WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

TROPICAL RAINFOREST HERITAGE OF SUMATRA (INDONESIA) ID N°1167

1. DOCUMENTATION

i) **IUCN/WCMC Data Sheet:** Two references.

ii) **Additional Literature Consulted:** De Wilde, W.J.J.O. and Duyfjes, B.E.E. 1996. **Vegetation, Floristics and Plant Biogeography in Gunung Leuser National Park, in Leuser: A Sumatran Sanctuary,** Yayasan Bina Sains Hayati Indonesia; Flora and Fauna International, 2003, **The Ecological and Subsequent Social-Economic Impacts of Ladia Galaska**, Technical Memorandum, Sumatran Elephant Conservation Programme, FFI; Marshall, A.J., Jones, J.H., Wrangham R.W. 2000, **The plight of the apes: a global survey of ape populations.** Briefing paper. Department of Anthropology, Harvard University; Thornton, I. 1997, **Krakatau: The destruction and reassembly of an Island Ecosystem,** Harvard University Press; Whitten, T., Sengli J. Damanik, Jazanul Anwar, Nazzaruddin Hisyam, 2000, **The Ecology of Sumatra,** The Ecology of Indonesia Series, Vol. I Periplus.

iii) **Consultations:** Five expert reviewers. Ten external reviewers consulted. The mission met with experts and high-level representatives from the Directorate of Forest Protection and Nature Conservation (PHKA), Jakarta; the Ministery for Environment; Jakarta Office of UNESCO; Leuser Development Programme; North Sumatra Planning Board; Flora and Fauna International, Sumatran Elephant Programmme; National Park staff; Provincial authorities; Office for Investment, Culture and Tourism of Lampung Province.

iv) **Field Visit:** Peter Hitchcock, January, 2004.

2. SUMMARY OF NATURAL VALUES

The Tropical Rainforest Heritage of Sumatra (TRHS) nomination comprises three widely separated protected areas on the island of Sumatra, one of the larger islands and westernmost of the Indonesian archipelago of some 17,000 islands.

By way of introduction, Indonesia occupies only 1.3% of earth's land surface, its 17,000 islands include more than 10% of the world's flowering plants, 12% of the world's mammal species, 17% of all reptiles and amphibians and 17% of the world's bird species (BAPPENAS 1993). This extraordinary biological richness is the reason why Indonesia is recognised as one of the 7 megadiverse countries, containing 2 of the world's 25 'hotspots' (areas of high diversity as defined by Conservation International – CI). Of the 200 WWF Global Ecoregions, 18 are located in Indonesia – 11 terrestrial, 4 freshwater and 3 marine.

Sumatra comprises part of the WWF "Sundaland" hotspot and is the location of the 'Sumatran Islands Lowland and Montane Forests Ecoregion'. Whitten (2000) estimated the original vegetation cover of Sumatra to include 5,680,000 ha of montane forest and 25,154,000 ha of tropical evergreen lowland forest. The lowland tropical forests have been largely destroyed in recent decades (circa 20% remaining, mostly as small remnants) and montane forest is increasingly threatened by logging and agricultural encroachment.

The biodiversity of the forests of Sumatra is exceptional. There are an estimated 10,000 species of plants, including 17 endemic genera. This very diverse flora is in large part shared

with other parts of the West Malesian region that extends from southern Thailand to the island of New Guinea. The part of Sumatra north of Lake Toba includes a distinctive Sumatran flora (de Wilde and Duyfjes 1996), most distinctive in the montane and sub-alpine vegetation, especially the '*blang'* forest.

Animal diversity in Sumatra is also impressive, with more than 200 mammal species and some 580 bird species of which 465 are resident and 21 are endemics. Of the mammal species, 22 are Asian species not found elsewhere in the Indonesian archipelago and 15 are confined to the Indonesian region, including the endemic Sumatran orangutan.

Geologically, Sumatra is located on the southern edge of the Asian tectonic plate adjacent to the oceanic floor section of the Austro-Indian plate that downthrusts beneath the island. The collision of the two plates has created the uplifted mountain range, the Bukit Barisan Range, extending the full 1680 km length of the island with many active volcanoes.Climatically, GLNP, KSNP and the western part of BBSNP fall within Type A (wet) of the Schmidt and Fergusson climate classification. The southern part of BBSNP is drier and is akin to a Type B climate, with an annual dry season of 5 months.

Turning now to the nomination, this has total core area of **2,595,125** hectares, the nomination comprises three national parks (Taman Nasional) established under national legislation of the Republic of Indonesia:

- Gunung Leuser National Park (GLNP) (established in 1980) 862,975 ha.
- Kerinci Seblat National Park (KSNP) (established in 1992) 1,375,350 ha.
- Bukit Barisan Selatan National Park (BBSNP) (established in 1982) 356,800 ha.

All three parks are located on Bukit Barisan range, that runs from Aceh in the north-west to Bandar Lampung in the south-east. Together they represent whole or part of the three most significant remnant 'islands' of the once vast Sumatran forests.

The nomination includes the highest mountain in Sumatra, Gunung Kerinci (3,800 m). This is also Indonesia's highest volcano and remains very active. Since both GLNP and BBSNP have minor frontages to the Indian Ocean, the altitudinal range of the nomination extends from the highest mountains on Sumatra to sea level. Thus all three protected areas in the nomination exhibit a wide altitudinal zonation of vegetation, from lowland rainforest to montane forest, extending to sub-alpine low forest, scrub and shrub thickets in GLNP and KSNP. But most of the nominated parks are mountainous with only small lowland areas (for example, 12% of GLLNP is below 600m). The nominated areas are therefore more characteristic of the Bukit Barisan Mountain Range than of Sumatra as a whole, which is otherwise predominantly lowland with very extensive floodplains.

GLNP is a part of one of 18 regions in Indonesia classified by the WWF as part of the 200 Global Ecoregions of importance for conservation of the world's biodiversity. The distribution of some species of animals in Sumatra is believed to provide evidence of the role played by the Toba tuff eruptions 75,000 years ago. For example, the Sumatran orangutan is not found south of Lake Toba and the tapir is not found north of it. Further, the high level of endemism in the mammals and birds is presented as evidence of the bridge-barrier relationship between the Sumatra biota and that of mainland Asia as a consequence of sea level changes. Despite periodic land bridges to Asia, Sumatra has developed a high endemicity, an important natural process well represented in the nominated sites. The altitudinal range and connectivity between diverse habitats in the nominated sites, in particular in GLNP and KSNP, would have facilitated on-going ecological and biological evolution.

There are no formal buffer zones included in the nomination. However, GLNP is the core of a tract of protected lands comprising the Leuser Ecosystem. This is of great conservation significance in itself but is also a critically important buffer zone to the park. There are other protected lands adjoining KSNP and BBSNP presently representing effective buffers but due to extensive illegal logging and encroachment, these can no longer be assumed to be permanent buffers.

3. COMPARISONS WITH OTHER AREAS

The geology of the TRHS is typical of the region. The TRHS includes two sample transects across the Sumatran subduction zone with largely intact naturally vegetated landscapes, incorporating sections of the uplift, rifting and volcanic zones. KSNP provides a transect with a very clearly defined rift valley and associated volcano, the largest in Indonesia. Whilst these represent important earth science values, they are features that are widespread throughout the region, and are not the basis of a distinctive claim for outstanding universal value.

From a biodiversity and ecological perspective, there is no comparable area within Indonesia, although a cluster forest site in Borneo has been nominated for examination in 2004/2005. However, the TRHS has significantly higher mammal diversity than the island of Borneo, which lacks many of the larger Sumatranm ammals, which are endemic to that island.

Although many of the Asian mammals once extended further east in the archipelago, extensive clearing, intensive agriculture and other human activity has progressively eliminated at least the larger mammals and their habitat from Bali and Java. The only other existing large World Heritage site in Indonesia is Lorentz National Park in Papua which is located in a completely different biogeographic realm (Australian realm).

Although Ujung Kulon National Park World Heritage site is just across the Sunda Strait from BBSNP, its very much smaller size and lesser biodiversity, means that it does not compare with either BBSNP or the TRHS nomination as a whole. There is also little basis for comparison with the Komodo National Park World Heritage site in eastern Indonesia where the primary values are the endangered 'komodo dragon' species and adjacent marine areas. Looking more widely, none of the mainland Asian sites exhibits the effect of sea-level oscillations on the on-going biological evolution, evidenced by the high level of endemism in Sumatra. Indeed, the TRHS needs to be compared with other places in the South Eastern Asian biogeographic region, as well as elsewhere in the tropical world. At the global level, the biodiversity of the TRHS nomination compares very favourably with that of other World Heritage sites. The best test of comparison is to compare like-with-like, using Manu National Park (Peru) and the Central Amazon Conservation Complex (CACC, Brazil), which includes Jau National Park, in the high biodiversity Amazon forests of Brazil, as shown in Table 1 below.

Table 1: Comparison of biodiversity between the nominated site and other World Heritage sites

Biodiversity class	**Mammals**	**Birds**	**Reptiles & Amphibians**	**Fish**
Protected Area				
TRHS (nominated area)	Circa 180	Circa 450	Circa 200	30+
2,595,124 ha				
Manu NP (Peru)	99	850	120	Circa 200
1,532,806 ha				
CACC, Brazil	120	411	Circa 150	320
5,232,018 ha				
Thungyai-Huai Kha Khaeng, Thailand	120	400	139	113
622,200 ha				
Lorentz NP, Indonesia 2,350,000 ha	41	274+	150+	Circa 100

The nominated site clearly excels in the high biodiversity of mammals when analysed at a global scale and one of the highest biodiversity of birds only after Manu National Park that protects 15% of all the birds species of the world. The broadly comparable diversity when compared with the much larger CACC is not surprising, given the much greater altitudinal range and hence habitat diversity of the Sumatran sites.

The large mammals of the TRHS (tiger, elephant, rhinoceros, tapir, sunbear and orangutan) are indicators of the Asian realm. The regions that need to be directly compared are the island of Java, peninsular Malaysia, Thailand, Myanmar, Borneo, Vietnam and Laos. Both Java and Sumatra have been periodically linked by land bridges in a geological timescale to Asia. However, Sumatra demonstrates an evolutionary divergence in response to longer isolation.

The Sumatran sites are distinguished by the high level of endemism, including the three Sumatran endemic large mammals. However, at the generic level, the most comparable sites are several in Malaysia and Thailand which share with the TRHS several large mammals, including the tiger and elephant, but lack the high plants and animals endemism of the Sumatran taxa, among montane biota.

In summary, the features of the TRHS that make it globally and regionally distinct from other existing World Heritage sites in biodiversity terms are:

- Very high fauna biodiversity rating at the global level;
- In SE Asia, overall fauna and flora biodiversity comparable only with some Borneo prospective sites.(e.g. 4,000 + plant species);
- The highest mammal diversity in insular SE Asia (incl. 22 Asian species not found elsewhere in insular SE Asia);
- Critically important habitat for many rare and threatened faunal species.(e.g. 58+ birds on 2000 IUCN Red List of Threatened Species);
- Critically important habitat for four threatened large mammals , three of which are Sumatran endemics (tiger, elephant, orangutan);
- Outstanding climatic refugial value for many species, and outstanding habitat diversity over a large altitudinal range (from sea level to 3,800 m);
- The presence of outstanding diverse and distinctive 'Asian' montane biota.

Finally, in terms of landscape and natural beauty, the TRHS cluster differs from the distinctive landscapes of both Kinabalu Park and Gunung Mulu National Park in Malaysian Borneo. It differs too from Taman Negara in peninsular Malaysia and the Thungyai - Huai Kha Khaeng Wildlife Sanctuaries (Thailand). All the above lack the volcanic component of the TRHS. Unlike Kinabalu Park and Gunung Mulu National Park, the natural beauty of the TRHS is mostly dispersed and often of a smaller scale, including many individual beautiful features, such as alpine landscapes, waterfalls, lakes, caves and rivers. Although Ujung Kulon National Park includes the remains of one of the world's most famous volcanoes, Krakatau, its scale and spectacle is not comparable to the volcanoes in the nomination such as Gunung Kerinci volcano in KSNP (3,404 m). This mountain is a 'classic' and active stratovolcano, the highest indeed in SE Asia (3,800 m). Moreover, the site is remarkable as the only nominated one in SE Asia with active volcanoes embedded in tracts of rainforest.

4. INTEGRITY

4.1. Legal Status

All three nominated parks are public lands designated as national parks by the Government of Indonesia. National Park status is the appropriate level of legal protection in Indonesia. The managing authority of all three nominated sites is presently the Directorate General of Forest Protection and Forest Conservation (PHKA) within the Ministry of Forestry. The nomination refers to the handover of management of the Leuser Ecosystem from the Leuser Management Unit to the Leuser International Foundation (LIF) in 2004. The home page of the LIF advises that it has a thirty year concession over the Leuser Ecosystem. The GLNP, however, will continue under PHKA management.

4.2 Management

Park rangers (mainly Polisi Hutan or Forest Police) administrative staff and technicians are employed at each park. Staff may from time to time be formed into special units such as a 'Rhino Management Unit'. Total staff numbers however (GLNP – 237, KSNP – 162, BBSNP – 127) suggest a greater management capacity than is the case. There is a need for increased training and resourcing to achieve greater effectiveness, especially in law enforcement. Whereas base salaries of staff are funded, in almost all cases there is a serious lack of resources for effective field routine management: for example, a shortage of vehicles severely limits mobility of field staff..

Management plans, as required by Indonesian law, exist for all three parks. However, many staff are not conversant with them, suggesting the need for a more concise document for briefing and training purposes.

The level of involvement and cooperation of local communities, including local government, in management of the parks, vary greatly within the nominated areas. In some cases, local communities and local government are seen by managers as a serious threat to the parks: in others they are playing a supporting role. In KSNP with a memorandum has been developed between 14 or more local governments and the park management: a commendable initiative. Even so, the level of support by local government has declined since management has opposed the opening of new roads through the park and demonstrated increasing effectiveness in anti-poaching and anti-logging activities within it. The operation of two large international aid projects in KSNP (GEF) and GLNP (part of EU sponsored Leuser Management Unit) resulted in a great deal of consultation and interaction with local communities on many aspects of park and wildlife management.

It is apparent that the financial resources available over the past decade have varied greatly within each site, as well as between sites, as shown in Table 2. Further major changes are imminent as a result of recent and pending cessation of several international aid programs.

Table 2: Trends in financial resources to nominated sites (indicative only)

Budget Period	GLNP	KSNP	BBSNP	Total
1984/85-1994/95	US$63,886.00 (70% from National budget)	Approx. average annual budget - US$6,546,960. Most funding since 1996 came from the KS-ICDP Project* totalling US $46 million. This project finished in 2002.	Most funding came from National Budget	
1984/85–1994/95	US$63,886.00			
2000	US$192,696.00 ($96,460 from National budget; $13,635 from Gunung Leuser Mgt. Strengthg. Fund)			
2001			US$240,450	
Annual Funding (approx. only)	US$190,000	US$6,546,000*	US$240,000	*US$6,976,000

*Note: The KS-ICDP project has now finished.

All three nominated parks have outstanding tourism potential. However, a variety of factors are impeding or preventing significant tourism development. These include inadequate strategic planning for tourism; totally inadequate infrastructure in parks; poor road infrastructure in some localities outside parks; lack of certainty in protection of the natural resource; illegal activities continuing to degrade the resource (e.g. logging along scenic forest routes); and security problems in Nanggroe Aceh Darussalam (NAD). If these issues are

addressed tourism could be an important alternative to provide additional funding for managing these parks.

4.3. Boundaries

Gunung Leuser National Park
GLNP is one component of a much larger block of high quality wildlife habitat and natural landscape known as the 'Leuser Ecosystem'. The Leuser Ecosystem provides major habitat for four threatened and critically threatened Sumatran endemic large mammals exist here, including the Sumatran Orangutan (critically endangered - CR), the Sumatran Tiger (CR), the Sumatran Elephant (endangered, IUCN Red List) and the Sumatran Rhinoceros (CR). GLNP, embedded in the Leuser Ecosystem, contains habitat of all four species though does **not** contain '*the most important habitat*' of three of those species (elephant, tiger and orangutan) in the region. Furthermore, GLNP is the only part of the cluster nomination that falls within the range of the critically threatened endemic Sumatran orangutan: while it contains important orangutan habitat, much of the critically important habitat is located outside the nominated area in the surrounding Leuser Ecosystem.

Unfortunately, some of the best evidence of significant on-going ecological and biological processes is contained in the part of the Leuser Ecosystem outside the nomination. For example, the recent discovery of evolutionary adaptation in a population of orangutans (use of tools) is limited to a population outside of the nominated GLNP. The most important areas of high biodiversity of the Leuser Ecosystem outside GLNP are mainly (i) the Singkil Barat Wildlife Reserve, (ii) Langsa lowlands and foothills, and (iii) the Aceh Highlands and the Tapaktuan lowlands. The Singkil Barat Wildlife Reserve alone is a threatened lowland swamp forest and considered by the Leuser Management Unit as being of global significance for conservation of the Sumatran orangutan.

In addition much of the regional scale migration of the Sumatran elephant in the Leuser area largely takes place outside of GLNP in the Leuser Ecosystem. Furthermore, the Policy Dialogue on World Heritage Forests held in Berastagi, Sumatra in December, 1998 paid particular attention to the nearby Leuser Ecosystem. The Berastagi proceedings refer to both BBSNP and KSNP but specify the Leuser Ecosystem instead of the smaller component GLNP. Limiting the nomination to the Gunung Leuser National Park section of the Leuser Ecosystem creates an anomalous situation and fails to meet international expectations from this important serial site nomination.

Kerinci Seblat National Park
KSNP is by far the largest of the three nominated areas. Whilst many of its boundaries interface with developed lands or highly degraded lands, some boundaries adjoin critically important habitat that currently functions as an integral part of the park ecosystem. With development proceeding apace outside the park, some of those boundaries will become very problematic, especially for the larger mammals. For example, the western boundary of the park between Padang and Benkulu transects tiger and elephant habitat. If development is allowed to extend up to the park boundary in such locations, the park will become very much more difficult to manage, unnecessary people/wildlife interaction will occur, and long term survival prospects for the larger mammals will be greatly diminished.

There is clearly a case for urgent review of the boundary of KSNP with view to identifying opportunities for protection of additional habitat critical to the larger endangered mammals. In particular, there are a number of adjoining logging concessions in which logging has been completed but which remain important habitat for larger mammals. There is also a critical habitat link between the east and west blocks of the park that requires urgent protection.

Bukit Barisan Selatan National Park
The existing boundaries of BBSNP are adequate for the purpose of the nomination. Smallest of the three nominated sites, BBSNP has greater pressure from surrounding developed lands. Nonetheless,, some adjacent protected forests and degraded forest lands are of complementary importance as habitat for the larger mammals, in particular for tiger, elephant and to some extent rhinoceros. Two of the three species are critically endangered and their

survival will depend very much on the protection and management of populations outside the national park, either as future additions to the park or as managed buffer zones. Failure to initiate protection and management of large mammal populations and/or their habitat outside the park will ultimately threaten the survival of the park.

4.4. Human Impact

There are four fundamental and related threatening processes that are continuing to impact on the nominated sites. The common denominator in all cases is access provided by roads and the failure to enforce the law effectively. Roads in tropical forests where law enforcement is ineffective are 'the beginning of the end' for rainforest ecosystems, facilitating illegal logging, encroachment, poaching and other ecologically degrading activities. The nominated Sumatran forests are no exception.

4.4.1 Illegal Logging

The unsustainable exploitation of tropical forests in Indonesia has degraded or destroyed so much of the lowland forests that timber exploitation is now increasingly dependent on illegal exploitation of protected areas, including national parks. This problem is very evident throughout Indonesia and attempts to control it have been largely ineffective. Illegal logging is a threat in all three areas and can be expected to reach a crisis point in the next few years as timber supply from outside the protected areas continues to rapidly decline. The international linkages in the illicit timber trade are presently the subject of a dispute between the Malaysian and Indonesian governments. A number of people interviewed asserted that illegal logging in Sumatra was highly organised, from the forest to the port, and that Sumatran timber was being exported as certified timber from other countries. Illegal logging is now very much a national issue currently being debated in Indonesia, both as an election issue and a matter that the President is publicly trying to address.

4.4.2 Encroachment

Encroachment into forest areas, including national parks, for subsistence agriculture and industrial plantations has now reached a critical point in many parts of the country. The three nominated parks are no exception to this general pattern. Significant recent organised illegal encroachments into a rare tract of lowland rainforest in GLNP were claimed by informed sources to have been an illegal operation facilitated as a 'business venture'.

4.4.3 Poaching

A combination of economic and social issues, combined with improved accessibility has intensified poaching of wildlife, in particular of elephants, tigers and rhinoceroses. All three nominated parks have a poaching problem that threatens the larger mammals. With international assistance, great effort is being put into anti-poaching activities in several of the parks, particularly KSNP.

4.4.4 Roads

As already noted, roads within and near the nominated sites facilitate forest and wildlife destruction.. KSNP is threatened by several road proposals that would cross critically important parts of the park. Those road proposals are currently being publicly debated and there is no guarantee that they will be cancelled.

GLNP, together with the surrounding parts of the Leuser Ecosystem, is also seriously threatened by a major highway proposal and several other road proposals. The proposed Ladia Galaska road traverses the northern section of the Leuser Ecosystem. Although it does not directly cross the GLNP, it will seriously impact on the park by changing the accessibility of the highland parts of the park. Its impact on the greater Leuser Ecosystem will be even greater; as well as facilitating illegal logging it will seriously impact on the critically important habitat of the Sumatran elephant. Although the road is a local initiative, it has now been approved-in-principle by Central Government. However, there appear to be dissenting opinions about the scheme in parts of the Government and the President has become involved in the issue.

4.5 Other Threats

4.5.1 Law Enforcement

Deficiencies in law enforcement probably represent the greatest single threat to the long-term survival of the natural heritage values of the nominated sites. Informal evidence gathered during the mission confirms that law enforcers often fail to uphold the law and instead seek financial gain from illegal activities. Most concerning is evidence of government officials involved in illegal logging in national parks. It was repeatedly asserted to the mission that military personnel participated in or controlled illegal logging operations, especially in the Aceh section of the Leuser Ecosystem. The involvement of law enforcers in illegal operations makes it doubly difficult for the park managers, PHKA, to obtain cooperation and support for their law enforcement. In the absence of major improvements in the effectiveness of law enforcement in the nominated sites, their long-term viability cannot be assured and much of their natural heritage values must be considered under serious threat.

There is some good news: with support from the police, recent convictions have been secured in cases of tiger poaching and illegal logging in KSNP. And the issue of illegal logging is now very much a national one, and has been raised in the course of both parliamentary and Presidential elections.

4.5.2 Decentralisation

There are presently some problems arising in terms of the authority of local government in national parks arising from the 'Otonomi Daerah' legislation that devolves a lot of powers from central government to local government. Provincial Governments are also exercising some powers in national parks in Indonesia. The confusion has the potential to threaten the integrity of the nominated parks and needs to be resolved.

4.5.3 Management Resources

As noted above, the adequacy of resources for management of the TRHS is an issue. Further, more support is urgently needed from law enforcement partner agencies , such as the police. This is an issue acknowledged by PHKA staff and a foreign aid project has been initiated to try to deal with it.

4.5.4 International Assistance

Both KSNP and the Leuser Ecosystem (including GLNP) have benefited from major international assistance in natural heritage management. In BBSNP however there is a low level of international assistance and resources and management are inadequate. The European Union funded the Leuser Management Programme, which has provided excellent data to assist in the planning and management of the Leuser Ecosystem, including GLNP. With cessation of major funding to KSNP in 2002, and the finalisation of the Leuser programme late in 2004, a major shortfall in management resources for the TRHS will arise. Major new international funding for all three sites, especially for BBSNP, will be critically important to their survival as protected areas.

5. ADDITIONAL COMMENTS

Justification for Serial Approach

When IUCN evaluates a serial nomination it asks the following questions based on the requirements in the Operational Guidelines:

a) What is the justification for the serial approach?

The main justification for the serial approach is that together the three parks form the cores of the three regions that offer the greatest potential for long term conservation of the distinctive and diverse biota of the island of Sumatra, including many endangered species. The three sites, all located on the Bukit Barisan mountain chain, in combination also provide biogeographic evidence of the evolution of the island of Sumatra and its rich biota. Together, the three sites include much of the critically important habitat necessary for long term

conservation of critically endangered species, in particular the large mammals endemic to Sumatra.

b) Are the separate elements of the site functionally linked?

The three separate elements of the nomination are essentially not functionally linked, particularly at the large mammal level. Unlike a number of existing serial World Heritage sites, the lack of functional linkages between the three components of this nomination raises questions about the appropriateness of them being considered legitimate parts of a serial nomination. Whereas both the Leuser Ecosystem and KSNP could independently qualify as World Heritage, BBSNP would be in doubt. BBSNP nonetheless makes a significant contribution to the biodiversity significance of the nominated sites by contributing populations of numerous rare or endangered species. BBSNP retains some semblance of a functional habitat link with KSNP but without a concerted effort, this corridor is likely to be eliminated by development over time.

c) Is there an overall management framework for all the units?

There is not presently an overall coordinated management framework for the three units but some coordination initiatives are proposed in the nomination document, which are to be implemented upon World Heritage listing. From a conservation viewpoint, greater cooperation and coordination between the three sites would be beneficial for effective management of each of the sites. Similarly, across the Sunda Strait, the Ujung Kulon World Heritage site would benefit from being included in coordinated management programs with the TRHS sites, more particularly BBSNP as many management issues are similar, e.g. rhinoceros management.

6. APPLICATION OF CRITERIA / STATEMENT OF SIGNIFICANCE

The Tropical Rainforest Heritage of Sumatra has been nominated under all four natural criteria.

Criterion (i): Earth's history and geological features

The site has important earth science values, represented in cross sections across the main mountain range of Sumatra. However the fact that the feature is widespread within the wider region, does not support a distinctive claim for inscription under criterion (i). IUCN considers that the nominated site does not meet this criterion.

Criterion (ii): Ecological processes

The nominated areas represent the most important blocks of forest on the island of Sumatra for the conservation of the biodiversity of both lowland and mountain forests. This once vast island of tropical rainforest, in the space of only 50 years, has been reduced to isolated remnants including those centred on the three nominated sites. The Leuser Ecosystem, including the nominated GLNP, is by far the largest and most significant forest remnant remaining in Sumatra. All three nominated sites would undoubtedly have been important climatic refugia for species over evolutionary time and have now become critically important refugia for future evolutionary processes. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance

The TRHS sites are all located on the prominent main spine of the Bukit Barisan Mountains, known as the 'Andes of Sumatra'. Outstanding scenic landscapes abound at all scales. The mountains of each site present prominent mountainous backdrops to the settled and developed lowlands of Sumatra. The combination of the spectacularly beautiful Lake Gunung Tujuh (the highest lake in SE 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 and numerous waterfalls and cave systems in lush rainforest settings, emphasise the outstanding beauty of TRHS. IUCN considers that the nominated site meets this criterion.

Addition of the Leuser Ecosystem to the nomination, as discussed above, would greatly enhance qualification on this criterion with its magnificent mountain forests, coastal swamp forests and natural beaches and the relative abundance of large mammals.

Criterion (iv): Biodiversity and threatened species

All three components of the nomination are areas of very diverse habitat and exceptional biodiversity. Collectively, the three sites can be expected to include more than 50% of the total plant diversity of Sumatra. At least 92 local endemic species have been identified in GLNP. The nomination contains populations of both the world's largest flower (*Rafflesia arnoldi*) and the tallest flower (*Amorphophallus titanium*)

The relict lowland forests in the nominated sites are very important for conservation of the plant and animal biodiversity of the rapidly disappearing lowland forests of South East Asia. Similarly, the montane forests, although less threatened, are very important for conservation of the distinctive montane vegetation of the TRHS.

The rapid and extensive destruction of the rainforests of SE Asia, Sumatra in particular, will continue to increase the already outstanding importance of the TRHS nomination for biodiversity conservation. The diversity of landscape, altitude, geology and habitat type will facilitate longer-term survival of many species through periods of climatic change.

IUCN considers that the nominated site meets criterion (iv).

Although the three nominated sites meet criterion (iv), qualification against this criterion would have been greatly enhanced if at least the critical habitat of endangered large mammals in the Leuser Ecosystem had been included in the nomination. The Leuser Ecosystem contains the most critically important habitat of the Sumatran endemic orangutan and elephant and some of the most important habitat of the endemic Sumatran tiger. For instance, Marshall, Jones and Wrangham (2000) note that 47% of the orangutan habitat in protected areas will be lost in the next decade, with less than 1% of habitat undisturbed by 'infrastructural' development by 2030. There is clearly an urgency to secure this critically important habitat.

7. RECOMMENDATIONS

7.1 IUCN recommends that the World Heritage Committee **inscribe** the Tropical Rainforest Heritage of Sumatra on the World Heritage List under natural criteria (ii), (iii) and (iv).

7.2 IUCN further recommends that the Committee should advise the State Party to consider extending the WH site to include other Leuser Ecosystem protected lands surrounding Gunung Leuser National Park, particularly the Singkil Barat Wildlife Reserve, Langsa lowlands and foothills, Aceh Highlands and the Tapaktuan lowlands. Such action should however be not be proceeded with until the integrity questions referred to in section 7.3 have been addressed and the mission called for on 7..4 comleted satisfactorily.

7.3 IUCN also recommends that the World Heritage Committee should at the same time **inscribe the site on the List of World Heritage in Danger** on the basis of Operational Guidelines 83 (i) Ascertained Danger.

Given the type and immediacy of the identified threats, it is important that the Government of Indonesia, with the assistance of the international community, responds with urgency to ascertained threats facing the three components of this serial nomination. In particular IUCN recommends:

i) a major coordinated effort, to address the serious threats posed to the nominated sites by on-going illegal logging and agricultural encroachment;

ii) urgent review of the Ladia Galaska Road, especially its likely serious impacts on both the nominated Gunung Leuser National Park and the surrounding Leuser Ecosystem;

iii) a coordinated effort to secure longer-term international assistance (especially for capacity building) to better protect and manage the nominated sites, with highest priority being for Bukit Barisan Selatan National Park;

iv) protection of the critical habitat 'missing link' across the Merangin River between the main eastern and western blocks of the Kerinci Seblat National Park;

v) a special funding project to urgently replace the many derelict visitor facilities and infrastructure and to develop a ecotourism/visitor management strategy in Bukit Barisan Selatan National Park.

7.4 IUCN advises the Committee to request the State Party to agree to invite a mission to the site within 2 years of its inscription. Based on the report of that mission, the Committee will need to decide whether to remove the site from the List of World Heritage in Danger, to retain it on that List of World Heritage in Danger or to remove it from the World Heritage List altogether.

7.5 Finally, IUCN recommends the Committee to request the State Party to submit detailed topographical maps clearly showing the boundaries for each site as soon as possible.