IUCN Conservation Outlook Assessment 2017 **(archived)**
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# Khangchendzonga National Park

## SITE INFORMATION

Country:
India
Inscribed in: 2016
Criteria:
(iii) (vi) (vii) (x)

Site description:

Located at the heart of the Himalayan range in northern India (State of Sikkim), the Khangchendzonga National Park includes a unique diversity of plains, valleys, lakes, glaciers and spectacular, snow-capped mountains covered with ancient forests, including the world’s third highest peak, Mount Khangchendzonga. Mythological stories are associated with this mountain and with a great number of natural elements (caves, rivers, lakes, etc.) that are the object of worship by the indigenous people of Sikkim. The sacred meanings of these stories and practices have been integrated with Buddhist beliefs and constitute the basis for Sikkimese identity. © UNESCO

## SUMMARY

## 2017 Conservation Outlook

**Good**

Remoteness, inaccessibility and extreme altitude are significant natural contributors to the good conservation status and promising conservation outlook of this recently inscribed mixed World Heritage property. The longstanding protection status and overall effective management effort comes together with the exceptionally high cultural, spiritual and religious significance of the Khangchendzonga / Kangchenjunga Massif and landscape, which translates into respect and reverence of direct conservation relevance. At the site level, the longstanding exclusion of local communities from resource use and decision-making is a legacy which needs to be addressed and one would hope that the explicit recognition of KNP as a “mixed” property will breathe new life into the consideration of the human dimension of this extraordinary mountain landscape. The importance of the large – but not vast – national park is further increased by its contiguity with the Kangchenjunga Conservation Area in Nepal, with which it shares much of the human history and many cultural and nature conservation values. In the context of climate change and its impact on biodiversity, vegetation and treeline shifts are being observed and animal movement towards higher elevation are reported. Therefore, the concept of connectivity corridors are very relevant and required for continued functional linkages to other important protected areas in Sikkim, such as Singalila National Park, Barsey Rhododendron Sanctuary and Maenam Wildlife Sanctuary. At an even larger landscape level, KNP is an integral, central and particularly valuable part of what some refer to as the Kangchenjunga Conservation Landscape. As a loss of conservation values in the broader landscape would inevitably also impoverish the property, all investments in the conservation of the broader landscape, be it in the immediate buffer zone, at the level of Sikkim or across state and even international borders, are wise investments in the future of KNP. The example of large mammalian apex predators illustrates that the long-term future of important conservation values will depend on such a vision and approach beyond individual protected areas. At the regional level, the existing conservation and

development initiative facilitated by ICIMOD lends itself as a platform for exchange, coordination and cooperation. The concept has been included, discussed and agreed by the three member countries with facilitating role of ICIMOD and initiatives for implementation has started. This includes anticipated climate change and efforts to mitigate and adapt which in their vast majority likewise exceed the level of individual protected areas. The inscription decision of the World Heritage Committee offers promising avenues to further enhance the conservation outlook, both in terms of the integration of “nature” and “culture” and in terms of going beyond the formal boundaries of Khangchendzonga National Park.

## Current state and trend of VALUES

**Good**
**Trend: Stable**

The many nature conservation values are identified, respected and well-protected. The equally important and intricately linked cultural significance adds to the effective protection of the values. The future of Snow Leopard and other large mammalian apex predators will require conservation efforts beyond the level of KNP. A regional approach at and beyond the level of Sikkim is being initiated by ICIMOD with feasibility assessment and developing long term programme for regional cooperation (ICIMOD, WCD, GBPNIHESD, RECAST (2017a/b). Despite the overall good understanding of the nature conservation values and helpful recent research efforts, important data gaps remain. As an overarching concern that cannot be addressed at the site level, climate change casts some doubts about the longer term future of some of KNP's natural values.

## Overall THREATS

**Low Threat**

The overall conclusion is that tangible threats are comparatively low at this stage due to the described favorable combination of factors. The current threats within the boundaries of KNP are known and appear manageable. The picture becomes more complex when adding the surroundings of the property, where the pressure for land use changes and hydro-power development is much higher and does not meet a similarly high level of legal obstacles. Arguably, the main concerns are related to the anticipated effects of climate change. As detailed in the subsequent section on protection and management, the property would benefit

from a better understanding of current and potential threats, underpinned by investment in human and financial resources beyond the current levels (see Bhardway et al. 2015). Local communities remain to be involved in decision-making in meaningful ways, which can be considered a threat to the park by compromising critical relationships.

## Overall PROTECTION and MANAGEMENT

**Mostly Effective**

Vast parts of the property find themselves in a very privileged position of an unusually high degree of natural protection. Most areas are rarely, if ever, visited. This largely compensates for a modest staffing level by surface area. The management is overall effective in addressing the current challenges within KNP. There are nevertheless a number of concerns noted, some of which are serious. These include in particular the relationship with local people and the legal restrictions on local resource use which complicate that relationship.

# FULL ASSESSMENT

## Description of values

### Values

### World Heritage values

- **Majestic landscape of stunning visual beauty**
  **Criterion:(vii)**

  The landscape of the mixed property and its surroundings stands out even within the Greater Himalayas, most literally in the form of Khangchendzonga, India's highest peak and the third highest mountain in the world at 8,586 m.a.s.l. Many of the additional 20 glaciated peaks above 6,000 m.a.s.l. within the property (Republic of India, 2015) are similarly spectacular. Below the rugged towering peaks intact old-growth forests reach well above 4000 m.a.s.l., further adding to the exceptional landscape beauty (Chettri, 2010). As the "Abode of the Gods", the mountain area has exceptional symbolical, cultural, religious and spiritual significance for many peoples and religious beliefs across and beyond the Himalayas. Khangchendzonga is often referred to as the "owner", "protector" and "guardian" watching over a plentiful "hidden land", locally known as "Beyul" (Government of Sikkim / Forest, Environment & Wildlife Management Department, 2010). Shared with neighboring Nepal, the Khangchendzonga / Kanchenjunga massif itself is comprised of five major peaks, each of which has specific cultural, religious and spiritual meanings (Republic of India, 2015).

- **Exceptional habitat mosaic along an extraordinary altitudinal gradient**
  **Criteria:(vii)(x)**

  The impressive vertical difference of more than 7,000 meters between the

lowest point (1,220 m.a.s.l.) and the peak of Khangchendzonga at 8,586 m.a.s.l. (Republic of India, 2015) covers one of the most extreme vertical ecological gradients in any protected area on earth, thereby encompassing an enormous range of ecosystems and habitats within a relatively small area (Chettri et al 2010; Sathyakumar et al. 2011a,b; Tambe et al. 2012; IUCN, 2016). The vertical difference is visually dramatic but can also directly be linked to World Heritage values recognized under criterion (x).

### ► High plant and mammal species richness

**Criterion:(x)**

Located within a biodiversity hotspot (CEPF, 2005), KNP boasts one of the highest species richnesses for mammals and plants documented in the vast high mountain ranges of Asia (IUCN, 2016). Sathyakumar et al. (2011a) documented 42 mammal species. The property is also home to, for example, nearly half of India’s bird, orchid and rhododendron diversity (Chettri et al., 2001; IUCN, 2016). An impressive 1,580 species of vascular plants have been recorded in KNP (Singh and Sundriyal, 2005; Maity et al. 2007) with recent studies confirming that new species discoveries are highly likely (see for example WWF, 2015).

### ► Critical refuge for endemic, rare and threatened flora and fauna

**Criterion:(x)**

Many of the plant species documented in KNP are rare and threatened, and some endemic (Chettri, 2000; Republic of India, 2015, Arrawatia et al. 2011, Tambe et al. 2010, CEPF, 2005). The impressive range of large mammals includes several large predators, such as Asiatic Black Bear and at least four canids, including the elusive Asiatic Wild Dog. A remarkable six cat species have been confirmed within KNP (Leopard, Clouded Leopard, Snow Leopard, Jungle Cat, Golden Cat, and Leopard Cat) (Sathyakumar et al. 2013, 2011a,b).

## Other important biodiversity values

### ► Extraordinary mosaic of forest types along the altitudinal range of more than 7 kilometres in a relatively small area

While inseparable from values explicitly recognized under World Heritage

criterion (x), the diversity and mosaic of forest types deserves to be highlighted. The many forest types range from lush subtropical forests in the lower elevations to stunted "krummholz" forests at the unusually high timber line and include conifer, deciduous and mixed forests (Singh and Sundriyal 2005; Chettri 2010; Republic of India, 2015).

▶ **Exceptional sacred natural site**

Bernbaum (1998) and numerous other references emphasize that Khangchendzonga is not just another sacred site but one of a selected few of highest significance for a range of peoples, cultures and belief systems, including beyond the Himalayas (Rai 2007; Ramakrishnan 2008). In this sense, KNP and the surrounding landscape are an outstanding example of the overlap of natural, cultural and spiritual values, aptly recognized by the inscription as a "mixed" World Heritage property in 2016.

## Assessment information

### Threats

### Current Threats

**Low Threat**

Overall, KNP is in a rare and privileged position. A strong level of legal protection coincides with an extraordinary cultural, religious and spiritual importance and corresponding respect and taboos. Furthermore, vast areas are extremely rugged and/or extremely high and thereby almost or actually inaccessible and naturally protected. The large contiguous protected area in neighboring Nepal, Kanchenjunga Conservation Area, contributes to buffering the property from external threats along most of its western boundary. The situation is less clear in terms of climate change. Given the lack of certainty and limited specific research, tangible threats are assessed as "low" at this stage. At the same time, it is clear that climate change may well become a major agent of change in KNP with multiple consequences, including as regards

biodiversity. The relationships with local communities leaves much room for improvement and clarity, which is addressed in the section on management in more detail.

### ► Tourism/ Recreation Areas

**Low Threat**
**Outside site**

Tourism continues to be small-scale and localized, both in terms of economic importance and ecological, social and cultural impacts (Chettri et al, 2002). In the few areas where tourism does occur, it comes with the costs and benefits well-known from other destinations in the Himalayas and other remote mountain ranges throughout the world (Maharana et al, 2000). As acknowledged in the nomination (Republic of India, 2015), adequate management is therefore needed even though the current touristic use does not amount to a severe threat at this stage - beyond localized littering, trail erosion, grazing impacts from pack animals etc. (see Chettri et al. 2008b for a useful overview).

### ► Changes in traditional ways of life and knowledge systems

**Low Threat**
**Inside site, extent of threat not known**
**Outside site**

The existence of the national park and corresponding access and resource use regulations are one of many factors of social change. The legal framework strongly influences and to a large degree restricts or excludes natural resource use, including livestock grazing and settlements. Lachungpa (2009) discusses the loss of the ancient nomadic lifestyle of the Dokpa, as well as major changes in the resource use of the transhumant Bhutia, including specifically the so-called Dzumsa system. Besides an "irretrievable loss of ancient wisdom" (Lachungpa, 2009) the consequences are complex and not understood in detail. While reduced use implies a "more natural" system, it is far from clear to what degree longstanding human use has contributed to shaping the current mountain ecosystem and what exactly the ecological consequences of the removal of resource users have been and will be. Likewise, it can be argued that the separation of traditional users from the landscape comes with the risk of increasing the vulnerability of protected areas to external users. While these question marks are considered very

relevant from both management and rights perspectives, from a strict and narrow perspective of nature conservation values, the threat is considered low.

### ► Earthquakes/ Tsunamis

**Low Threat**
**Inside site, throughout(>50%)**
**Outside site**

All of Sikkim is located within a much larger, seismically highly active zone and susceptible to earthquakes. A major earthquake in 2011 had its epicentre in the national park (Republic of India, 2015). Beyond obvious implications for disaster preparedness, the risk is a natural factor largely beyond human control in terms of its effects on KNP and its natural and cultural values. It can reasonably be argued that seismic activities are part of the natural disturbance regime. Therefore, this assessment concludes that it represents a low risk for the property - while fully acknowledging that earthquakes otherwise constitute a very severe risk to the people and infrastructure of Sikkim.

### ► Poaching

**Low Threat**
**Inside site, localised(<5%)**
**Outside site**

Park management, volunteer rangers and NGOs report occasional incidents of poaching (IUCN, 2016). There is no indication that poaching occurs at levels which would seriously threaten the species conservation values at this point in time. The poaching is likely to be restricted to the more accessible areas, whereas vast areas of KNP are extremely difficult to reach at best, suggesting an exceptionally high degree of natural protection.

### ► Habitat Shifting/ Alteration, Temperature extremes

**Data Deficient**
**Inside site, throughout(>50%)**
**Outside site**

The small-scale ecological mosaic along the altitudinal gradients creates countless small and sensitive ecological niches which provide critical habitat. It can be argued that this complex small-scale mosaic is particularly sensitive

and vulnerable to climate change (Chettri et al, 2010; IUCN, 2016). Given the predicted climate change and general impacts (Arrawatia et al. 2012), the threat may be considered significant per se. However, this assessment did not rate the threat due to the absence of specific research clarifying the exact situation and (expected) trend.

## Potential Threats

**High Threat**

Controversial hydro-power development has occurred near the property, accompanied by protests. Proposals for additional hydro-power development have been brought forward, including in the recent past within the immediate vicinity of the property. While these project proposals have so far not been approved on social and environmental grounds (Republic of India, 2015), pressure to tap the hydro-power potential is here to stay and likely to increase. There is also some concern about the military presence between the property and the Chinese border and possible demand for additional access infrastructure in this regard. Arguably the main concern in terms of "potential threats" are anticipated direct and indirect impacts of climate change. A better understanding and systematic monitoring would help to at least be in the best possible position to prepare and respond. In order to draw attention to this need and to encourage follow-up it was considered adequate to assess the potential threats as high despite the admitted lack of detailed information.

### ▶ Renewable Energy

**Low Threat**
**Inside site, extent of threat not known**
**Outside site**

Hydropower development is an explicit objective of the government of Sikkim and large, controversial dams have been constructed on the Teesta and Rangit Rivers near KNP, with others being planned. At this stage, it seems unlikely that dam construction could be proposed within KNP, whereas this does not appear to be the case for proposals for developments in the buffer zone. In fact, past proposals are on record and appear to have been rejected on the grounds of environmental and social impacts (Republic of India, 2015). Any additional dam, including in the buffer zone, would inevitably come with impacts, including visual impacts - adding to the visual impacts induced by

the existing dams.

### ► Other Biological Resource Use

**Low Threat**
**Inside site, extent of threat not known**
**Outside site**

Local resource use does occur and to some extent appears to be accepted despite the strict legal bans. The management plan (Chettri et al 2002; Chettri et al. 2005a; Circle, Forests, Environment and Wildlife Management Department of the Government of Sikkim, 2008) can reasonably be interpreted as granting corresponding options in its generic guidance. The lack of clarity is not considered a tangible and direct threat in terms of ecological impacts at this stage but rather a factor compromising the relationship between park management and local communities. While Chettri et al. (2013) found detrimental impacts of formally illegal resource use, such impacts are likely to be restricted to the relatively small easily accessible parts of the property. Overall, the level of resource use, typically for subsistence purposes, does not appear to be a major threats at this stage, on the basis of available literature (e.g. Chettri et al. 2002; Chettri et al 2005b).

### ► Temperature extremes

**High Threat**
**Inside site, throughout(>50%)**
**Outside site**

It is somewhat speculative to comment on the exact consequences of anticipated climate change at the level of the property. Little specific information appears to be available suggesting a need for research. A useful overview is provided by Arrawatia et al. (2012) and chapters therein, especially Bawa et al. (2012), Telwala (2012) and Chettri et al. (2012). Kumar (2012), modeling the biogeographic response of Rhododendron species in Sikkim to climate change found that the "suitable bioclimatic envelope for Rhododendron has shrunk considerably under the envisaged climate change scenario". Ravindranath et al. (2012) suggested that the "forest sector in Sikkim is unlikely to be adversely impacted by climate change in the short- and medium-term." In spite of or perhaps because of such uncertainty - and given the potentially drastic consequences - the threat is rated "high" in the spirit of the precautionary principle, to draw attention to the need for a better

understanding of the situation.

### ▶ Temperature extremes

**High Threat**
**Inside site, throughout(>50%)**
**Outside site**

The status and trends of glaciation within KNP do not appear to be subject to specific research. Luitel et al. (2012) report a considerable receding of the East Rathong Glacier in West Sikkim between 1997 and 2008. Using the study as a proxy would indicate that climate change is already directly affecting glaciation in Western Sikkim. From a strict and narrow perspective of the natural World Heritage values, the threat may be relatively low and is difficult to predict in detail. From the perspective of ecosystem services, it is clear that the dynamics of glaciation are directly related to the provision of water; the importance and possible downstream implications cannot be overstated, including as regards agriculture and energy. It is for this reason that the threat level is assessed as "high".

### ▶ Roads/ Railroads

**Low Threat**
**Inside site, extent of threat not known**
**Outside site**

The northern border of Sikkim coincides with the international border between India and China, resulting in an important military presence on both sides of the border. Consequently, there is access infrastructure and potentially a demand for additional access infrastructure in the future.

## Protection and management

## Assessing Protection and Management

### ▶ Relationships with local people

**Serious Concern**

The area today constituting the mixed property has a long and well-documented history of human habitation and use, including by Dokpa,

Bhutia, Lepcha and Nepali people (Republic of India, 2015, Lachungpa, 2009). The national park provided a temporary safety net for Tibetan refugees since the late 1960s (Republic of India, 2015). Today, human settlements and consumptive resource use are not legally permitted within KNP, including livestock grazing, and harvesting of timber and non-timber forest products. Some settlements were therefore relocated. This legacy and legal framework has strained the relationships with local communities and continues to do so even though there appears to be some flexibility to accept some sustainable use at the local level. The livelihood options of local communities are very limited and to a very high degree depend on local natural resources (Chettri et al, 2002; Krishna et al. 2002; Chettri and Sharma, 2006). At the same time, local communities bear the burden of some human-wildlife conflicts, such as livestock predation (IUCN, 2016). It is important to recall that KNP is inscribed as a mixed property, i.e. explicitly for its extraordinary natural and cultural heritage and inherently for the intricate linkages between these dimensions. It can reasonably be argued that traditional resource use and associated knowledge and practices are important parts of the local culture and that therefore the categorical ban of any resource use raises important question marks requiring attention. The combination of rapid population growth, 33% in the last decade of the 20th century in Sikkim (Krishna et al. 2002) and direct dependence on local natural resources for energy, food etc. makes it inevitable that pressure and conflicts will increase. The situation is therefore assessed as a serious concern.

### ► Legal framework

**Some Concern**

The legal framework governing KNP, primarily the Wildlife (Protection) Act of 1972 provides a strong framework from a strict protection perspective (Government of India, 1972). The Act is crucially important as the decisive legal foundation to prevent major developments in the property. One dilemma is the above mentioned categorical ban on local resource use, which can be challenged on the grounds of rights and which, remarkably, is not compatible with objectives stated in the applicable KNP management plan (Circle, Forests, Environment and Wildlife Management Department of the Government of Sikkim, 2008). While the strong level of protection should not - and cannot easily - be changed, the room for local flexibility in terms of

sustainable use deserves to be further explored.

### ► Enforcement

**Mostly Effective**

Law enforcement is facilitated by the rugged terrain, which severely decreases the risks and intensity of illegal activities throughout most of KNP. In the more accessible lower elevations, enforcement does take place, supported by volunteer rangers and non-governmental organizations (IUCN, 2016). Even though the recent management effectiveness evaluation reports understaffing, the current overall situation is assessed as effective (Oli et al, 2013). It is clear that rising visitor numbers would have to be accompanied by a corresponding rise in management effort.

### ► Integration into regional and national planning systems

**Some Concern**

The property shares a long border with Nepal along its western side. There are working level contacts, including at the academic and NGO level. These contacts, however, do not amount to a (desirable) systematic coordination or cooperation. The small stretch of the boundary shared with the border to China’s Autonomous Region of Tibet is inaccessible and thus naturally protected with no indications of conservation concerns stemming from across the border. An overall framework and platform to discuss and promote regional transboundary efforts is offered and promoted by ICIMOD, as detailed in section 7 of this assessment, see also Sharma and Chettri (2005), Chettri et al. (2011 and 2008), ICIMOD, WCD, GBPNIHESD, RECAST (2017a) and Kandel et al. (2016).

To the south and east, the property is adjacent to a buffer zone, which adds to the protection of the property and boasts important natural and cultural values in its own right. The current status of much of the buffer zone as "Reserved Forest" (Republic of India, 2015) meets common protected area definitions implying that the buffer zone has an important underpinning. This, however, could change relatively easily, for example to permit hydropower development if corresponding permits are granted. The property would benefit from a more systematic consideration of the relationship between KNP, the buffer zone and the functional links to several important protected

areas in the immediate vicinity of the property, as suggested by ICIMOD, WCD, GBPNIHESD, RECAST (2017a). It is clear from the very location of Sikkim and KNP that conservation and management undoubtedly benefit from a vision and approach beyond national and state borders. At the level of Sikkim, there are efforts to harmonize planning at the state level in various areas. According to the nomination (Republic of India, 2015), these include (i) the Forestry and Environment Mission Sikkim (2015); (ii) the State Policy of Environment, Forests, and Land Use (2000); and (iii) the Sikkim Biodiversity Action Plan (2012) among others. A national level biosphere reserve likewise serves as an attempt to harmonize the park with its surroundings. Despite this promising framework, there is room for further integration between sectors and administrative units at and beyond the regional level. Specific conservation priority-setting exercises, such as the work by Ganguli-Lachungpa et al. (2011) can inform a regional land use planning approach which systematically takes nature conservation into account.

### ► Management system

**Some Concern**

As detailed by Republic of India (2015) and IUCN (2016), the Forest, Environment and Wildlife Management Department, Government of Sikkim (FEWMD) is the management authority, represented by its KNP administration unit. The KNP Management Plan (2008-2018, Circle, Forests, Environment and Wildlife Management Department of the Government of Sikkim, 2008) provides overarching guidance. The management system is based on a conventional top-down approach with decision-making relying on governmental actors. While there are fully functional communication channels enabling coordination and cooperation with other governmental branches at the state level and with the central government, particularly the Indian Forest Service, there is "limited evidence of systematic inputs of local stakeholders in decision-making" (IUCN, 2016). Besides meaningful involvement of local communities, the perhaps most striking question mark from the perspective of a mixed World Heritage property is the integrated consideration of cultural and natural values. There are opportunities to strengthen the ties between institutions, sectors and stakeholders to further integrate culture and nature.

### ► Management effectiveness

**Some Concern**

The management effectiveness of KNP has recently been evaluated as part of a major assessment of 125 Indian protected areas led by the Wildlife Institute of India (Bhardway, 2015). The assessment draws upon the widely used IUCN MEE Framework and the result can be summarized as follows: The overall ranking is ‘good’ while pointing out a number of weaknesses. These include (i) a "not very comprehensive" management plan; (ii) a lack of a systematic assessment of conservation values and threats and adequate monitoring; and (iii) inadequate human and financial resources. The credible and recent source thereby offers useful and tangible advice to further improve the management effectiveness of KNP and the World Heritage Committee's decision in inscribing the site encourages follow up action from the management effectiveness evaluation across several areas. Some of the weaknesses noted may be considered to be significant warranting prioritized action, however, on balance the management effectiveness is assessed as some concern.

### ► Implementation of Committee decisions and recommendations

**Data Deficient**

KNP was inscribed on the World Heritage List only in 2016 and therefore has a very limited World Heritage history rendering any assessment premature at this stage. It was thus decided to rate this section as data deficient. The only applicable Committee decision is the inscription decision (40 COM 8B.17), which encourages and requests the State Party to embark on a number of further efforts. Concretely, the Committee encouraged the State Party to address the actionable points suggested in the above-mentioned management effectiveness evaluation. The decision further encourages the State Party to "consider the progressive addition of suitable lower altitude areas" and to "foster greater collaboration between Khangchendzonga National Park (India) and Kanchenjunga Conservation Area (Nepal)", noting the potential for a future transboundary World Heritage extension. Further recommendations mostly refer to the cultural dimension of the mixed property, which this assessment supports. While equally important and deserving full consideration, the further consideration of cultural heritage is

beyond the scope of this exercise. The implementation of follow-up to the inscription decision will be up for review in future assessments.

### ► Boundaries

**Some Concern**

Where the boundaries coincide with India's international border there is obviously no room for re-considering boundaries on the part of Sikkim in India. Some of the area between the international border (Nepal) and the northern boundary of KNP might qualify as a possible extension area from a technical perspective. Security considerations are likely to override such considerations, which is beyond the scope of this assessment. There might be room for extensions to the south and east of KNP, which would have the conservation benefit of adding particularly valuable and vulnerable forest types in lower elevations which are hardly represented in KNP or not represented at all. Strategic additions may also help to secure connectivity across the larger landscape, including for flagship species like the Red Panda. The areas of potential boundary extensions largely coincide with the limited areas accessible to local communities which may restrict the feasibility of further extensions. It is also not clear what the exact conservation status of these areas is. As encouraged by the World Heritage Committee in its inscription decision, a specific assessment, in line with the encouragement expressed in the inscription decision, would help to better understand the options, costs, benefits and obstacles.

### ► Sustainable finance

**Some Concern**

Funding primarily relies on a governmental budget, complemented by projects, such as the bilateral cooperation with Japan, which strongly supported the World Heritage nomination. Mathur et al. (2015) suggest "extremely insufficient" resources. It is clear that the property would benefit from an increased budget and that diversified sources would help increase the resilience of the financing model. Given that KNP was explicitly recognized as a "mixed" property for its extraordinary cultural and natural significance, it would seem adequate to eventually move towards an integrated approach to financing, allocation and other financial decision-making bringing together the various involved institutions - to the degree

possible.

### ▶ Staff training and development

**Some Concern**

While acknowledging high staff motivation, the recent management effectiveness evaluation also suggested limited human resources, quantitatively and in terms of capacity (Mathur et al. 2015). This clearly indicates considerable room for improvement and a need for corresponding investment. The inscription as a "mixed" property could serve as a desirable incentive to invest in capacity development facilitating an integrated management approach to the intricately linked natural and cultural heritage of KNP and its surroundings.

### ▶ Sustainable use

**Serious Concern**

Sustainable use in KNP represents a classic protected area dilemma and conflict. The rigorous approach to exclude human settlements and consumptive use comes at a high price and raises many questions. There is evidence of some flexibility at the local level, for example as regards collection of medicinal plants for auto-consumption. At the same time, the categorical legal ban on use, including grazing is at odds with the longstanding interaction between herders and their natural environment (IUCN, 2016). While it is clear that there are no easy solutions and the legal framework is likely to remain in place in the foreseeable future, further analysis of options to understand levels of use which would not affect the nature conservation values is encouraged.

### ▶ Education and interpretation programs

**Mostly Effective**

KNP benefits from being exceptionally "visible" in the most literal sense of the word. The place and its meaning is present and undoubtedly an integral part of the local and regional identity. In this sense, KNP "needs no introduction". The local perception of the place is not primarily shaped by the formal protected area status but has much older and deeper roots. Thereby, the cultural, spiritual and religious significance exceeds the depth and reach any protected area can hope to promote and communicate. There are many

opportunities to link the cultural and religious respect to formal conservation efforts. At the more superficial level of site interpretation for tourism, there are laudable efforts, such as the visitor centre in Yuksom. If and as tourism might increase, further efforts will be desirable.

### ► Tourism and visitation management

**Mostly Effective**

Tourism and visitation is in its infancy and still very localized, thereby requiring localized management attention only at this stage. There are some signs of local impacts (IUCN, 2016) and additional resources would help to address and better manage those. The need for more careful and intense management will rise if the State of Sikkim is to follow up on its stated intention to promote tourism by improving access and by removing administrative obstacles. The management plan acknowledges the need to prevent impacts and to ensure local benefits (Circle, Forests, Environment and Wildlife Management Department of the Government of Sikkim, 2008).

### ► Monitoring

**Some Concern**

Sikkim's Forest, Environment and Wildlife Management Department (FEWMD) has the primary monitoring responsibility (Republic of India, 2015). The nomination notes a somewhat selective effort using species indicators (population size and trend), forest cover and incident frequency (e.g. poaching, human-wildlife conflict, encroachment) and water quality at intervals ranging from one to five years. Some initiatives were taken for monitoring for vegetation and species levels (Chettri et al 2002; Sathyakumar et al. 2014). There is room to expand the monitoring system and in particular to consider climate change under the umbrella of broader efforts at the state level. Likewise, the monitoring system described in the nomination appears limited in terms of the human dimension. Especially in light of the explicit recognition of globally exceptional cultural and natural values moving towards more integrated monitoring approaches are desirable. The results of the recent management effectiveness evaluation (Mathur et al. 2015) can contribute as one reference for future monitoring.

### ► Research

**Mostly Effective**

It is important to acknowledge that the location and terrain of, and access to, KNP render any field work not only challenging in terms of logistics and security but very costly. Substantial effort was made by G B Pant Institute of Himalayan Environment and Development as a pioneering work, and a wealth of information is available, including from sophisticated and recent wildlife research under the auspices of the Wildlife Institute of India (see for example Republic of India, 2015, and IUCN, 2016 and references cited therein). The fact that the nomination dossier did not take full advantage of important and readily available research could indicate a certain disconnect between research and management, as is unfortunately not uncommon. The Government of Sikkim has invested in excellent information services on the biodiversity (Arrawatia et al. 2011) and climate change (Arrawatia et al. 2012) at the state level, much of which is highly relevant to KNP. Moreover, the longstanding work by ICIMOD across the region and specifically in the transboundary "Kangchenjunga Landscape" covers ecological, social and policy issues and is readily available on ICIMOD's webpage (http://www.icimod.org/kl).

## Overall assessment of protection and management

**Mostly Effective**

Vast parts of the property find themselves in a very privileged position of an unusually high degree of natural protection. Most areas are rarely, if ever, visited. This largely compensates for a modest staffing level by surface area. The management is overall effective in addressing the current challenges within KNP. There are nevertheless a number of concerns noted, some of which are serious. These include in particular the relationship with local people and the legal restrictions on local resource use which complicate that relationship.

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

**Some Concern**

In terms of (potential) external threats, it is important to recall the border

setting and the extremely rugged high altitude terrain. Large adjacent areas in neighboring countries are extremely remote and inaccessible. While beyond the direct scope of the State Party, the current need for management in such areas is limited in the first place. The fact that KNP is contiguous with a large protected area in neighboring Nepal (Kanchenjunga Conservation Area) likewise positively contributes to addressing possible external threats. This leaves mostly the southern and eastern surroundings of KNP as vulnerable to external pressure. The buffer zone and the national level biosphere reserve are important efforts to address the relationships between KNP and its immediate surroundings. The pressure on natural resources in those surroundings is higher whereas the protection status is weaker. While there is no current sign of alarming threats to KNP stemming from these adjacent areas, continuous monitoring and, if needed, management responses to emerging threats are required.

► **Best practice examples**

This assessment proposes the nomination process, including the IUCN and ICOMOS evaluations, as a constructive learning process and in this sense a best practice example. The nomination effort motivated the State Party at the national and state level to carefully consider the cultural and natural heritage dimensions. The nomination process facilitated corresponding discussions bringing together a broad range of actors and views. While this debate should ideally have started much earlier on in the process, this learning process could be reflected in the further follow-up that was explicitly encouraged by the World Heritage Committee in its inscription decision. It is hoped that the inscription as a mixed World Heritage property will continue to spark constructive debate about the intricate linkages between "culture" and "nature" within and around a globally significant national park.

## State and trend of values

### Assessing the current state and trend of values

#### World Heritage values

### ► Majestic landscape of stunning visual beauty

**Good**
**Trend:Stable**

It would be difficult to think of any direct human-induced change fundamentally altering the visual backdrop of the rugged and extremely high peaks. These areas of the property are among the least accessible and most inhospitable places on earth. The dense forest cover, often reaching altitudes well above 4,000 m.a.s.l. is intact with no indication of dramatic changes in the short run. Eventually, climate change and perhaps major earthquakes could impact on the visual beauty of KNP. It an be argued that the existing hydro power dams in the vicinity of the property compromise some of the spectacular views of the property.

### ► Exceptional habitat mosaic along an extraordinary altitudinal gradient

**Low Concern**
**Trend:Stable**

The vertical gradient will remain unchanged in the foreseeable future and will remain the basis for a remarkable habitat mosaic. Climate change is anticipated to induce change in ways that are today largely speculative. While emphasizing the need to better understand and to the degree possible respond, this value is not assessed as currently being under acute and tangible threat.

### ► High plant and mammal species richness

**Good**
**Trend:Stable**

Currently, all available evidence indicates that KNP delivers an important contribution to species conservation. The few existing limitations are inherent to the limitations of the protected area approach. For example, the future of large mammalian apex predators like the Snow Leopard which require enormous ranges and tend to have low populations densities and reproduction rates, will eventually depend on conservation efforts beyond individual protected areas. Anticipated climate change adds complexity and

uncertainty, including as regards the impressive floral diversity.

▶ **Critical refuge for endemic, rare and threatened flora and fauna**

**Low Concern**
**Trend:Stable**

Similar to the observations on the previous value, individual protected areas on their own cannot amount to a feasible conservation approach for certain species requiring large ranges and having low population densities and reproductive rates. While KNP effectively serves as a critical refuge, the maintenance of landscape connectivity and coordinated conservation efforts elsewhere are just as important and needed.

## Summary of the Values

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

**Good**

**Trend: Stable**

The many nature conservation values are identified, respected and well-protected. The equally important and intricately linked cultural significance adds to the effective protection of the values. The future of Snow Leopard and other large mammalian apex predators will require conservation efforts beyond the level of KNP. A regional approach at and beyond the level of Sikkim is being initiated by ICIMOD with feasibility assessment and developing long term programme for regional cooperation (ICIMOD, WCD, GBPNIHESD, RECAST (2017a/b). Despite the overall good understanding of the nature conservation values and helpful recent research efforts, important data gaps remain. As an overarching concern that cannot be addressed at the site level, climate change casts some doubts about the longer term future of some of KNP's natural values.

▶ **Assessment of the current state and trend of other important biodiversity values**

**Good**

**Trend: Stable**

The assessment is identical to the previous section referring specifically to

values as identified and recognized under the World Heritage Convention.

## Additional information

### Benefits

### Understanding Benefits

#### ► Collection of wild plants and mushrooms

Collection of wild plants and mushrooms has been an integral part of local livelihood systems at all times of human habitation of Sikkim with important benefits for not just food but also medicinal purposes (Borah et al. 2011). While collection within the national park is today a somewhat grey area, it continues to take place and play an important role (Chettri et al. 2011).

The above factors do not appear to be decisive in the case of KNP, with the exception of climate change, the expected impacts of which on collection of wild plants and mushrooms are beyond the scope of this exercise. Rather, the main question mark appears to be a lack of full clarity in terms of the regulatory framework and management objectives. In the wording of the IUCN evaluation, "there is a contradiction between the legal ban on any resource use, including livestock grazing, and a vision of “ensuring sustainable flow of resources for traditional livelihood” and an objective “to allow controlled use of the Park and its resources by local people” both of which are stated in the management plan" (IUCN, 2016).

#### ► Livestock grazing areas

Similar to the collection of wild biodiversity products, mostly mobile livestock keeping - and thus grazing - have been and continue to be integral elements of traditional livelihood systems and cultures. It is important to note that livestock keeping serves important functions beyond food, for example the provision of leather, bones and wool, livestock is also related to social status and may serve as a "bank" for owners by constituting a source of income

when needed.

Among the above factors, none appears to be particularly relevant at this stage, perhaps with the exception of climate change which may induce major shifts in the ecosystems, including the vegetation. Comparable to the collection of wild biodiversity, there is a lack of clarity between a formal ban on grazing in place and the stated management objectives for KNP to ensure "sustainable flow of resources for traditional livelihood” and to permit "controlled use of the Park and its resources by local people” (Circle, Forests, Environment and Wildlife Management Department of the Government of Sikkim (2008).

- **History and tradition, Wilderness and iconic features, Sacred natural sites or landscapes, Sacred or symbolic plants or animals, Cultural identity and sense of belonging**

It is not excessive to suggest that KNP "ticks all the boxes" under this benefit type. As acknowledged by way of the inscription as a "mixed" World Heritage property, KNP is the center of a major sacred mountain area of enormous cultural, religious and spiritual importance across cultures and borders.

As such, the above factors do not appear to influence the cultural and spiritual values of KNP.

- **Collection of medicinal resources for local use, Outdoor recreation and tourism, Natural beauty and scenery**

The collection of wild biodiversity for medicinal purposes, including leaves, seeds, bark, fruits, animal parts and mushrooms, is widespread in Sikkim, as it it across the entire Himalayas. The potential for outdoor recreation and tourism - against the backdrop of one of the most spectacular mountain landscapes anywhere on the planet - is enormous and has so far not been tapped, with the exception of a limited number of access points and routes.

As discussed elsewhere, the collection of medicinal resources is part of a dilemma between a generic ban on resource collection within national parks and the stated objectives to permit sustainable use of renewable natural resources to the benefit of local communities. None of the above factors significantly limits the options of recreation and tourism.

### ► Importance for research

KNP is an intact reference area offering enormous potential for countless areas of scientific research, much of which remains to be fully realized. The extraordinary altitudinal gradient provides a unique opportunity for ecological research, including as regards climate change. Among the limiting factors are funding, the difficult access and the extreme altitude and terrain. Traditional knowledge systems are likewise important and risk being further eroded.

KNP constitutes a comparatively intact area. The park permits an increasingly rare glimpse into the functioning of relatively undisturbed mountain ecosystems. Climate change is expected to induce important changes which deserves major scientific attention. As noted for example by Lachungpa (2009) traditional knowledge is sophisticated, relevant - and severely threatened.

### ► Carbon sequestration, Soil stabilisation, Flood prevention, Water provision (importance for water quantity and quality), Pollination

KNP contains dense and large forests up to the unusually high tree line above 4,000 m.a.s.l. The conservation of these forests secures multiple environmental services which include carbon sequestration, soil stabilisation, flood prevention and water provision. It can reasonably be assumed that pollination is a benefit to agricultural areas adjacent to KNP.

Given the effective protection of the forests located withing KNP the only main question mark is related to climate change, which is expected to affect the glaciation of KNP and the wider Himalayas and the vegetation, including the distribution and composition of forests. This, in turn, would inevitably affect all environmental services considered above.

### ► Tourism-related income, Provision of jobs

The national park generates a relatively modest number of direct jobs. In a very limited number of current access points, a small tourism economy has evolved which provides important, yet localized and seasonal income and

employment.

The above factors do not appear to be critical in terms of the local economy as understood according to the proposed "specific benefits".

► **Access to drinking water, Commercial wells**

Water provision - in terms quantity, regulation and quality - is a major benefit of the national park with direct implications for human livelihoods and health besides the corresponding economic benefits. The water resources delivered, conserved and naturally regulated by KNP are of critical importance well beyond the immediate surroundings, including for energy generation and agriculture.

The only main concern among the above factors is climate change and how it will affect glaciation, temperatures and precipitation patterns. The same holds true for the entire Himalayan range and the vast areas depending on the major rivers originating in the Himalayas. While a detailed assessment of predicted change is beyond the scope of this exercise, it is clear that the factor deserves adequate monitoring and analysis.

► **Water provision (importance for water quantity and quality)**

The massive glaciers of the Himalayas are an enormously important resource and service for large parts of Asia in countless ways, including for the agriculture and energy sectors. This raises concerns

As in the previous and related benefit, the only main concern among the above factors is climate change and how it will affect glaciation, temperatures and precipitation patterns.

## Summary of benefits

Beyond its major and indisputable nature conservation and cultural / religious / spiritual significance, KNP is home to large glaciated areas and the headwaters of several very important rivers, thereby substantially contributing to the water quality and quantity of some of India's most important rivers. These in turn underpin multiple environmental services in the realms of energy, agriculture, food security and human health among others, well beyond Sikkim and indeed India by extending into Bangladesh. In terms of the local economy, KNP on the

one hand provides some direct employment and indirect employment via tourism development. On the other hand, the contribution to the local economy in the form of non-timber forest products for auto-consumption, medicinal and income generation purposes is limited through the very existence of the park. More clarity in terms of balancing strict conservation and acceptable use of renewable natural resources, including pasture, is desirable.

## Projects

### Compilation of active conservation projects

| № | Organization/individuals | Project duration | Brief description of Active Projects |
|---|---|---|---|
| 1 | Japan International Cooperation Agency (JICA) | From: 2010 To: 2020 | JICA cooperates with India, and particularly the State of Sikkim on a state-wide "Sikkim Biodiversity Conservation and Forest Management Project" (SBFP). According to the project website, the ambitious objective is to "strengthen biodiversity conservation activities and forest management capacity, and to improve livelihood for the local people who are dependent on forests by promoting sustainable biodiversity conservation, afforestation and income generation activities including eco-tourism for the community development, thereby contributing environment conservation and harmonized socio-economic development of Sikkim". One component explicitly supported the elaboration of the World Heritage nomination dossier. Likewise with project support, a website dedicated to KNP was created (see below), which includes the full text of the nomination in addition to a wealth of other useful information. |
| 2 | International Centre for Integrated Mountain Development (ICIMOD) | From: 2012 To: 2020 | Based in Kathmandu, Nepal, ICIMOD describes itself as a regional "intergovernmental learning and knowledge sharing centre serving the eight regional member countries of the Hindu Kush Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan". Supported by the governments of Austria and Germany, ICIMOD facilitates the Kangchenjunga Landscape Conservation and Development Initiative (KLCDI), one of six major transboundary landscapes initiatives. KNP and the neighboring Kanchenjunga Conservation Area (KCA) are the heart of KLCDI. Concretely, ICIMOD works with the governments of Bhutan, India and Nepal to promote a coordinated transboundary landscape approach to conservation and development. Building upon longstanding earlier discussions, the initiative was conceived in 2012 and is now in a 2016-2020 implementation phase. The initiative has a 20 year strategic programme and vision. |

## Compilation of potential site needs

| № | Site need title | Brief description of potential site needs | Support needed for following years |
|---|---|---|---|
| 1 | Bilateral transboundary cooperation | The above mentioned ICIMOD initiative provides a promising intergovernmental umbrella and platform for India and some of the neighboring countries to coordinate conservation efforts across international borders. There might be additional opportunities to work with Nepal, home of the "other half" of the Khangchendzonga / Kanchenjunga Massif, protected as the Kanchenjunga Conservation Area (KCA). This is noted and encouraged in the World Heritage Committee's inscription decision (40COM 8B.17, Istanbul, 2016). From a technical perspective, there could also be options to coordinate and cooperate with China, with which KNP likewise shares a (smaller) part of the border. | |
| 2 | KNP and its surroundings within Sikkim | KNP is renowned for its spectacular altitudinal gradient and the enormous ecological and biological diversity along this gradient. A closer look reveals that some of the forest types of Sikkim's lower elevations are hardly covered within the protected area, some are not covered at all. At the same time, the forests in the lower elevations are particularly valuable and clearly among the most vulnerable forests in Sikkim. This suggests room for an even more comprehensive coverage of the extraordinary ecosystem and forest type diversity. In practice, this could mean an adaption of the park boundaries so as to add a layer of protection to particularly valuable parts of what is currently the buffer zone. It is important to understand that there are still functional linkages between KNP and other, very important protected areas in Sikkim, namely Singalila National Park, Barsey Rhododendron Sanctuary and Maenam Wildlife Sanctuary. As an example, such de facto "corridors" between KNP and other protected areas in Sikkim unite important Red Panda populations. While currently de facto protected in the buffer zone, possible changes to the management objectives of the buffer zone cast some doubts about future connectivity. A systematic assessment to better understand and ensure the maintenance of connectivity in line with the above Committee decision is recommended. | |

| № | Site need title | Brief description of potential site needs | Support needed for following years |
|---|---|---|---|
| 3 | Opportunities for comparative conservation research | KNP shares a long border with its mirror image on the Nepali side, Kanchenjunga Conservation Area (KCA). The two contiguous protected areas share many attributes in terms of ecology and human history and resource use. However, the legal, governance and management frameworks are remarkably distinct. This provides a rare and fascinating opportunity for comparative research. | |
| 4 | Preparedness for future tourism | Tourism remains a localized activity with overall still modest economic importance and impacts. Among the bottlenecks are logistically difficult and costly access and administrative burdens, such as special entry permit requirements for foreign visitors to Sikkim. In light of planned infrastructure improvements designed to improve access and ambitious plans to promote tourism in Sikkim, this might significantly change in the medium and longer term. The World Heritage inscription is likely to increase the visibility of KNP, including as a tourism destination. KNP has world-class trekking potential on par with the most renowned and well-established destinations in the Himalayas. If realized, this potential is likely to come with benefits but also with environmental, cultural and social impacts which are well-documented elsewhere in the Himalayas. Preparing in time would no doubt constitute a wise investment. | |

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