarette butts and other non-biodegradable refuse are a major problem along most visitor access pathways to and within the caves. Much of it eventually makes its way into the watercourses. The increase in the number of visits to caves and the diversification of cave related tourism activities with highly varied levels of visitor supervision warrants the threat of pollution affecting both the caves and the adjacent waterways and forest to be raised from low in 2017, to now being high (IUCN Consultation, 2020a). Increasing population pressures exist in the immediate borders outside the National Park. Agricultural cultivation and associated spraying of pesticides are likely to have a negative impact on the water quality of nearby rivers as has the illegal disposal of solid waste (IUCN Consultation, 2020b).

▶ **Roads/ Railroads**

(Access roads)

The construction and subsequent use of the Ho Chin Min Highway/Route 20 link road have been identified as major threats to the Park’s integrity and values. The road was completed several years back (as of 2020), and while there has been no study published on the impact of the construction and subsequent use of the road, the State Party’s 2019 State of Conservation report details the violations detected by the checking stations controlling the roads. The large mammal survey report appended to the State of Conservation report, suggests that the increased use of the road may be a significant contributor to the loss of the elephant population, which was once found in the Park (State Party of Viet Nam, 2019). This report also notes that the roads within the site "make it easier for local residents to access the remote parts of PNKB NP for illegal hunting, forest products collecting, etc." (State Party of Viet Nam, 2019).

▶ **Droughts**

(Wildfire)

It is recognised that with the regular dry season comes the risk of forest fires (UNEP-WCMC, 2011). Biodiversity is resilient, as witnessed by the recovery of the site’s forests and biodiversity following the damages caused during the War, and fire will generally cause low level, short term impacts on Biodiversity values; and the impacts may be either positive or negative for biodiversity depending on the intensity and frequency of fires. Climate change may result in more severe drought periods, which would increase the fire intensity risk and increasing tourism access will increase the fire frequency risk.

▶ **Logging/ Wood Harvesting**

(Illegal logging)

The lack of access to economic opportunities for local communities combined with improving vehicle access both within the province and the country means that illegal timber gathering remains difficult to eliminate.

In its 2019 State of Conservation Report the State Party advises that measures to detect and prevent illegal logging have been highly successful, however, as the population in the buffer zone is noted in the
2018 Reactive Monitoring Mission report (UNESCO and IUCN, 2018) as having grown from 54,000 in 2015 to 70,000 in 2018, there remains an ongoing threat of illegal logging should vigilance by the Management Board decrease.

▶ Mining/ Quarrying  
(Limestone quarrying)  
High Threat  
Inside site, extent of threat not known

The illegal quarrying of limestone is widespread throughout the buffer zone and is impacting on the area’s natural and aesthetic values. It is important to control this issue. A clear system for local communities to legally quarry rock outside areas that impact on the OUV of the site needs to be developed and enforced by authorities. The latest State of Conservation Report by the State Party of Viet Nam (2019) is silent on this matter, and ongoing quarrying of limestone right next to the National Park borders poses high concern for the scenic values of the protected site (IUCN Consultation, 2020b). The local communities need access to limestone and a properly regulated system of quarrying stone within the buffer zone (or, preferably, from an area(s) proximal to but outside of it) must be developed as soon as possible to avoid an expensive aesthetic remediation process. Failure to address this issue in view of the rapidly increasing buffer zone population (UNESCO and IUCN, 2018) indicates a need to elevate the threat level from low to high.

▶ Changes in traditional ways of life and knowledge systems that result in negative impact  
(Displaced ethnic groups and economically marginalised local communities)  
High Threat  
Inside site, extent of threat not known  
Outside site

Several ethnic minority communities living in the Phong Nha-Ke Bang (PNKB) area were, in line with wider national policies, resettled in new areas upon creation of the Park and apart from these communities living within the Park, a number of other ethnic minority communities live in its buffer zone. In all, a total ethnic minority population of some 11,000 (GFA, 2006) have customary relationships with the forest of the PNKB area.

Population growth in the region is rapid and poverty is widespread, with many people dependent upon the exploitation of forest products as part of their livelihoods (UNEP–WCMC, 2011). The lack of assured and sustainable income generation activities creates pressure on these communities to exploit resources and values that are sought to be protected through the World Heritage site. The low income of a large number of families living within the buffer zones means that wildlife poaching and other extractive activities will continue until other sustainable opportunities to support livelihoods are assured.

Management policies support local involvement in tourism, enforcement and management of the site and community engagement in management has been strengthened. However, the livelihoods of people in some areas of the buffer zone has not improved so they remain dependent on exploiting the forest in whatever way the can so the threat remains (State Party of Viet Nam, 2019).

▶ Tourism/ Recreation Areas  
(Inappropriate development of access infrastructure to and within caves)  
High Threat  
Inside site, scattered(5-15%)

The development of infrastructure within the Phong Nha and Tien son Caves for visitor access is not in line with internationally accepted standards for the development of show-caves (Worboys, 2012). Ly and Nguyen (2017), in their tourism carrying capacity case study paper, note that these caves were reopened after redevelopment of facilities in 2013 and that Paradise Cave had been developed as a mass-tourism site in 2010. Tien son cave was closed due to issues with the access infrastructure during the joint UNESCO-IUCN 2018 Reactive Monitoring Mission and the Mission report notes the inappropriate positioning of lights in the Paradise Cave (UNESCO and IUCN, 2018). A recent study by Trinh et al. (2018) has shown that lampenflora and their associates have already discoloured and severely damaged speleothem surfaces in Paradise Cave. From this, it is concluded that the 2012 statement by Worboys (2012) has not been adequately addressed.
Tourism/ visitors/ recreation
(Inadequate visitor management)

Very High Threat
Inside site, scattered (5-15%)

Park visitation has grown from a few thousand people in 1995 to almost 1 million in 2019 (based on the published 715,000 in 2015 with a stated increase of 7-9% per annum). The site's management plan includes an estimate/target of 3.5 million visitors by 2030. The initial development of the tourism product was focused on providing access to the show-caves (Phong Nha, Tien son and Paradise Caves), where problems of pollution and damage to speleothems and biodiversity has been significant.

Remedial measures including training for staff and tourist guides, bans on the use of motor boats and fuel lights in the caves, and establishing waste collection systems have been undertaken (UNEP-WCMC, 2011). These measures have been variably successful but the 2018 Reactive Monitoring Mission report notes that food waste deposited in Paradise Cave (and probably all show-caves) attracts rats and mice into the cave, which pose a significant threat to the cave fauna (UNESCO and IUCN, 2018). In recent years, the development of the tourism product has expanded beyond the show-caves to include adventure caving experiences, kayaking into caves, mud bathing in caves, an extensive and expanding system of zip-lines and an aquatic playground in the Nuoc Mooc Eco-trail/Dark Cave area. The 2018 Mission considered that the development of thrill-seeking activities inside the site, which do not contribute to the understanding of its globally significant World Heritage values or its conservation should not be permitted (UNESCO and IUCN, 2018).

It is also discernible that sites managed by the Tourism Centre (which is considered a functional unit of the National Park, but is financially dependent on the Treasury House of the provincial government) follow a strictly business-oriented rather than a conservation-oriented management strategy. Due to the current management structure of the National Park, there are concerns of conflicts of interest between the National Park and the provincial government's interest in developing tourism (IUCN Consultation, 2020b).

A proposed cable car to Hang En, which was a major concern to the 2018 Reactive Monitoring Mission, has since been abandoned (UNESCO, 2019), but the Mission report further notes concern regarding the planned development of mass tourism in the administrative zone and urbanization of the buffer zone. It recommends improvement of the existing and planned tourism product by placing a stronger focus on conservation and education. Of the various recommendations in the 2018 Reactive Monitoring Mission report in regard to visitor management, one of the most significant is its proposal for individual management prescriptions for all caves being accessed for tourism purposes.

Hunting and trapping
(Commercial and subsistence hunting)

High Threat
Inside site, extent of threat not known
Outside site

Commercial and subsistence hunting remains a major threat to the biodiversity of the site. Since 2015, there has been a concerted effort to improve law enforcement and community engagement in forest protection and conservation activities. The 2018 joint UNESCO-IUCN Reactive Monitoring Mission was provided with details on enforcement activities for the period January 2015 – June 2018. This data indicates that enhanced patrolling combined with awareness-raising had resulted in a significant reduction in illegal logging and hunting activities, but, the Mission report concludes that the data did not clearly demonstrate that the effectiveness of law enforcement is increasing as the decrease in offenses being recorded coincides with a decrease in patrol effort (UNESCO and IUCN, 2018). Despite this, the Mission noted the many measures that the Management Board has taken to support law enforcement activity including the various livelihood improvement programmes in the buffer zone, the provision of training to strengthen the enforcement capacity of Forest Rangers, and stepping up disciplinary action against its own employees to correct and discourage misbehavior. Despite these significant efforts to moderate the threat of hunting to the site's OUV, a 2018 'Survey of large mammals in PNKB-NP and its buffer zone' concludes that: “The most serious threat to the large mammal species in PNKB NP is uncontrolled wildlife hunting /snaring in buffer zone and village-close part of core zone of PNKB NP. Other less serious threats includes significant reduction of prey animal sources of Tiger and Dole” (State Party of Viet Nam, 2019). This comment about the significant reduction of prey animals is indicative of a high level of hunting activity persisting.
Livestock Farming / Grazing

(Cattle grazing)

Data Deficient

Inside site, extent of threat not known

Outside site

The State Party's 2019 State of Conseration report includes a 2018 Survey of large mammals in PNKB NP, which makes reference to free-ranging cattle grazing impacting the habitat of several of these large mammals to the degree that parts of the World Heritage site and its buffer zone are now unsuitable for the support of fauna such as Asian Elephant, Gaur, Large-antlered Muntjak and Saola (State Party of Viet Nam, 2019).

Tourism/ visitors/ recreation, Other Activities

(Encroachment for collecting NTFPs and increasing tourism access)

Low Threat

Inside site, widespread(15-50%)

The analysis of the results of 2018 large mammal survey in PNKB-NP shows that the abundance of Tiger, Asiatic Black Bear, Dhole, Asian Elephant, Gaur, Large-Antlered Munjjak and Saola has been seriously reduced (State Party of Viet Nam, 2019). It states that elephants are already gone and are unlikely to return due to the disruption by the Route 20 /Ho Chin Min Highway link-road (and other roads within the site) and further asserts that the other six mammals will also be lost from the World Heritage site soon unless urgent conservation measures are undertaken. It notes that illegal hunting with guns is well controlled and that there is an increased effort to prevent the use of snares, but raises the concern of the passive disturbance of sensitive wildlife species resulting from the increasing encroachment by humans into the heart of the core area for non-timber forest product (NTFP) collecting and tourism, citing in particular the Saola population known to inhabit the area around Son Doong Cave (State Party of Viet Nam, 2019). While there have also been efforts made in banning illegal wildlife from local menus, offerings of wildlife meat in local restaurants persists (IUCN Consultation, 2020b).

Problematic Native Species

(Severe infestation by Merrimia boisiana)

Very High Threat

Inside site, widespread(15-50%)

The management plan for the World Heritage site notes that a number of invasive alien species are present in the site, but it does not provide any indication as to the extent or impact of their presence. The State Party reported in January 2017 that the invasive plant species Merremia boisiana, which is regarded as native to Viet Nam, is of great significance and had invaded and occupied an area of over 4,000 ha causing biodiversity loss and affecting the entire ecosystem (UNESCO and IUCN, 2018).

Potential Threats

High Threat

Facilitation of easier and rapid transport for poaching activities poses an increased threat to biodiversity values of the World Heritage site. Tourist cave developments within and nearby the National Park borders already resulted in over-tourism and could threaten the Outstanding Universal Values of the Property. Additional concerns also rise from the over-dependency on revenue from tourism, where loss of funding due e.g. the Covid-19 outbreak could strongly affect both site protection and management, as well as income for the local communities.

Tourism/ visitors/ recreation

(Tourism infrastructure)

High Threat

Inside site, scattered(5-15%)

The proposals to develop pedestrian access facilities, an aerial cable car, a power supply and tourist cave developments within the Strictly Protected Zone of the Park threaten the Outstanding Universal Value of the site (Worboys, 2012). The World Heritage Committee had raised concern about a proposal for the development of a cable car to provide access to Son Doong Cave and the State Party has resolved not to proceed with a cable car project to either Son Doong Cave or to Hang En Cave, both of which would have resulted in inappropriate mass tourism development in a remote area of the site (UNESCO and IUCN, 2018; UNESCO, 2019).
There are concerns regarding the over-dependency on revenue from tourism for the Park, the Provincial government as well as for the local population. Sudden disruptions of the system, such as the Covid-19 outbreak, and the absence of visitors to the area can pose increased pressures to the National Park and diminish already-made efforts made by the Park management to provide alternative sources for income. New tourism sites should only be developed and current sites only be extended, if there is a clear reference made to the OUVs (IUCN Consultation, 2020b).

**Overall assessment of threats**

The remote and rugged nature of the property’s terrain means that the site’s geological values are relatively well-protected from immediate threats, except that the tourist caves Phong Nha and Tien son have been and continue to be severely degraded by poor management practices. More recently, the development of a mass tourism show-cave (Paradise Cave) in the Strict Ecotourism Zone was inappropriate and its poor management will ultimately result in the same degradation seen in Phong Nha and Tien son caves. Quarrying in the buffer zone might become a serious threat, particularly to the scenic values of the area.

Biodiversity values of the site continue to be threatened by hunting, encroachment for NTFP collection and expansion of tourism activities into sensitive remote areas of the property and most significantly by the invasive plant species Merremia boisiana.

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**Protection and management**

**Assessing Protection and Management**

**Management system**

The main documents upon which management of the property is based are a 2013–2025 Strategic Management Plan supported by the 2010–2020 Sustainable Tourism Development Plan, the 2013–2020 Operational Management Plan and the Buffer Zone Development Plan. Following the evaluation of the re-nomination and extension of the World Heritage site in 2015, the World Heritage Committee requested the State Party to revise the Sustainable Tourism Development Plan, reflecting the site’s extension and to ensure an integrated and environmentally sensitive approach to tourism, to submit updated data on the population status of key large mammal species, as well as to provide data on law enforcement addressing illegal logging and poaching. In 2017, the Committee noted that data provided by the State Party regarding law enforcement and wildlife monitoring did not enable an assessment of their effectiveness and requested further clarifications on the methods used and also requested the State Party to submit to the World Heritage Centre the relevant tourism planning documents for the site and to invite a Reactive Monitoring Mission to assess the state of conservation of the site, and to provide advice to the State Party regarding sustainable tourism that is compatible with the OUV. The Committee reiterated the need for revision of the Sustainable Tourism Development Plan to ensure that visitor use remains compatible with the OUV of the site. In 2018, the Monitoring Mission concluded that the request by the Committee to revise the existing management and planning tools for the site had not been fully addressed and that there is critical need to update and integrate all existing management tools into a single document, accompanied by yearly action plans and to provide a clearer definition of functional and tourism use zoning. The Mission noted in particular the issuance of two additional Decisions of the Prime Minister in 2015 and 2017, and expressed its concern about the massive tourism development in and around the site and planned urbanization of the buffer zones indicated in those decisions, which contradict the objectives of the Sustainable Tourism Development Plan (UNESCO and IUCN, 2018). Most recently, the World Heritage Committee reiterated its request for the State Party to revise the Sustainable Tourism Development Plan as suggested by the 2018 Mission (UNESCO, 2019). In 2018, a
Master Plan for the Development of Tourism in Phong Nha – Ke Bang until 2030 was approved by the State Government (2017). There are severe concerns about its implementations, proposing 2,500ha of additional tourism site development in adjacent Park communes. There is little indication that the Plan will be implemented in line with expressed conservation missions outlined in earlier plans (IUCN Consultation, 2020b).

There are concerns in terms of the Park’s management structure. While the resources’ management lies within the responsibilities of the Management Board of the Park, income from touristic activities and from environmental fees paid by visitors entering the strictly protected zone are administered by the Treasury House of the Province, which then returns revenues to the Park based on budget estimations and conservation proposals made. The Tourism Centre Unit, though functionally under the National Park Management, is however also able to access financing directly with the Treasury House. It is therefore difficult for the National Park Management to control touristic developments in the area, which may be under greater influence of the provincial government (IUCN Consultation, 2020b). Furthermore, the division of the National Park into three different functional zones holds dangers in that touristic developments in the Administrative and Service Area are made justifiable and that these can be facilitated easier (IUCN Consultation, 2020b).

Effectiveness of management system

The Phong Nha-Ke Bang National Park Management Board is the government agency directly responsible for implementing the management plan for the World Heritage site. The majority of the Board's human resources are allocated to the forest protection unit (FPU) and Tourism Centre and the Board collaborates with other relevant agencies to enhance forest protection and engages with local communes to participate in management through an action plan developed to minimize violations of forest protection legislation in and around the site. To a very large extent, the management plan for the site is focused on a system of zoning by functional areas and also by proposed tourism use. There are three functional areas: a Strictly Protected Area, an Ecological Restoration Area and an Administrative and Service Area. Overlaying the functional system is a Tourism Use system designated to cater for:
- High Volume tourism;
- Nature and Heritage tourism;
- Strict Ecotourism;
- Community Benefit Tourism;
- Tourism Infrastructure Zone;

and the Plan provides detailed tourism management objectives and requirements for each of these zones. Importantly, each functional area can have one or more tourism use zones and parts not zoned for tourism use at all.

Concerns expressed in previous assessments about effective management have been variably addressed.

In recent years, there has been a strong focus and training and development of FPU staff focusing on practical skills and technology application in forest protection and management and the Management Board has developed local community livelihood supporting initiatives to decrease the pressure of hunting and gathering from the National Park.

At the same time, the Board has developed or permitted the development of a range of additional tourism products within the World Heritage site, including new show caves, adventure caving activities, kayaking and aquatic playgrounds associated with an extensive network of zip-lines and the site has been subject to a dramatic and ongoing increase in tourist arrivals projected to reach 3.5 million by 2030.

The 2018 Reactive Monitoring Mission noted that the development and management of Paradise Cave is in contradiction to the management plan as are the aquatic playgrounds and zip-lines and concluded that there is a lack of human resource in terms of both numbers and capacity of staff to cope with highly complex issues in managing such a large protected area, particularly concerning the balance between the preservation of the site’s OUV and developing sustainable tourism activities. The Mission also concluded that an enhanced awareness of the requirements and obligations of the World Heritage Convention would lead to a better decision-making process and better coordination between national and local authorities within the development co-ordination framework of the site (UNESCO and IUCN,
In 2015, the World Heritage site was extended in line with past calls from IUCN and the World Heritage Committee. The extended site provides a larger more intact ecosystem that offers additional protection to the water catchments, which are so critical to the integrity of karst landscapes. The extension increases the size of the existing site by some 46% and is part of the same karst plateau, covering largely undisturbed forest. The buffer zone encircles the entire extended site to the north, east and south to further strengthen integrity. The land immediately adjacent to the site is either designated as forest protection area or watershed protection zone.

In summary, the site represents one of the largest protected karst landscapes in South East Asia. Its boundaries appear to be adequate from an ecological perspective, although the field evaluation concluded that boundaries were difficult to identify on the ground.

Furthermore, the extension of the site improves connectivity with the karst landscape in Lao PDR (IUCN, 2015).

The World Heritage site was recognized in the Quang Binh Province Master Plan for Economic Development for 1997-2010 and it is logical to assume that it is also included in the current plan (or planning process at the very least).

The 2005-2015 Hunting & Wildlife Trade Control Action Plan has lapsed and while there is no available indication that this plan is being replaced with an updated formal agreement. The State Party of Viet Nam in the 2019 State of Conservation Report acknowledged the need for ongoing cooperation with Lao People’s Democratic Republic for the protection of large mammal populations and at its 2019 session, the World Heritage Committee asked the State Party to continue its cooperation with Lao PDR for strengthened preservation of biodiversity in the adjoining Hin Nam No national protected area (UNESCO, 2019).

With the establishment of the National Park in 2001, the local communities have been affected by the prohibition of access to forest resources and, in some cases, relocation. This has led to some impacts for part of these communities, notably for ethnic minorities, resulting from the loss of forest-dependent livelihoods. However, the 2018 joint UNESCO-IUCN Reactive Monitoring Mission report notes that the Quang Binh Provincial People’s Committee has indicated that there is a possibility of reviewing the regulations to allow ethnic minorities to continue some customary practices (UNESCO and IUCN, 2018). This is of particular interest when considered in conjunction with Section 1.8.2 of the Strategic Management Plan, which states that ‘nothing in this document is intended to diminish in any way their (ethnic minority groups) rights, either legally recognized or customarily.’

From 2015 to 2018, the population living within the Park and its buffer zone increased from 54,000 to an estimated at 70,000 people, including two villages within the boundaries of the World Heritage site. While some measures have been taken to integrate and improve the livelihoods for local communities and ethnic minorities, some ethnic minorities are now deprived of traditional access to the forest and its resources. Some local communities receive government subsidies to compensate for the loss of access to forest resources, but still suffer food shortages both as a result of access restrictions and the limited availability of agricultural lands which, given the high proportion of local people dependent on agriculture and the increasing demand for food both from a growing population and a growing number of visitors, is a major concern for the community.

An Action Plan, which has engaged local people in systematic patrolling to reduce poaching and other infringements, has been combined with a series of awareness raising activities, such that the number of people involved in the illegal exploitation of natural resources, has decreased while the number of people involved in forest protection has increased.

In parallel with this strategy, the Management Board has implemented various livelihood improvement programmes for villages in the buffer zone by introducing alternative income generating activities such as bee-keeping, animal husbandry, vegetable cultivation, and communal forestry.
The 2018 Reactive Monitoring Mission report notes that all members of the Management Board are government officials and even though many activities for the involvement of local communities have been conducted, there is no formal mechanism in place to ensure the participation of a wider group of stakeholders in the management of the site and makes recommendations to rectify this (UNESCO and IUCN, 2018).

There are also strong cultural and economic ties to populations bordering the National Park on the Lao side. Such communities should also be involved in activities where possible (IUCN Consultation, 2020b).

Legal framework

Designated as a Nature Reserve in 1986, Phong Nha - Ke Bang became a National Park in 2001. A Management Board, established in 1994, is responsible for protection of forest resources and biodiversity. Cave conservation and tourism services are the responsibility of the Tourism Centre under the Management Board. The site is also included in the Special National Heritage List (2009), and the Special Use Forest system (1999). It is effectively protected by a number of national laws and government decisions, which prohibit any action that may have a significant impact on the site's OUV, therefore the legal framework would seem to be strong (World Heritage Committee, 2012). The operational bodies with powers of control and management are found across various responsible executive departments, and decisions on heritage-related questions are made at the following levels, according to the importance of the decisions: 1) Prime Minister's office; 2) The Ministry of Culture, Sports and Tourism; 3) The Quang Binh Provincial People’s Committee; 4) The Management Board of Phong Nha-Ke Bang National Park. The main operational responsibilities reside in the power of the Provincial People’s Committee including the decision-making on the important development issues and budget allocation, while implementation of technical activities is carried out by the Management Board, which controls human resources for operation of the property. Major projects and important directives are issued at the national level, through Prime Ministerial Decisions. There is evidence of a flaw in this structure in that two such decisions regarding the planned development of mass tourism in the administrative zone and the urbanization of the buffer zone are inconsistent with maintaining the site's OUV and there is no procedure for the integration of Environmental Impact Assessment in the planning process. Development and proposed development which is inconsistent with the management plan has resulted in the 2018 Reactive Monitoring Mission expressing the need for the State Party to establish an official mission statement to set an institutional vision that emphasizes the primary management objective of maintaining the OUV of the site (UNESCO and IUCN, 2018). Such an official mission statement may be unlikely, given the recent approval of a Master Plan for the development of tourism in Phong Nha – Ke Bang until 2030, which holds little indication for a change in directions (IUCN Consultation, 2020b).

Law enforcement

The State Party advised in December 2014 of a series of measures to combat poaching and illegal activity within the World Heritage site, however, at the time of IUCN's evaluation in 2015, concerns remained regarding a lack of funding, staffing and capacity (IUCN, 2015). In 2017 and again in 2019 the State Party reported further measures to enhance law enforcement within the site, including the establishment of strategically located ranger stations and checkpoints, engagement with village based forest protection groups, collaboration with relevant local agencies to enhance forest protection measures and an extensive programme of community education and awareness activities in parallel with strong stance on pursuing the prosecution of violators. This strategic approach, combined with a livelihood improvement programme, has resulted in a significant reduction in the number of violations in 2018 compared to 2015. Despite this, the 2019 State of Conservation report by the State Party also notes that forest fires, which do occur in the site, are mainly due to slash-and-burn agriculture, honey collection and the carelessness of those who engage in illegal tourism activities and that illegal exploitation of NTFPs continues due to high market demand and the lack of employment in parts of the buffer zone (State Party of Viet Nam, 2017 and 2019).
Implementation of Committee decisions and recommendations

The World Heritage Committee’s concern regarding a cable car development in the area of Son Doong Cave and Hang En Cave were resolved when the Committee welcomed advice that ‘the State Party has no intention to build a cable car to the Son Doong and Hang En caves or any other similar project within the property’ (UNESCO, 2019).

The World Heritage Committee and IUCN have both previously expressed concerns about the threat of road developments in Phong Nha-Ke Bang National Park (Worboys, 2012) and this threat has not been adequately resolved as there has been no documented research to assess the impact of the now completed roadworks.

The serious concern about use of the completed road has been partially resolved by the establishment of a number of ranger stations and checkpoints at key points of the road(s) (State Party of Viet Nam, 2019).

Sustainable use

The literature indicates a number of problems pertaining to sustainable use. One report indicates that the collection of certain plant species has ceased only because they can no longer be found and the abundance of certain fauna (pigs, binturong and primates) has noticeably declined (UNEP-WCMC, 2011). The impact of inappropriate lighting, inadequate site hardening and lack of behavioral control has caused significant damage to the Phong Nha and Tien son caves (Pers. obs., 2013; Trinh et al., 2018). The development of a mass tourism product (Paradise Cave) in the Strict Ecotourism Zone was in itself inappropriate as is its management with no attention to behavioral control and overcrowding, the development of the Nuoc Mooc Eco Trail area as an aquatic playground along with the development ziplines and cave mud bathing all severely challenges a commitment to sustainable use. The Plans requirement that “tourism is developed in a way which improves the existing product and introduces new products which complement the Park’s values in order to encourage the existing/dominant market segments to experience newer products with a stronger conservation focus and to attract a higher yield and more conservation-oriented market” has either been badly misunderstood or simply ignored (UNESCO and IUCN, 2018). Significantly, the World Heritage Committee has observed that "Environmental Impact Assessments must be undertaken and complied with to ensure that any infrastructure and tourism developments being considered within the property and adjacent areas do not adversely affect the Outstanding Universal Value of the Property". The Worboys report (2012) additionally recommends that the Management Board be formally accountable for approval or non-approval of such assessments. A major sustainable use challenge concerns inadequate protection of customary use rights and equitable resource management planning. Customary forest use areas are currently not effectively mapped out or recognized. Subsistence use and traditional agriculture is conflated with external pressures without adequate regulatory protection mechanisms (Larsen and Nguyen, 2012), although the Provincial People’s Committee has recently indicated that there is a possibility of reviewing the regulations to allow ethnic minorities to continue some customary practices. This is of particular interest when considered in conjunction with Section 1.8.2 of the Strategic Management Plan, which states that nothing in that document is intended to diminish in any way the customary rights of ethnic minority groups (UNESCO and IUCN, 2018).

Sustainable finance

The 2011 UNEP-WCMC report noted that enforcement was hindered by the lack of funding for staff and the World Heritage Committee noted that additional financial assistance is required for: • staff training and equipment to strengthen law enforcement; • management and monitoring capacity; • adoption of a management effectiveness evaluation framework; • improved heritage interpretation; and • conservation at local and landscape scales.

While funding for conservation programmes (in particular invasive species control) is an ongoing concern, there has in recent years been significant investment in staff training and development in the areas of law enforcement and wildlife monitoring, community awareness programmes and commune livelihood improvement (State Party of Viet Nam, 2019). The current annual allocation of funds by the
State Party for management of the World Heritage site is unknown. The Master Plan for tourism development until 2030 states a target of 8200 billion VND to be generated from touristic activities in and adjacent to the National Park borders (IUCN Consultation, 2020b).

**Staff capacity, training, and development**

Serious Concern

The Investment Plan for the World Heritage site includes training of staff and guides and the available documents make note of training having been provided for enforcement and community liaison. From 2015 to 2018 there has been an extensive programme of training provided to Forest Protection Unit Rangers in the areas of enforcement and biodiversity monitoring (State Party of Viet Nam, 2019).

In 2010, some of the guides and management staff participated in a training and development program at Mulu NP. The effectiveness of such training was not assessed and in 2018 it was noted that 75% of the guides involved were no longer employed in the site and none were working as guides. The training currently provided for guides in the caves of PNKB-NP was variably inadequate to non-existent and this combined with the failure to impart any level of environmental awareness or impose any level of control on visitor behavior in the show-caves is a major threat to the OUV represented in the caves (UNESCO and IUCN, 2018; IUCN Consultation, 2020). There are also concerns about the quality of training provided to obtain a guiding licence (both domestic and international) in the country in general, and extra licences should be needed for guides that enter the Strictly Protected and the Ecological Restoration areas of the National Park (IUCN Consultation, 2020b).

There is yet to be a consistent capacity building effort directed at targeting communities and enabling effective co-management.

**Education and interpretation programs**

Data Deficient

Presentation of ‘World Heritage’ at Phong Nha-Ke Bang National Park (PNKB NP) has commenced, though more needs to be done. A management plan should identify a strategic approach to the presentation of the site and its World Heritage values (UNEP-WCMC, 2011; Worboys, 2012) and the 2018 joint UNESCO-IUCN Reactive Monitoring Mission noted that outreach and educational activities on heritage values both for the personnel involved in park management and the public could be addressed through a capacity-building initiative.

From 2015 to 2018 the Board has conducted 25 environmental interpretation sessions for about 700 school students and youth union members in the buffer zone communes in collaboration with village forest protection teams; implemented an education and training programme on nature conservation, developed education skills for teachers and school students in secondary schools in the buffer zone; integrated the knowledge and information about the site into the teaching curriculum for grades 6, 7, and 8; organized writing contests to introduce PNKB NP as a natural World Heritage site promoted the development of school posters for secondary school students in the buffer zone communes; produced and hung 150 panels to communicate the values of forests and call for wildlife protection and forest fire management (State Party of Viet Nam, 2019).

The effectiveness of the activities in imparting a lasting awareness of the site's World Heritage significance among the local and national community is yet to be evaluated.

**Tourism and visitation management**

Serious Concern

The management plan's objective for tourism development is to ensure that the conservation of the site's heritage values is supported through tourism development that emphasizes research, learning and awareness-raising about those heritage values. It details the activities/requirements to meet this objective as the development of:

- a Tourism Monitoring and Management Programme;
- a Site Visitor Management Plan for any cave to be used for tourism activity;
- a water-based tourist product in the park and Buffer Zone;
- a concept plan for tourism operations in the Botanical Garden, Bamboo Valley, the Gao Forest and U Bo Peak;
- interpretation material for the Phong Nha Visitor Centre;
- site-specific interpretation plans and materials for priority sites;
- site interpretation tailored to reach the various audiences that visit the property including the
construction of a visitor interpretation centre;
- only allowing guides certified to be knowledgeable about cave protection and safety to lead groups into the caves;
- environmental and social impact assessments together with an impact mitigation plan for any tourism development in the park particularly if the development or activity involves a cave;
- a sustainable project working towards the privatization of the Park’s (2,500 ha) Tourism Centre.

In 2018 (with 75% of the planning period lapsed), progress towards meeting the plan’s objective for tourism development is inadequate. Apart from developing the aquatic playground at the Nuoc Moc Eco-trail site and a plan for the development of the Park’s 2,500 ha Tourism Centre, there has been no notable progress in the supervision of tourists in caves, no progress in the training and certification of guides, no progress with or effective application of impact assessments, no individual site management plans and no evidence of adequate interpretation materials. In pursuing the objective that tourism development should support the conservation of the site’s OUV, a key requirement is to establish, on the basis of scientific studies and assessments, a strict upper limit for the number of visitors to each tourism node in the site.

No such studies and assessments have taken place to date, and there is an urgent need to put a cap on visitation before additional tourism products are developed (UNESCO and IUCN, 2018). The development of a mass tourism show-cave (Paradise Cave) in the Strict Ecotourism Zone was inappropriate and its poor management will ultimately result in the same degradation seen in Phong Nha and Tien son caves.

**Monitoring**

While the monitoring efforts within the World Heritage site have been largely focused on noting tourist arrivals and the results of enforcement activities the State Party provided a 2017 information on the monitoring of 3 unspecified key fauna species, however, the information provided was considered to be inadequate for further monitoring. The introduction of wildlife monitoring using the Spatial Monitoring and Reporting Tool in 2017 has been a significant step forward but the 2018 joint UNESCO-IUCN Reactive Monitoring Mission found that there is no systematic measurement of management effectiveness in regard to:
- visitor management/impacts (particularly on caves);
- spread of invasive/alien plant species;
- wildlife monitoring (although this was noted to be in progress);
- capacity building;
- site interpretation and awareness raising (UNESCO and IUCN, 2018).

Subsequent to this report, the State Party submitted the results of a very recent survey, which identified the existence of 6 of 7 important large mammal species within the property and its buffer zone. Tiger, Asiatic Black Bear, Dhole, Gaur, Large antlered Muntjak and Saola populations were noted as being small to very small. The Asian Elephant has disappeared and is unlikely to return due to increasing road traffic (State Party of Viet Nam, 2019).

**Research**

As part of a new management program for the National Park, a research unit was established in 2003. Research on the area’s biodiversity and cave systems continues and new caves and new species of both flora and fauna are regularly found. Cave exploration was curtailed by the dangerous conditions, but in 2009 it culminated in the discovery of the Son Doong cave (UNEP-WCMC, 2011). Mapping of customary use areas and cultural values is another key research priority, where data is currently lacking to facilitate their incorporation in management planning. Nevertheless, the 2015 IUCN evaluation of the extension of the World Heritage site noted that the absence of systems and a comprehensive approach for data management, research, monitoring and scientific collaboration constituted a weakness in management, and considered that a research strategy should be established to address this weakness (IUCN, 2015). Apart from the introduction of a structured wildlife monitoring program and the State Party’s report on the large mammal survey, the 2018 joint UNESCO-IUCN Reactive Monitoring Mission report notes little change in the status of research activity within the property (UNESCO and IUCN, 2018; State Party of
IUCN World Heritage Outlook: https://worldheritageoutlook.iucn.org/
Phong Nha-Ke Bang National Park - 2020 Conservation Outlook Assessment

Viet Nam, 2019).

Overall assessment of protection and management

There is an important need to update and streamline the management plan for the World Heritage site to ensure that its development and management is focused on sustaining its OUV and that planning and decision making at all levels of the administrative framework is consistent with the Management Plan. Of some concern is the current trend in the development of the tourism product in the site. The objective for tourism development according to the Plan is "to ensure that the conservation of the property's heritage values is supported through tourism development that emphasizes research, learning and awareness-raising about those heritage values". However, the development of Paradise Cave is inconsistent with this, as is the zip-line and aquatic playground development in the Nuoc Mooc Eco/Dark Cave area. Despite this, the values of the site related to geodiversity are not at high risk, although the management of the caves used for tourism is poor and must be addressed. Each cave must have its own visitor management plan and access to the caves should be under the supervision of certified guides able to control visitor behavior and provide visitors with an appropriate understanding of the origin and values of the caves. Biodiversity values, however, are at high risk due to:

- illegal exploitation activities in particular hunting of the prey animals for Tigers and Dhole;
- physical disruption of habitats by roads;
- human encroachment of habitats by ongoing poaching activity;
- encroachment of human activity into remote areas by increasing tourism developments;
- invasive species, particularly Bindweed (Merremia boisiana), which has over-run large parts (as in thousands of hectares) of the site, completely displacing the flora of the areas affected.

Invasive species is the biggest threat to the site's OUV and considered to be beyond the technical and financial resources of the Board to take effective action against. While the 2018 Reactive Monitoring Mission was informed of a trial to assess the proposed control strategy in a 100 ha plot (to be expanded to a 1,000 ha plot), there was no mention of the remaining 3,000 ha affected at the time nor any understanding of the rate at which the infestation was spreading (UNESCO and IUCN, 2018). Issues that are still not being addressed properly include distinguishing customary use rights from intensive hunting, trapping and logging, and integrating high levels of ethnic diversity, cultural landscape values and customary relationships with management of the site.

Assessment of the effectiveness of protection and management in addressing threats outside the site

Previous Site Assessments identified the Property's significant external threats to be:

- the demand for illegal timber and non-timber forest products combined with a nearby impoverished community that is willing and able to access the site in order to supply the demand and the improved access to and within the site;
- lack of protection of customary user rights and a clear co-management strategy (UNEP-WCMC, 2011; Larsen, 2008; Larsen and Nguyen, 2012).

The responsible authority's capacity to address these threats was rated as low and there was evidence of widespread institutional corruption (Roberton, 2004; Vietnews, 2011). During a 2018 joint UNESCO-IUCN Reactive Monitoring Mission it was noted that the responsible authority, the PNKB NP Management Board, had in the period from 2015 to 2018 taken numerous steps to address the poaching of timber and non-timber forest products including:

- the training and development of staff in detection of infringements, enforcement of regulations and prosecution of offenders;
- implementing strategies to identify incidences of institutional corruption and reluctance to take action against offenders;
- removal of firearms from the buffer zone communes;
- implementing an extensive community awareness programme;
- engaging members of the communes in enforcement and wildlife monitoring patrols within the site;
• developing a strategy to increase community livelihood through various agricultural/silvicultural/tourism activities to reduce dependence on forest products (UNESCO and IUCN, 2018).

The threat of improved access has been addressed by the establishment of Ranger Stations and check-points at key locations on the roads to detect and react to inappropriate use of the roads. These activities have in general been well planned and effectively delivered and results to date are encouraging. However, it is noted that the population of the buffer zone had in the same period increased from 54,000 to 70,000 and while some very good examples of livelihood improvement were observed, there are still parts of the community that have not benefited from change and continue to be dependent on the forest (UNESCO and IUCN, 2018). While enforcement has increased and poaching has reportedly decreased, it is still an ongoing threat. There are ongoing assertions that institutional corruption continues to be a problem (State Party of Viet Nam, 2019). The issues of customary user rights and a clear co-management strategy have not been addressed.

However, the 2018 joint UNESCO-IUCN Reactive Monitoring Mission report notes that the Quang Binh Provincial People’s Committee has indicated that there is a possibility of reviewing the regulations to allow ethnic minorities to continue some customary practices, which should be seen as a positive step forward on this issue (UNESCO and IUCN, 2018).

State and trend of values

Assessing the current state and trend of values

World Heritage values

► Outstanding karst landforms

The topography of the World Heritage site provides a high degree of ongoing protection from forces, which would damage its geological values although these values would be greatly enhanced by expanding the boundary to include the adjoining Hin Namno karst in Laos. While such expansion is not imminent, the neighbouring provincial authorities of both countries have met many times to discuss co-operative management of the two reserves (UNEP-WCMC, 2011) and the desirability of this transboundary site remains an important issue underlined by the World Heritage Committee (2003) and reiterated most recently in 2019.

► Scientifically significant caves

Although the relatively recently discovered Son Doong cave, reputedly the largest in the World, is yet to be scientifically evaluated in a formal sense, it is clearly a significant part of the site's karst related values (World Heritage Committee, 2012). As the primary attraction to the Park, the show-caves (Phong Nha, Tien son and Paradise Caves), as well as those caves being accessed for adventure tours, offer the most significant opportunity to present the World Heritage values of the National Park and therefore are scientifically significant (IUCN Consultation, 2020). While the show-caves have been impacted by inappropriate visitor management, the overall scientific significance of caves in the World Heritage site currently remains high. However, visitor management, particularly in the show-caves, needs to be significantly improved in order to avoid further negative impacts on and deterioration of these caves (UNESCO and IUCN, 2018).

► Spectacular diversity of cave types

The concept of ‘spectacular’ is based upon how people perceive and appreciate a subject's physical attributes. Tourism in Quang Binh Province is focused on the spectacular caves of the World Heritage site with particular focus on the show-caves (Phong Nha, Tien son and Paradise Cave) and increasingly
on caves accessed for adventure tours with particular focus on Son Doong, Hang En, Pygmy Cave and Dark Cave. Maintaining the ‘spectacular’ aspect of the caves is critical to the sustainability of the tourism industry. It is vital to maintain the OUV and ensure ‘carrying capacity’ is appropriate to maintain the values and integrity of the caves. There is no established carrying capacity for the show-caves other than cessation of ticket sales when it is perceived by management staff that the caves have become over-crowded and while the limit placed on the size of groups on adventure caving trips is strictly followed, there is no rationale for group sizes that has been set (Ly and Nguyen, 2017). The current overall state of conservation of caves in the site (many of which have only just been discovered (Nhung, 2018) remains good, but the original show-caves have been severely impacted by pollution and inadequate visitor management. Paradise Cave, which has been open for just a few years, is also being degraded by overcrowding and inadequate visitor management (IUCN Consultation, 2020a).

**Ongoing development of ecosystems**

About 94% of the World Heritage site is covered by forests, of which 84% is considered to be primary forest. There is some evidence that road construction within the site may have permanently driven the population of Asian Elephants from the site and its buffer zone and in the absence of an understanding of the potential impact of removing the largest of the browsing mammals from the system on its ongoing development.

Similarly, the invasion by Bindweed (Merremia boisiana) is having a substantial but unquantified impact the forest ecosystem and should be assessed to determine the severity of threat presented (UNESCO and IUCN, 2018; State Party of Viet Nam, 2019).

The surface and underground ecosystems of the site are linked through perennial and ephemeral streams and a complex subsurface riverine system (IUCN, 2015). Concerns exist regarding pollution of watercourses with oil and solid waste.

**Habitat diversity**

The diversity of habitats within the World Heritage site has become uncertain due to the extent of the Bindweed (Merremia boisiana) infestation and the loss of impact by Elephant grazing on micro-habitats within the broader forest habitat.

**Floral diversity**

The noted concerns about illegal resource extraction from the World Heritage site, including elements of its flora, have been moderated by the efforts to prevent such activity but it is known to be ongoing, albeit to a much reduced extent (State Party of Viet Nam, 2019). While insufficient data is available to assess the current status of the site’s floral diversity, the inaccessible nature of large areas of it bode well for the maintenance of floral diversity - except for the threat posed by the invasive Bindweed (UNESCO and IUCN, 2018).

**Significant species of fauna**

There are significant data gaps in terms of the populations of animal species. However, empirical evidence points to noticeable declines in some species, including pigs, binturong, primates and other prey animals upon which the tiger and dhole are dependent. According to the 2017 State of Conservation report on the site, many large mammal species have not recently been recorded, and the 2015 IUCN evaluation also noted a decline in large mammal species sightings (IUCN, 2015; UNESCO, 2017).

One recent study (Dang and Nghia, 2018) confirms the presence of 143 mammal species within the site but provides no indication of abundance. Six species of important large mammals (Tiger, Asiatic Black Bear, Dhole, Gaur, Large Antlered Muntjac and Saola) still exist within the site in small to very small populations, while a seventh, the Asian Elephant no longer does (State Party of Viet Nam, 2019).
Summary of the Values

▶ Assessment of the current state and trend of World Heritage values

High Concern

Trend: Deteriorating

The conservation trend for the World Heritage site’s karst landscape values are ‘stable’ despite the values presented by the caves experiencing ongoing deterioration due to poor management practices. The lack of appropriate site-hardening infrastructure to prevent damage to the caves, the lack of effective people management, the seriously insufficient site presentation and the opening of a new show-cave when there is no evidence of significantly improved management of the existing show-caves is of high concern.

The biodiversity values have been diminished by increasing threats. The local population is expanding and collection of wild meat and other forest products persist albeit at a reduced level. How much of this is for subsistence and how much is cash driven is not determined, but there remains a need to distinguish between subsistence practices and intensive operations driven by outsiders. Furthermore, agro-biodiversity values are currently not valorized as part of the landscape and are currently being undermined by restrictive policies.

Of great concern are the unknown impacts of the roads within the site and the loss of large grazing animals, and more significant than any other issue is the threat posed by invasive species, in particular Bindweed (Merremia boisiana), which is thoroughly suppressing the entire floral assembly on a massive scale.

Additional information

Benefits

Understanding Benefits

▶ Outdoor recreation and tourism

The site offers a range of recreation opportunities which in turn are converted into tourism industry products.

Factors negatively affecting provision of this benefit:

- Habitat change: Impact level - Low, Trend - Increasing

Encroachment of tourists into remote areas is believed to cause disturbance to fauna and flora in these areas.

▶ Contribution to education

The site provides an outstanding opportunity to educate the national and international community about the history of the earth.

Insufficient attention has been given to this issue.

▶ Importance for research

The site's geology and geomorphology contribute to a greater understanding of earth history and geology.

▶ Wilderness and iconic features

The local people maintain cultural ties to the area and its natural resources.

Some local people are being denied access to cultural sites and use of traditional resources.
History and tradition
Archeological sites are present in the Phong Nha Cave.

Water provision (importance for water quantity and quality)
Water catchment protection.

Direct employment, Tourism-related income, Provision of jobs
Management and protection of biodiversity and presentation of values provide direct employment within the property for many people living in the Province and within the buffer zone. Provision of tourism activities such as boat transport and guide services provide income for buffer zone residents and provision of tourism services such as transport, accommodation, food and beverage supply associated with visitation to the property provides substantial business and employment opportunities within the buffer zone, nearby areas and also within the Provincial city of Dong Hoi.

Factors negatively affecting provision of this benefit:
- Pollution: Impact level - Low, Trend - Continuing
- Habitat change: Impact level - Moderate, Trend - Increasing

Some concerns have been expressed that agricultural land is being converted to resort style accommodation in the buffer zone (UNESCO and IUCN, 2018). Pollution within and adjacent to the show caves is an ongoing problem and the business community in the nearby ‘Phong Nha Village’ are embarking on a strategy to eradicate the use of single-use plastic in the food and beverage services (IUCN Consultation, 2020).

Summary of benefits
Development of the PNKB-NP tourism product is fully focused on economic outcome with no regard for the opportunity that tourism presents for educating visitors about the site’s World Heritage values. The activities provided do contribute to the recreation benefit presented by the site, but there is a high risk of developments attracting thrill seekers rather than the environmentally inquisitive audience, which the management plan identifies as being desirable. The site’s potential for research opportunity and its cultural significance to local communities are not being adequately realized.
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