IUCN Conservation Outlook Assessment 2017 **(archived)**
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Please note: this is an archived Conservation Outlook Assessment for Tropical Rainforest Heritage of Sumatra. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Tropical Rainforest Heritage of Sumatra

SITE INFORMATION

Country:
Indonesia
Inscribed in: 2004
Criteria:
(vii) (ix) (x)

Site description:
The 2.5 million hectare Tropical Rainforest Heritage of Sumatra site comprises three national parks: Gunung Leuser National Park, Kerinci Seblat National Park and Bukit Barisan Selatan National Park. The site holds the greatest potential for long-term conservation of the distinctive and diverse biota of Sumatra, including many endangered species. The protected area is home to an estimated 10,000 plant species, including 17 endemic genera; more than 200 mammal species; and some 580 bird species of which 465 are resident and 21 are endemic. Of the mammal species, 22 are Asian, not found elsewhere in the archipelago and 15 are confined to the Indonesian region, including the endemic Sumatran orang-utan. The site also provides biogeographic evidence of the evolution of the island. © UNESCO

SUMMARY

2017 Conservation Outlook

Critical

Serious concern about the threats and damage to the Tropical Rainforest Heritage of Sumatra (TRHS) have been raised by UNESCO and IUCN since the property's inscription in 2004. In 2011, the TRHS was inscribed on the List of World Heritage in Danger and, in 2014, the Committee described the corrective measures necessary to attain a desired state of conservation that would justify removing the property from the 'in danger' list . Those corrective measures include tackling poaching, illegal logging, encroachment and proposed road developments, and improving management and law enforcement. However, recent official reports indicate that environmental crimes within the property, such as poaching, illegal logging and encroachment, continue at very high levels and may even be increasing. The damage occurring to lowland tropical rainforests and the habitat of species such as orangutans, rhinos, tigers and elephants is therefore continuing at a high level. There is no authoritative evidence that populations of key species have stabilised. Law enforcement is totally inadequate; the numbers of arrests documented by the State Party comprise a tiny fraction of the numbers of illegal incidents reported. Management of the TRHS is also inadequate due to the absence of a property-wide management plan and structure. The legal framework is complex. Serious concern remains about the impact of the Aceh Spatial Plan, whose objectives include increased resource extraction from the Gunung Leuser National Park (GLNP) component of the property and its surroundings. The boundaries of the GLNP component of the property remain unclear. Requests from the Committee for a rationalisation of the boundaries to exclude areas whose contribution to the Outstanding Universal Value (OUV) has been destroyed, and to include additional habitat of key species, have not been met. A prohibition on the development of geothermal energy within protected areas in Indonesia has recently been removed – this creates additional uncertainties about future protection of the property, despite the State Party's undertaking that geothermal development within the TRHS will not be permitted. Proposed developments on the periphery

of the property, including hydro dams, geothermal development and new roads, pose additional threats to the site's integrity.
On the positive side is the State Party's undertaking not to allow geothermal development within the property (hopefully this will be both legislated and communicated strongly to would-be developers and to provincial authorities); its completion of an SEA into road development (though it is not yet clear how this will translate into a protective policy); and the recent significant improvement in the numbers of patrols and their equipment. Hopefully, this will lead to a massive improvement in law enforcement, including arrests, prosecutions, convictions and penalties, which are necessary for the property to maintain its OUV and integrity. The TRHS, thanks to its size and diversity, retains its OUV despite the above threats, but a concerted effort on the part of the State Party and the international community is necessary to reverse the deterioration in the property's condition. In particular, the State Party must deploy all of the resources at its disposal to rein in environmental crime and to ensure that local and provincial authorities become part of the international effort to protect this irreplaceable World Heritage property.

Current state and trend of VALUES

High Concern
Trend: Deteriorating

It is important to highlight that although the threats are substantial and protection and management to date largely ineffective, the values of the site are still intact. That said, many of the flagship species are at a crossroads in terms of their long-term viability and external development pressures are adversely impacting their prospects. IUCN, conservation NGOs, missions to the site and the World Heritage Committee have repeatedly expressed serious concern about the impacts on the TRHS of encroachment, roads, wildlife poaching and illegal logging, as well as the potential impacts of geothermal energy development. A new threat has emerged in the form of proposed hydro dams around the periphery of the GLNP component of the property. The inscription of the TRHS on the List of World Heritage in Danger seems to be creating momentum to address the range of issues in a longer-term and more comprehensive manner, such as a massive increase in patrols and the preparation of an SEA on road development within the property. Unfortunately, such measures have not been accompanied by an improvement in law enforcement; a concerted effort is required on this front to prevent permanent loss of OUV and integrity. Similarly, the continued

loss of forest must be halted and reversed in order to meet the requirements of the DSOCR. The broader landscape of the property continues to suffer from environmental degradation. The property attracts considerable international profile due to its formal status as a sanctuary for charismatic species such as the Sumatran rhino, tiger, elephant and orangutan (IUCN, 2004). It is difficult to assess the overall status of these key species as the data provided by the State Party are not accompanied by an authoritative analysis pertaining to the benchmark levels of 2004, when the property was inscribed on the World Heritage List; what is known is that incidents of poaching remain alarmingly high with a disturbingly low level of arrests and prosecution (State Party of Indonesia, 2017). The State Party's commitment to comprehensive baseline monitoring of the four flagship species should improve the understanding of the health of these populations; ultimately, though, it is solid law enforcement that is necessary to deter poachers and other illegal exploiters. The outstanding qualities of the TRHS, though damaged, nevertheless remain. It is still an exceptionally beautiful landscape of mountains, rainforest and rivers, with extraordinary wild animals. Nevertheless, a concerted effort from the State Party and the international community remains essential to protect the property's OUV from the alarming level of impacts being suffered.

Overall THREATS

Very High Threat

The World Heritage Committee has expressed increasing alarm regarding threats to the TRHS since its inscription in 2004. A total of five missions to the site have taken place between 2006 and 2013, all of which have expressed grave concerns about the impacts of encroachment, roads, wildlife poaching and illegal logging. Encroachment has been widespread, large-scale and, in the case of Gunung Leuser National Park, often linked to commercial plantation interests. Conversely, at Kerinci Seblat National Park, encroachment is primarily by small-holders, while plantation companies there are reported to be frequently helpful and supportive of the national park (IUCN Consultation, 2017). The inscription of the site on the List of World Heritage in Danger (World Heritage Committee, 2011) is raising wider awareness of the alarming threats to the site and leading to positive measures to mobilise the necessary financial and technical expertise to address current and potential threats to the site. Nevertheless, many complex and entrenched threats persist which will require vigilance and long-term commitment from the State Party and international partners. Reports continue to

emerge of large-scale conversion of forest in Aceh Province which would have a detrimental effect on the site's integrity. Overall, the level of known impacts from poaching, illegal logging and encroachments remains highly disturbing. A high incidence of such threats was documented by the State Party in 2017. When this high level of known threats is combined with the lack of adequate law enforcement and the potential for major new infrastructure in the form of geothermal developments, hydro dams and associated new roads within and around the property, it is clear that the TRHS faces a critical situation.

Overall PROTECTION and MANAGEMENT

Serious Concern

This serial property (consisting of three separate national parks) faces enormous challenges. There appears to be no overarching management structure or plan for the TRHS. Management appears to be undertaken on a park-by-park basis. Boundaries of the property (particularly the GLNP component) have yet to be clarified, a situation that renders on-the-ground demarcation an exercise of questionable merit in certain areas. There remain areas outside the property which would contribute significantly to OUV with respect to key species, and there remain areas inside the property that have been damaged so badly that they retain no contribution towards the property's OUV. Recent legislative changes have made geothermal development a permitted activity within protected areas, creating a new area of uncertainty for managers (notwithstanding the State Party's undertaking that it will not be permitted within the property). A recent welcome investment in patrols has improved monitoring but this has not been accompanied by a commensurate improvement in law enforcement, which remains disturbingly inadequate. Contributing to this deficiency is the separation of responsibilities between two Directorate Generals, where the DG of Conservation of Natural Resources and Ecosystems has overall management authority over the property, whereas law enforcement is entirely under the responsibility of the DG of Law Enforcement (IUCN Consultation, 2017). It is crucial that representative staff of the DG of Law Enforcement are stationed within each of the management offices of the three component national parks of the property. The conservation of the Leuser Ecosystem has been jeopardised by the advent of the Aceh Spatial Land Use Plan, which critics say opens the way for a spate of roads and resource exploitation around – and potentially within – the GLNP component of the property. There appears to be no formal evaluation of the impacts of infrastructure developments (such as proposed hydro dams and

geothermal developments) in close proximity to the property. It is therefore not clear how land managers can mitigate impacts of such developments on the property. In some cases, the World Heritage Centre and IUCN have yet to be formally notified of the existence or progress of such proposals. Relationships with stakeholders both inside and outside the property remain challenging. Environmental NGOs are having to tackle some of the issues affecting the property (the Aceh Spatial Plan, palm-oil development) in the courts, an uncertain and expensive process. The management system and authorities have therefore made little progress towards the DSOCR for the property and face a mammoth struggle to protect its OUV and integrity.

FULL ASSESSMENT

Description of values

Values

World Heritage values

- **Exceptional scenic landscapes at all scales**
  Criterion:(vii)

  The three national parks that comprise the Tropical Rainforest Heritage of Sumatra (TRHS): Gunung Leuser (GLNP), Kerinci Seblat (KSNP) and Bukit Barisan Selatan (BBSNP), are all located on the prominent main spine of the Bukit Barisan Mountains, known as the 'Andes of Sumatra'. The mountains of the site, many of which descend into the sea, present prominent backdrops to the mostly settled and developed lowlands of Sumatra. The combination of the spectacularly beautiful Lake Gunung Tujuh (the highest lake in Southeast Asia), the magnificence of the giant Mount Kerinci volcano, numerous small volcanic, coastal and glacial lakes in natural forested settings, fumaroles belching smoke from forested mountains, montane peat swamps, and numerous waterfalls and cave systems in lush rainforest settings, emphasise the outstanding beauty of the TRHS (adapted from IUCN Evaluation, 2004 & World Heritage Committee, 2013).

- **Outstanding examples of forest on the island of Sumatra for the conservation of the biodiversity of both lowland and mountain forest ecological processes.**
  Criterion:(ix)

  Indonesia's extraordinary biological richness is the reason why it is one of only seven megabiodiverse countries in the world. As one of Indonesia's largest islands, Sumatra possesses globally exceptional forest biodiversity

yet its tropical rainforests have been reduced to isolated remnants over the past 50 years. It is in this context that the site, which protects some of the most important remnant forest on Sumatra, is of outstanding universal value. Both GLNP and BBSNP extend from the highest mountains on Sumatra to sea level. All three components of TRHS exhibit wide altitudinal zonation of vegetation, from lowland rainforest to montane forest, extending to sub-alpine low forest, scrub and shrub thickets and covering an astounding diversity of ecosystems. The Leuser Ecosystem, including the GLNP, is by far the largest and most significant forest remnant remaining in Sumatra. All three components of the TRHS would have been important climatic refugia for species over evolutionary time and have now become critically important refugia for future evolutionary processes (adapted from IUCN Evaluation, 2004 & World Heritage Committee, 2013).

► Important and significant natural habitats for in-situ conservation of biological diversity of plant and animal species

Criterion:(x)

All three components of the site are areas of very diverse habitat and exceptional biodiversity. Collectively, the three parks include more than 50% of the total plant diversity of Sumatra. There are an estimated 10,000 species of plants, including 17 endemic genera. Animal diversity in TRHS is also impressive, with 201 mammal species and some 580 species of birds, of which 465 are resident and 21 are endemics. At least 92 locally endemic species have been identified in GLNP. The site contains relict lowland forests which are very important for conservation of the plant and animal biodiversity of the rapidly disappearing lowland forests of Southeast Asia. Similarly, the montane forests, although less threatened, are very important for conservation of the distinctive montane vegetation of the TRHS (adapted from IUCN, 2004 & World Heritage Committee, 2013).

► A critical habitat refuge for several globally significant and endangered species

Criterion:(x)

The site holds the greatest potential for long-term conservation of the distinctive and diverse biota of Sumatra, including many endangered species. Of the mammal species, 22 are Asian, not found elsewhere in the

archipelago and 15 are confined to the Indonesian region, including the endemic Sumatran orangutan. Key mammal species also include the Sumatran tiger, rhino, elephant and Malayan sun-bear. The site also contains populations of both the world's largest flower (Rafflesia arnoldii) and the world's tallest flower (Amorphophallus titanum) (adapted from IUCN, 2004 & World Heritage Committee, 2013).

Other important biodiversity values

▶ **Biological integrity values**

Gunung Leuser was designated a UNESCO Biosphere Reserve in 1981 (UNESCO MAB, 2015).

▶ **Significant biological values**

GLNP and KSNP were designated as ASEAN Heritage Parks in 2005.

▶ **Watershed values**

The Rimba Karya Indah 'finger', which is surrounded on three sides by the property and has been repeatedly recommended for urgent inclusion in KSNP, for the first time by the World Bank in 2002, due to biodiversity and watershed protection values (IUCN, 2012), has been declared a Watershed Protection Forest (IUCN Consultation, 2014).

Assessment information

Threats

Current Threats

Very High Threat

While positive progress has been made in establishing patrols and improving

the technology used by those patrols (State Party of Indonesia, 2017), these have yet to significantly improve the situation. The dramatic increase in environmental crimes reported may well reflect the increase in patrols, but the level is alarming, as is the continuing inadequacy of law enforcement (State Party of Indonesia, 2017). The cumulative impacts of poaching, illegal logging, encroachment and other illegal activities that include mining therefore create a very high threat to the OUV and integrity of the TRHS (State Party of Indonesia, 2017; HAkA et al., 2017a). This is potentially exacerbated by the construction of new roads within the property (Orangutan Centre, 2017). It is not clear whether the central government's policy of not approving new roads in the property is being enforced on the ground. Reports that new roads are being built, while not substantiated, are nevertheless disturbing, as new roads will only exacerbate the prevalence of illegal and destructive activities within the TRHS.

► Invasive Non-Native/ Alien Species

Low Threat
Inside site, widespread(15-50%)

Merremia peltata is now also observed in a number of areas adjoining Kerinci Seblat National Park, as is Leucaena leucocephala, which is spreading widely. No programmes appear to be in place to address this threat (IUCN Consultation, 2017), although the State Party reported in 2013 that attempts were being made to eliminate Merremia peltata from Bukit Barisan Selatan National Park (State Party of Indonesia, 2013).

► Roads/ Railroads

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

The issue of the impact of existing and proposed roads was identified from the date of inscription (IUCN, 2004) and has been noted in all subsequent State of Conservation reports, five IUCN/UNESCO Missions and many Committee Decisions. Roads through the property and adjacent to it provide access for poaching, illegal logging and encroachment, so constitute a major threat. In 2017, the State Party said that it is "committed" to "not granting any concession or permits with regard to … construction of new roads within the property" (State Party of Indonesia, 2017). According to UNESCO, the

State Party provided a Strategic Environmental Assessment (SEA) for road development within the TRHS on 31 March 2017 for review by IUCN, the conclusion being that road development within the property would constitute a threat to the property's OUV and integrity (UNESCO, 2017a). In 2017, a conservation NGO warned about proposed roads, saying "despite repeated assurances from the State Party, significant road projects have already begun to destroy the TRHS property" and provided a map showing "roads under development" cutting through parts of the GLNP component of the property (Orangutan Centre, 2017). No sources are provided. Some of the concerns raised may in fact concern older roads, nevertheless, political pressure for building new roads remains very high. It is also reported that village development funds (dana desa) are frequently being used to construct dirt roads close to or even within the property (IUCN Consultation, 2017). New roads pose a very high threat to the TRHS, but there is a critical lack of data pertaining both to the Government's ability to implement its 'no new roads' policy and to NGOs' warnings about new roads.

► Hunting (commercial/subsistence), Logging/ Wood Harvesting

Very High Threat
Inside site, widespread(15-50%)
Outside site

Poaching and illegal logging were identified as issues from the date of IUCN's evaluation (IUCN, 2004) and have been noted in all subsequent missions and State of Conservation reports. State Party reports acknowledge this threat. The State Party has outlined its programme of SMART patrols, training and acquisition of equipment for the purposes of monitoring the numbers of key species and has provided some statistics relating to some of the key species in some parts of the property, asserting that numbers are stable (State Party of Indonesia, 2017). However, no authoritative analysis of all species over the entire property is provided to substantiate this claim. The same document says that reports of incidents of poaching within the property have increased five-fold – from 102 in 2013 to 512 in 2016; there were only 30 arrests during that period (State Party of Indonesia, 2017). The increase in the number of poaching incidents reported may well reflect the increase in the number of patrols, but the number of incidents remains disturbingly high. Poaching threat for Sumatran tiger in Kerinci Seblat National Park rose dramatically between 2012 and 2015 following a 400% rise in blackmarket prices for tiger

body parts in that same period. Prices went down again since 2015, and the poaching threat to tigers has been falling since 2016. The reduction of this threat is also closely linked to law enforcement actions conducted by the national park and the Natural Resources Management Authority (KSDA) of Jambi Province (IUCN Consultation, 2017).

► Crops

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

Encroachment is one of the main threats to the property, affecting attributes of its Outstanding Universal Value (OUV) under all three criteria for which it was inscribed (vii, ix, x). Relict lowland rainforests in the property are crucial for the conservation of the plant and animal biodiversity of the rapidly disappearing lowland forests of Southeast Asia. The montane forests, though less threatened, are vital for conservation of the distinctive montane vegetation of the property (World Heritage Committee, 2004), and are increasingly under threat due to the national and international demand for Arabica coffee (IUCN Consultation, 2017). The issue of encroachment and related impacts was identified from the date of inscription with IUCN highlighting encroachment for small-holder agriculture and industrial plantations with associated illegal logging and poaching (IUCN, 2004). All five IUCN/UNESCO monitoring missions between 2006 and 2013 have highlighted ongoing and serious encroachment inside the site. Large-scale encroachments of the parks within the site have been noted, for example up to 22.5% of BBSNP, often due to large-scale coffee and/or palm oil land conversions (IUCN and UNESCO, 2006). Though outside the site, the large-scale conversion of forest to oil palm plantation within the critically important Leuser Ecosystem is likely to have a significant effect on the integrity of the site, particularly through loss of habitat for key species (IUCN Consultation, 2013). In 2013, encroachments that included palm-oil plantations were estimated at 373,000 ha, over 10% of the property (IUCN, 2013). A further 8,700 ha of forest were lost in GLNP from 2012 to 2017, attributed largely to extension of palm-oil plantations (State Party of Indonesia, 2017). Conservation NGOs have graphed a cumulative loss of forest exceeding 14,000 ha since inscription of the TRHS in 2004 (Orangutan Centre, 2017). WWF says that clearing of forest for oil palms is continuing in Sumatra (WWF, 2017). Incidents of encroachment recently reported by the State Party have

escalated dramatically from 55 in 2013 to 1,641 in 2016; only 17 arrests occurred during these four years despite a total of over 2,500 incidents; the report says prosecutions of encroachers “have not been done properly” (State Party of Indonesia, 2017). Clearly, the acute threats of encroachment and associated forest loss have become more severe, with law enforcement measures seemingly powerless to cope. Part of the problem appears to be a lack of personnel of the Directorate of Law Enforcement in place at each of the national parks that make up this serial property (IUCN Consultation, 2017).

Potential Threats

High Threat

The landscape context of TRHS is critical to its survival yet is suffering environmental degradation from uncoordinated development. The Leuser Ecosystem, of which GLNP is a part, has been repeatedly noted as providing critical habitat for globally significant species, however, it continues to suffer from various impacts. The central government’s undertaking not to approve geothermal developments within the property is welcome (State Party of Indonesia, 2017). Further action is required to enshrine this undertaking in law, especially given that the government has recently removed the legislative prohibition against geothermal development within protected areas (State Party of Indonesia, 2016). Without an appropriate law or regulation, protection of the property from geothermal development is reliant on the government maintaining and enforcing its undertaking from one year to the next. Meanwhile, it appears that a geothermal development is proceeding adjacent to part of the property without the World Heritage Committee or IUCN having been given the opportunity to review its impacts (PTT Greencap, 2017). The prospect of large hydro-electric dams has also been raised (HAkA et al., 2017a; b; Orangutan Centre, 2017), with one such project appearing to be located in an area of habitat particularly important for orangutans (Terapong, 2016; Wich et al., 2011). Further information is required to ascertain the full extent of threats to the property’s OUV and integrity from such developments.

► Mining/ Quarrying

Low Threat

Outside site

Although mining is illegal inside national parks, the IUCN mission of 2013 confirmed that illegal traditional gold mining was still occurring inside the KSNP (IUCN, 2013). In 2015, the State Party said that such operations were in the process of being closed and the area rehabilitated (State Party of Indonesia 2015, p.4), and later that all illegal mining within the KSNP had been stopped and 30 ha had been rehabilitated (State Party of Indonesia, 2016). However, according to other sources, illegal gold mining continues in areas both inside and adjoining KSNP, in Merangin and Lebong districts (IUCN Consultation, 2017). In 2017, some conservation groups warned that a controversial new Aceh Spatial Plan would permit mining within the Leuser Ecosystem, around the GLNP component of the property (Orangutan Centre, 2017). In 2017, the State Party has stated that there are no mining concessions or exploration permits within the property and that it is addressing the issue of illegal mining through monitoring and collaboration with concessionaires outside the property (State Party of Indonesia, 2017). Given recent efforts and policy initiatives by the State Party, the threat from mining will remain small unless major mining projects are approved at the provincial level. The State Party has identified mining amongst “other illegal activities in TRHS”, a category of illegal impact whose reporting rose from 22 in 2013 to 615 in 2016; only 34 people were prosecuted for these activities within the four years (State Party of Indonesia, 2017). More information is required to determine how big a proportion of these incidents is attributable to mining.

► Renewable Energy

High Threat
Inside site, localised(<5%)
Outside site

Geothermal development was flagged as a potential threat to the property’s OUV by the 2013 mission (IUCN, 2013).There are two parts of the property where such development has been discussed – GLNP and BBSNP.
One proposed location for geothermal development is on the Kappi Plateau within GLNP, an area identified by IUCN and the World Heritage Centre, as well as conservation NGOs, as an area containing critical habitat for all four key species of the property (UNESCO, 2017a). In early 2017, conservationists warned that the outgoing governor of Aceh province and a Turkish company

were lobbying for reduced protections in the core of the GLNP component of the property in order to enable geothermal development to proceed (HAkA et al., 2017b). The State Party has said that it is “committed to not granting any concession or permits with regard to exploration of geothermal energy … within the property” (State Party of Indonesia, 2017). The State Party does not yet appear to have complied with the Committee’s request that geothermal development within the property be prohibited by law (38 COM 7A.28). Indeed, it reports that it has “issued a regulation in favour of geothermal operations in conservation areas through Law No. 21 of 2014 on Geothermal”, in which geothermal development is no longer classified as mining and can occur within conservation reserves (State Party of Indonesia, 2016). This ambiguity leaves geothermal development as a significant threat to the property.

Another proposed geothermal development adjacent to BBSNP has been discussed, and IUCN and the Committee have called for an EIA that addresses potential impacts on the OUV of the property to be submitted for review (World Heritage Committee, 2015, 2016). In response, the State Party has asserted that “the preliminary study to explore the possibility of Geothermal Energy will not be conducted within the property” (State Party of Indonesia, 2017). This assertion sidesteps the Committee’s request, which pertained to a development adjacent to the property. An online report appears to indicate that the proposal adjacent to BBSNP is proceeding, with major work being done on a biodiversity action plan, with maps showing the project’s proximity to tiger habitat and the TRHS (PTT Greencap, 2017). Given the apparent absence of the EIA sought by the Committee as well as the proximity of this project to the property, there appears to be a potential threat to the property’s integrity from this project. Furthermore, planning is reported to be well advanced for geothermal development immediately adjoining KSNP in Solok Selatan, West Sumatra Province. Exploration for geothermal is also reported to have been conducted in the Merangin and Kerinci areas of KSNP, and a geothermal contractor is said to have requested permission to conduct test drilling in a site bordering KSNP in the Jangkat area. There are concerns that this planning may be a contributing factor to road construction through the KSNP to Renah Kemumu village (IUCN Consultation, 2017).

► Renewable Energy

High Threat
Inside site, localised(<5%)
Outside site

In 2017, conservation NGOs warned that three major new hydro-electric dams had been proposed in and/or around the GLNP component of the property and that these would have a significant impact on the integrity of the Leuser Ecosystem (HAkA et al., 2017a; b). A map was produced showing the locations of the proposed dams, one of which, Kluet, appeared virtually on the boundary of the TRHS and capable of submerging forest within it (Orangutan Centre, 2017). The Kluet area has been identified as important orangutan habitat (Wich et al., 2011). There are numerous references to the proposed Kluet hydro scheme online. An online business news service has reported that the Kluet Dam ‘mega project’ will be built by a Chinese-Indonesian consortium, that construction would start in 2019, and that certain permits had been granted by local authorities (Terapong, 2016). While there is as yet insufficient data to determine the likely impacts of the hydro schemes, there does appear to be a significant potential threat to the habitat of at least one of the property’s key species.

Protection and management

Assessing Protection and Management

► Relationships with local people

Serious Concern

The State Party collaborates with various environmental NGOs on patrols, community liaison, outreach, wildlife management and rehabilitation (State Party of Indonesia, 2017). These efforts are praiseworthy. However, a number of environmental NGOs have described their struggle to protect the property, including challenging palm-oil companies and the provincial government in the courts, and have issued a critique of the State Party’s 2017 State of Conservation report (HAkA et al., 2017a). It appears that the State Party’s central government could improve its efforts to communicate

with conservation NGOs on major issues affecting the property.

The 2014 Outlook reported that confusion regarding boundaries had created conflict with local people and district governments over rights to land and resources. The State Party says it is making a major effort to maintain and restore national-park boundary markers and undertaking an information dissemination programme (State Party of Indonesia, 2017). No figures were given regarding lengths of the boundary clarified in this fashion. The information dissemination was described in very general and brief terms. The large-scale encroachment, illegal logging and poaching reported indicate that much work remains to be done. HAkA et al. (2017a) assert that this physical exercise in boundary demarcation is “an exercise in futility” because of persisting confusion at the government and UNESCO level about the actual official boundaries (see below under ‘Boundaries’).

The 2014 Outlook reported that local politicians believe enhanced road access is necessary. This still appears to be the case (HAkA et al., 2017a; b). A more assertive approach from the central government to safeguard the property’s OUV appears necessary.

► Legal framework

Some Concern

The 2014 Outlook reported that the Indonesian laws protecting the site are technically sound. IUCN has described the laws pertaining to the property (IUCN, 2013). However, the following problems have subsequently emerged:
- A legislative prohibition on geothermal development within protected areas has been removed (State Party of Indonesia, 2016).
- It has been reported that the Spatial Land Use Plan developed by the Aceh provincial government would allow mining, palm-oil development and major infrastructure within previously protected areas of the Leuser Ecosystem, including the GLNP (HAkA et al., 2017a). The Committee and IUCN have expressed concern about this and asked the State Party for assurances regarding protection of the GLNP and parts of the Leuser Ecosystem important for the property’s integrity (World Heritage Committee, 2015, 2017; IUCN, 2013). The State Party has asserted that the property’s protection is unaffected by the Aceh Spatial Land Use Plan (State Party of Indonesia, 2016), but it is not clear that this firm commitment by the central

government translates into strong protective action on the ground, or effective communication with regional authorities that may have a different view.

Formal and enforceable legislative protection of the World Heritage property, based on the State Party's obligations under the World Heritage Convention, would be a desirable step to help overcome current problems and ambiguities within the legal framework.

► Enforcement

Serious Concern

The 2014 Outlook reported that law enforcement is patchy and staff capacity variable. The State Party has confirmed that this situation persists; a huge increase in patrols has resulted in few arrests and prosecutions (State Party of Indonesia, 2017). This report says: "Prosecution to encroachers have not been done properly, the data from 2013 to 2016 showed that only 17 people were brought to legal process" (Annex 3). The report documents only 24 arrests from 2,377 illegal incidents (Annex 3), an alarming failure to enforce critical protective laws. The responsibility for law enforcement lies with the Directorate General of Law Enforcement, which has its Sumatra office in Medan, and which has no representative staff within the management offices of the property (IUCN Consultation, 2017). The State Party's central government should be driving a concerted effort to overcome this critical inadequacy in the management of the TRHS.

► Integration into regional and national planning systems

Serious Concern

Provincial and local government authorities surrounding the site tend to view protected areas as barriers to development and are largely unaware of the property's World Heritage status (IUCN, 2013). For example, road construction was proposed by local authorities in all three components of the site, and particularly in KSNP. The recently completed Strategic Environmental Assessment (SEA) of road development proposals in and around the property concludes that road development would have unacceptable negative impacts on the OUV of the property. The State Party has given a commitment that no new roads will be approved (State Party of

Indonesia, 2017). A further significant example of the disconnect between the needs of the site against provincial and local needs concerns plans for large-scale conversion of forest in Aceh Province which would have a detrimental effect on the site's integrity.
The serious concern amongst environmental NGOs and the Committee regarding the Aceh Land Use Spatial Plan, the apparent ambiguity about which legal regime prevails, and the resultant litigation (HAkA et al., 2017a; World Heritage Committee, 2015; 2017) indicate that a regime protecting the World Heritage TRHS has not been effectively integrated into regional and local planning systems.
The establishment of National Strategic Areas (NSA) for all three components of the site is considered to be a positive step towards establishing effective buffer zones to regulate development and ensure that it is sustainable (IUCN, 2013), however, the effectiveness of this approach has yet to be demonstrated, and the full establishment of the entire serial site as an NSA is yet to be completed (IUCN Consultation, 2017).

► Management system

Some Concern

The property consists of three national parks, which are all public lands; the only exception is the Tambling Wildlife Nature Conservation (TWNC), a 45,000-ha conservation forest nested within the southern part of BBSNP and privately owned by Artha Graha Peduli (AGP Foundation); the management authority for all three national parks used to be the Directorate General of Forest Protection and Nature Conservation (PHKA) within the Ministry of Environment and Forestry (IUCN, 2013), but this has changed in 2015 to the Directorate General of Conservation of Natural Resources and Ecosystems within the same ministry (IUCN Consultation, 2017). Law enforcement responsibility has been transferred to the Directorate General of Law Enforcement, which has its Sumatra office in Medan and has no representative staff in management offices of the property (IUCN Consultation, 2017).

Collaboration between managers and NGOs on patrols and community liaison are frequent and welcome, but there appear to be no structured, transparent means for stakeholders to have input into the broader management of the property. There does not appear to be an accepted, transparent and

accountable framework of governance for the TRHS as a whole.

It is not clear whether the Ministry of Environment and Forestry has an overarching management system for the property as a whole. The need for an overall Management Plan was identified at the time of nomination (State Party of Indonesia, 2003); the State Party identified the need for a coherent approach between the three national parks that comprise the property (p.54); various programmes were identified but no common structured plan (p.58); management plans existed for each of the three national parks but there was a need “to coordinate the management of the three parks” (p.71). In 2007, the Committee urged the State Party to “establish an effective coordination mechanism between the three management units of the property so that it functions as one integrated World Heritage property, and for effective cooperation amongst different organisations and agencies involved in the property” (World Heritage Committee, 2007). There is no evidence that this has occurred.

► Management effectiveness

Serious Concern

Whatever the professionalism, hard work and good intentions of the managers, the state of conservation of the TRHS is undermined by the lack of enforcement and the proliferation of environmental crimes. The constantly looming threat of intrusive and destructive infrastructure within and around the property, in the form of proposals for roads, dams and geothermal development, is a symptom of poor governance and assessment structures. Management effectiveness is seriously undermined by all of the above, as well as by the apparent absence of an overarching management structure or plan for the property as a whole. The management system is clearly not adequate to maintain the property’s OUV and integrity, as demonstrated by the property’s inscription on the List of World Heritage in Danger, and by the disturbing level of high-impact environmental crime within the property.

► Implementation of Committee decisions and recommendations

Serious Concern

The 2014 Outlook said the State Party’s responses to Committee decisions had been slow and inadequate, hampered by intractable problems such as

ineffective law enforcement, poor boundary definition and lack of capacity; whilst the addition of the property onto the List of World Heritage in Danger (World Heritage Committee, 2011) had mobilised greater attention, there remained significant shortcomings in protection and management. This situation prevails in 2017. The State Party's positive assurances to the Committee often appear to lack the necessary follow-up measures at the local or provincial levels. Some Committee requests have effectively been ignored (for example, regarding provision of an EIA for the geothermal development at BBSNP). Ambiguity remains over the status of boundaries, roads and other developments. As a result, little progress has been made in implementing the corrective measures and towards achieving the Desired State of Conservation for the Removal of the property from the List of World Heritage in Danger (DSOCR).

► Boundaries

Some Concern

Confused boundaries occur throughout the site, both on paper and on the ground. This is especially so in GLNP where a confused chronology of land tenure and boundary changes has occurred since the park's declaration in 1980 (IUCN Consultation, 2013). The confused boundary issue creates conflict over land tenure and so exacerbates encroachment impacts. It has also resulted in misperceptions between the park authorities and the Aceh Provincial Government (State Party of Indonesia, 2013), as well as at the district level (IUCN Consultation, 2014). The maps of the three components of the TRHS published online by UNESCO are of poor resolution, with the GLNP, in particular, defined by lines of such regularity as to be totally inconsistent with on-the-ground realities (UNESCO, 2017c). HAkA et al. (2017a) show two versions of the TRHS boundary for the GLNP component and say that the differences between UNESCO, the State Party and IUCN occur because certain provisions of Indonesian law have not been properly enacted. As a result, they say, current exercises in marking, maintaining and restoring boundary markers on the ground for the GLNP component of the property are "an exercise in futility".

In 2009, the Committee requested that the State Party submit a proposal to amend the property's boundaries to incorporate more habitat of key species and to exclude areas that no longer contributed to OUV (World Heritage

Committee, 2009). That has not occurred.

▶ Sustainable finance

Some Concern

The inscription of the TRHS on the List of World Heritage in Danger has mobilised some additional resources to more strategically address threats and management needs; however, long-term sustainable financing remains to be secured, and should be adequately allocated to address the threats to the site.

▶ Staff training and development

Some Concern

IUCN, 2013 identified the capacity of park-management staff as a serious problem. The significantincrease in recent patrols and the resultant training described by the State Party (State Party of Indonesia, 2017) is a large positive step. The engagement of local communities in patrolling and forest fire prevention should complement management and law enforcement activities (IUCN, 2013).

▶ Sustainable use

Serious Concern

Uses of the property such as poaching, illegal logging and encroachment are prevalent and widespread. These constitute unsustainable use of the property.

▶ Education and interpretation programs

Data Deficient

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▶ Tourism and visitation management

Data Deficient

The 2014 Outlook reported that an in-depth assessment of the current tourism market was to be carried out by UNESCO and State Party with a view to developing an ecotourism strategy for TRHS. No further information on this

has been found.

▶ Monitoring

Mostly Effective

The State Party has committed to a regular programme of monitoring for four flagship species (Sumatran elephant, rhino, tiger and orangutan) to assess their conservation status. The subsequent recent massive increase in patrols, the acquisition of improved equipment, and the use of methods such as camera trapping as described by the State Party (State Party of Indonesia, 2017) have greatly enhanced monitoring of the property. Monitoring of forest loss using remote sensing has been presented by the State Party with accompanying tables (State Party of Indonesia, 2017); a positive step. Analysis of data using long-term benchmarks (particularly benchmarks relevant to DSOCR) would improve this presentation.

▶ Research

Data Deficient

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Overall assessment of protection and management

Serious Concern

This serial property (consisting of three separate national parks) faces enormous challenges. There appears to be no overarching management structure or plan for the TRHS. Management appears to be undertaken on a park-by-park basis. Boundaries of the property (particularly the GLNP component) have yet to be clarified, a situation that renders on-the-ground demarcation an exercise of questionable merit in certain areas. There remain areas outside the property which would contribute significantly to OUV with respect to key species, and there remain areas inside the property that have been damaged so badly that they retain no contribution towards the property’s OUV. Recent legislative changes have made geothermal development a permitted activity within protected areas, creating a new area of uncertainty for managers (notwithstanding the State Party’s undertaking that it will not be permitted within the property). A recent welcome investment in patrols has improved monitoring but this has not been accompanied by a commensurate

improvement in law enforcement, which remains disturbingly inadequate. Contributing to this deficiency is the separation of responsibilities between two Directorate Generals, where the DG of Conservation of Natural Resources and Ecosystems has overall management authority over the property, whereas law enforcement is entirely under the responsibility of the DG of Law Enforcement (IUCN Consultation, 2017). It is crucial that representative staff of the DG of Law Enforcement are stationed within each of the management offices of the three component national parks of the property. The conservation of the Leuser Ecosystem has been jeopardised by the advent of the Aceh Spatial Land Use Plan, which critics say opens the way for a spate of roads and resource exploitation around – and potentially within – the GLNP component of the property. There appears to be no formal evaluation of the impacts of infrastructure developments (such as proposed hydro dams and geothermal developments) in close proximity to the property. It is therefore not clear how land managers can mitigate impacts of such developments on the property. In some cases, the World Heritage Centre and IUCN have yet to be formally notified of the existence or progress of such proposals. Relationships with stakeholders both inside and outside the property remain challenging. Environmental NGOs are having to tackle some of the issues affecting the property (the Aceh Spatial Plan, palm-oil development) in the courts, an uncertain and expensive process. The management system and authorities have therefore made little progress towards the DSOCR for the property and face a mammoth struggle to protect its OUV and integrity.

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

Serious Concern

The 2014 Outlook said that improvements have been made but many threats continue; the site sits within a highly developed landscape; poor boundary definition, a lack of coordination between the Ministry of Environment and Forestry and other provincial and local authorities together with weak law enforcement and the lack of a single coordinating management body for the Leuser Ecosystem conspired to undermine the effectiveness of managing the many external threats to this property. This remains the situation. An SEA for road development was conveyed to IUCN in March-April 2017 (UNESCO, 2017a); a comprehensive road strategy based on this document has yet to be published. Management of threats associated with geothermal

development adjacent to the BBSNP component of the property is made more difficult by the State Party's failure to provide an EIA on this development (as requested by the Committee). The World Heritage Centre and IUCN have yet to be formally informed of a proposed series of hydro dams in proximity or on the edge of the property. The impacts of these on OUV and integrity have yet to be evaluated, so their impacts on the property can only be speculated upon. Poaching, illegal logging, encroachment and new roads outside the property continue to impact on the integrity of the property. The boundaries of the property have yet to be clarified; there are no formal buffer zones adjacent to the property. Relationships with members of communities in close proximity to the property who wish to exploit natural resources remain a challenge.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ Exceptional scenic landscapes at all scales

High Concern
Trend:Deteriorating

Large-scale and widespread encroachment coupled with an opening up of forest areas through illegal logging (State Party of Indonesia, 2017) threaten the integrity of the aesthetic beauty of this site which acts as a backdrop to the lowlands of Sumatra. Geothermal energy development within and adjacent to the property, and hydro dams on the edge or in the vicinity, would exacerbate these impacts if they proceed. (EIAs may show otherwise but these have not been provided.) An SEA on road development has been provided to IUCN (UNESCO, 2017a), but it remains to be seen what form of strategy will be adopted for such developments and therefore whether OUV and integrity will be protected. The undertaking of the State Party not to approve new roads within the property (State Party of Indonesia, 2017) is welcome and should be enshrined in a legal instrument. The 2014 Outlook warned that invasive species in BBSNP are impacting on the landscape. A forest area of 252 ha has been the subject of restoration activities in the last

year (State Party of Indonesia, 2017) – a figure not keeping pace with forest loss, with 8,000 ha lost over the last four years in GLNP alone (State Party of Indonesia, 2017).

- **Outstanding examples of forest on the island of Sumatra for the conservation of the biodiversity of both lowland and mountain forest ecological processes.**

  High Concern
  Trend:Deteriorating

  Most of the threatening processes identified above affect lowland forest; mountain ecosystems are less affected due to greater difficulties of access and a lower suitability of the land for agricultural purposes, although a growing national and international demand for Arabica coffee appears to have potential to impact on upper hill and montane forests. The illegal logging, encroachment, proposed geothermal developments and proposed dams occur largely in lowland areas (Orangutan Centre, 2017). The threats and impacts above also pertain to the lowland components of the property. Poor management capacity coupled with ineffective integration with local development planning is limiting the capacity of park authorities to manage these threats. The situation is therefore serious.

- **Important and significant natural habitats for in-situ conservation of biological diversity of plant and animal species**

  High Concern
  Trend:Deteriorating

  There were 650 incidents of illegal logging and over 2,500 of encroachment reported by patrols from 2013 to 2016 (State Party of Indonesia, 2017a). The trend for both was dramatically upward during the four years. Forest loss remains a key concern (UNESCO, 2017a,), with conservation NGOs calculating that over 14,000 ha have been permanently lost since 2004 (Orangutan Centre, 2017). The impacts on integrity and crucial wildlife species of various projects adjacent to the property (geothermal next to BBSNP, Kluet hydro dam adjacent to GLNP, other hydro projects) cannot be assessed because EIAs have not been provided. The State Party’s undertaking not to issue a permit (State Party of Indonesia, 2017) for geothermal development within an area of critical habitat of the GLNP component of the property is very welcome and should be communicated

strongly to the relevant provincial authorities and the developer. As a result of the above continuing threats, impacts on natural vegetation, including rainforest, have continued and in some cases escalated, meaning that critical habitats are being degraded and, in many cases, lost. Poor management capacity coupled with ineffective integration with local development planning is limiting the capacity of park authorities to manage these threats. This situation could be exacerbated if proposed developments around the fringes of the property (dams, geothermal, roads) proceed. Designation of buffer zones outside the property as requested by IUCN and the Committee (World Heritage Committee, 2016) has not occurred.

► A critical habitat refuge for several globally significant and endangered species

High Concern
Trend:Deteriorating

It is feared that the Sumatran elephant population has shown a marked decline in BBSNP since 2002. In GLNP, the populations of Sumatran orangutan, Sumatran tiger, Sumatran elephant and Sumatran rhino are all decreasing (IUCN, 2012), although tiger populations are stable in areas that are subject to focused patrol and protection regimes (IUCN Consultation, 2014). Data on the populations of critical species remain inadequate to ascertain whether populations have stabilised (UNESCO, 2017a; HAkA et al., 2017a; b). Incidents of poaching reported by patrols are high, having increased from 102 in 2013 to 512 in 2016 (State Party of Indonesia, 2017). Only 30 arrests have been documented for that period, raising concern about whether law enforcement is able to keep pace with environmental crime. On the other hand, in KSNP at least, a very small number of individuals operating in organised gangs were responsible for the great majority of snares placed, so the small number of arrests versus the large number of poaching incidents documented may be misleading (IUCN Consultation, 2017). Poaching is facilitated by access, so the advent of new proposals for infrastructure (dams, roads, geothermal power plants) around the property could exacerbate this situation. Designation of buffer zones outside the property as requested by IUCN and the Committee (World Heritage Committee, 2016) has not occurred. No proposal for an extension to the property to include adjacent critical habitat for key species as requested by the Committee (World Heritage Committee, 2009) has been forthcoming. A

welcome increase in patrols (in 2016 occurring in 47 of 61 management units, or ‘resorts’); the plan for an Intensive Protection Zone and Rhino Sanctuary Centre at BBSNP (State Party of Indonesia, 2017), and initiatives on human–wildlife conflict should enable an improvement of the situation. A concerted effort on law enforcement remains essential, including by posting officers of the Directorate General of Law Enforcement at the national park management offices, and by providing the national parks with a budget for law enforcement.

Summary of the Values

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

High Concern

Trend: Deteriorating

It is important to highlight that although the threats are substantial and protection and management to date largely ineffective, the values of the site are still intact. That said, many of the flagship species are at a crossroads in terms of their long-term viability and external development pressures are adversely impacting their prospects. IUCN, conservation NGOs, missions to the site and the World Heritage Committee have repeatedly expressed serious concern about the impacts on the TRHS of encroachment, roads, wildlife poaching and illegal logging, as well as the potential impacts of geothermal energy development. A new threat has emerged in the form of proposed hydro dams around the periphery of the GLNP component of the property. The inscription of the TRHS on the List of World Heritage in Danger seems to be creating momentum to address the range of issues in a longer-term and more comprehensive manner, such as a massive increase in patrols and the preparation of an SEA on road development within the property. Unfortunately, such measures have not been accompanied by an improvement in law enforcement; a concerted effort is required on this front to prevent permanent loss of OUV and integrity. Similarly, the continued loss of forest must be halted and reversed in order to meet the requirements of the DSOCR. The broader landscape of the property continues to suffer from environmental degradation. The property attracts considerable international profile due to its formal status as a sanctuary for charismatic species such as the Sumatran rhino, tiger, elephant and orangutan (IUCN, 2004). It is difficult

to assess the overall status of these key species as the data provided by the State Party are not accompanied by an authoritative analysis pertaining to the benchmark levels of 2004, when the property was inscribed on the World Heritage List; what is known is that incidents of poaching remain alarmingly high with a disturbingly low level of arrests and prosecution (State Party of Indonesia, 2017). The State Party's commitment to comprehensive baseline monitoring of the four flagship species should improve the understanding of the health of these populations; ultimately, though, it is solid law enforcement that is necessary to deter poachers and other illegal exploiters. The outstanding qualities of the TRHS, though damaged, nevertheless remain. It is still an exceptionally beautiful landscape of mountains, rainforest and rivers, with extraordinary wild animals. Nevertheless, a concerted effort from the State Party and the international community remains essential to protect the property's OUV from the alarming level of impacts being suffered.

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

Data Deficient

Trend: Data Deficient

Additional information

Benefits

Understanding Benefits

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

The Leuser Ecosystem provides many environmental services to the surrounding region – valued at 400 million dollars per year. For instance, the water from the Leuser Ecosystem supports some 4 million people. An assessment of ecosystem services (water) from KSNP forests to the municipality of Sungaipenuh, Kerinci in 2011 valued water services for domestic consumption and rice field irrigation at 1.049 million Euros per year

(IUCN Consultation, 2014).

The main threat to the provision of water stems from the illegal conversion of rainforests to industrial plantations, mostly for palm oil, but also for rubber.

▶ **Soil stabilisation**

The steep slopes in the property experience heavy rainfall throughout the year, and are prone to landslides. Healthy forest cover is critical to stabilising these slopes.

As forests are illegally cut, there is a significant risk for landslides in the exposed areas.

▶ **Outdoor recreation and tourism, Natural beauty and scenery**

The property’s exceptional scenery, including the highest lake in Southeast Asia (Lake Gunung Tujuh), as well as its magnificent biodiversity, are of great interest to domestic and international tourists alike.

▶ **Wilderness and iconic features**

The wilderness and natural beauty of the property are attributes that are rare and diminishing in Southeast Asia and the world generally.

Summary of benefits

The values of TRHS for Sumatra’s scenic amenity, rich assemblages of wildlife and cultural assets should be translated wherever possible into tangible benefits for all stakeholders, particularly local communities. The site’s significant ecotourism potential should be harnessed through the proposed ecotourism plan. The site also provides significant ecosystem services, most notably the provision of valuable water supplies to the surrounding region and the prevention of landslides through retention of forest cover.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Flora & Fauna International (SE Asia)		Programmes for conservation of Sumatran tigers, orangutans and elephants; global trees campaign; marine conservation; human–wildlife conflict; law-enforcement partnerships; community action in Kerinci.
2	WCS		Worked on TRHS issues for many years and continue to do so.
3	Sumatran Orangutan Conservation Programme		Rescue, confiscation, quarantine and re-release of orangutans; habitat conservation; research and monitoring.
4	Jambi Community Forest Management Project (FFI and Lembaga Tiga Beradik)		Establishing community managed forest in KSNP buffer zones in 2 park edge districts in Jambi.
5	PanEco Foundation		PanEco leads the multi-stakeholder Initiative: Sumatran Orangutan Conservation Programme (SOCP) and about 35% of the world’s remaining Sumatran orangutans are within this site (Sumatran Orangutan Conservation Programme, 2017).
6	Lembaga Tumbuh Alami / AKAR Network		A network of NGOs working on community empowerment around KSNP. LTA and the KSNP park management authority have a programme of collaboration during 2012-2015.
7	Yayasan Orangutan Sumatera Lestari - Orangutan Information Centre (YOSL-OIC)		Education; community liaison; tree planting; liaison with government; human–wildlife conflict.
8	Yayasan Leuser International (YLI)		Monitoring of the population of Sumatran rhino and their habitat in GLNP, ecosystem restoration, awareness raising, Rhino Protection Units (RPUs).
9	Yayasan Ekosistem Lestari		Environmental outreach and education and community development.
10	YABI (Yayasan Badak Indonesia)		Rhino conservation in BBSNP, Rhino Protection Units (RPUs).

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