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## Forests of Borneo

### Forest location and brief description

Located in the equatorial region of the Pacific Ocean, Borneo is the third largest island in the world. The island is nearly 740,000 km<sup>2</sup>, sparsely populated by humans, and one of the world's most important biodiversity centres.

Three countries occupy Borneo – Brunei Darussalam, Indonesia and Malaysia. The Malaysian region of Borneo is divided into two states, Sarawak and Sabah, and the largest part of Borneo (72,000 km<sup>2</sup>), belonging to Indonesia, is called Kalimantan.

Borneo contains a wide variety of forest habitats, including mangroves, peat swamps and freshwater swamp forests, mixed dipterocarp forests, montane forests and forests on limestone and ultrabasic soils. The island is also home to the largest heath forests in Southeast Asia.

The tropical rainforest of the area popularly known as Heart of Borneo covers almost 30 per cent of the island and represents one of the largest contiguous forests remaining in all of Southeast Asia. Totalling approximately 24 million hectares, these forests possess staggeringly high endemism levels across all groups of plants and animals. They are one of the only two places on Earth where orang utans, elephants and rhinos still co-exist, and currently large enough to maintain viable populations of these species. The central highlands are the location of the headwaters of Borneo's major rivers, the protection of which is critical in ensuring clean water and food (fish) supplies to a large number of human settlements.

### Unique qualities of forest area

Of the 200 most important habitats for biodiversity worldwide, five are located in Borneo, including: the lowland dipterocarp forests, with tree cover reaching heights of over 60 metres and holding as many as 1,000 insect species in one tree; and the montane forests of Borneo, which support an abundance of oak, chestnut and myrtle species, and are one of the most diverse montane habitats on Earth.

Borneo has some of the highest levels of plant diversity on Earth, with approximately 15,000 plant species, of which 6,000 are endemic. In fact, Lambir Hills National Park in Sarawak has the highest tree diversity in the world, with 1,175 species in a 52-hectare plot.

## Forest Area Key Facts & Carbon Emissions from Deforestation

- Deforestation and forest degradation account for more than 83 per cent of Indonesia's and more than 80 per cent of Malaysia's total carbon emissions.
- In the Kalimantan forest fires of 1997/98, carbon emissions were so high that Indonesia became one of the world's largest polluters.
- The peat swamp forests of Central Kalimantan store the largest amount of carbon in Borneo – 6.4 Gt, or about 10 times that of the UK's total greenhouse gas emissions in 2005.
- A recent WWF study estimated that the economic value of carbon contained in nearly 2 million hectares of forests in Kalimantan is approximately US\$2.7 billion, with a minimum likely value of US\$500 million and a maximum likely value of US\$7.1 billion.



In addition to orang utans, elephants and rhinos, Borneo also houses lesser-known species such as the sun bear, banteng (wild ox) and endemic Bornean gibbons. Surveys conducted throughout the area have established that there are well over 200 bird species, approximately 150 reptiles and amphibian species, and almost 100 mammal species. New species are constantly being found. Between 1994 and 2004, at least 361 new species have been identified in Borneo. A recent WWF report showed that in 2006 alone, scientists had identified at least 52 new species of animals and plants, including 30 unique fish species, two tree frog species, 16 ginger species, three tree species and one large-leafed plant species. Scientists also recently agreed that Borneo's clouded leopard is an entirely new cat species. For a long time, it was thought to be the same species as that found in mainland Southeast Asia.

Borneo's forest area is also inhabited by about 4 million indigenous peoples, or Dayak (meaning "interior" or "upriver" person), with hundreds of different ethnic groups, each with a distinct language and culture.

Most of Borneo's major rivers originate in the uplands; the highlands are a source for at least 14 of the island's 20 major rivers. Maintaining the forests in good condition is therefore vital for the people, from ensuring the island's water and food supply, to moderating the impacts of droughts and fires, and to supporting ecological and economic stability in the lowlands.

### Deforestation data

Despite its importance, Borneo has one of the world's highest deforestation rates. Once almost completely covered in forests, today half of the island's forest cover remains. Between 1985 and 2005, Borneo lost an average of 850,000 hectares of forest annually. If this trend continues, forest cover will drop to less than a third by 2020.

The rate of deforestation in Kalimantan, in particular, is increasing dramatically. Geographic Information System (GIS) analyses, combining satellite imagery and field-based assessments, show that from 1985 to 2001, Kalimantan's protected lowland forests declined by more than 56 per cent. Uninhabited frontier parks are being logged and "protected" forests have become increasingly isolated and deforested. Combined with forest loss in Sabah and Sarawak, total forest loss in Borneo is approximately 1.3 million hectares a year. The World Bank has predicted that in Kalimantan there will be no lowland rainforests left outside protected areas by 2010 if current destruction rates continue.

### Key threats

The main factors causing the rapid destruction of Borneo's forests are: large-scale conversion to plantations, illegal logging, and forest fires. Forests are being cleared for commercial uses, including rubber, palm oil and pulp production. Forest conversion to oil palm plantations is one of the biggest threats to Borneo's remaining forests in Sabah and Sarawak. The average annual growth rate of oil palm areas was nearly 8 per cent between 1998 and 2003. Today there are over 1.6 million hectares of oil palms areas. In Kalimantan, oil palm plantations grew by 11.5 per cent to nearly a million hectares between 2002 and 2003.

Forest fire is also a key threat to the forests. During the forest fires of 1997/98, over 6.5 million hectares were affected in Kalimantan. Some 75 million people were affected by the fires and the resulting smoke and haze. Hundreds, if not thousands, of orang utans were killed during this disaster, and smoke from the fires contributed significantly to global carbon emissions. The economic costs were estimated to exceed US\$ 9 billion. An unusually strong El Nino played a role during this period, but the fires were mostly set by humans.

## Kalimantan tree diversity

Kalimantan is the centre of diversity of Dipterocarpaceae, a very important family of trees, both ecologically and commercially. Kalimantan's dipterocarps produce the majority of Indonesia's

enormous quantity of timber. Rattans, another commercially valuable plant group, are also found in Kalimantan.

## Kalimantan Peat Swamps – carbon sink or source of emissions?

Peat swamp forests are important carbon sinks – storing 30 times more carbon than rainforests. However, peat's ability to store carbon long-term depends on healthy forests above them. When natural forests on peat soil are cleared and soil drained, the dried peat catches fire easily and is difficult to extinguish. Peat fires can last for months, producing greenhouse gas emissions (GHG), and particulate matter, that is hazardous for the respiratory system.

Kalimantan holds Borneo's largest remaining expanse of peat swamp forests. Much of these are in Central Kalimantan and estimated to store Borneo's largest amount of carbon – 6.4 Gt (about 10 times that of the UK's total GHG emissions in 2005). A decade ago, about 1 million hectares of Central Kalimantan's peat swamp forests were destroyed due to a mega rice project. Today, less than 0.5% of this habitat that remains is preserved. With plans to revive part of the rice project and conserve some areas, it is critical to have a balanced solution.

This trend towards increasingly devastating fires has continued in recent years, with 2002 and 2006 ranking amongst the highest rate of forest fires in Indonesia's history. In September 2006 alone, there were 26,561 hot spots, the highest since August 1997, with 37,938.

### Protection status

There are several ecologically important areas that are protected in Borneo. In Kalimantan, approximately 9 per cent of total land mass is under some form of protection, as national parks, nature reserves or wildlife reserves. Sarawak has around 8 per cent of its total landmass designated as protected, while in Sabah, it is about 14 per cent.

Although protection laws are in place throughout Borneo, these are often inadequate or not enforced. Satellite studies show, for example, that about 56 per cent (more than 29,000 km<sup>2</sup>) of protected lowland forests in Kalimantan were cut down between 1985 and 2001.

In February 2007, the three Bornean governments – Brunei Darussalam, Indonesia and Malaysia – signed an historic declaration to conserve and sustainably manage the Heart of Borneo.

### Carbon emissions from deforestation

Deforestation and forest degradation account for more than 83 per cent of Indonesia's and more than 80 per cent of Malaysia's total carbon emissions.

In Indonesia, besides deforestation and illegal logging, the other main source of carbon emissions within the forestry sector is forest fires. In the Kalimantan forest fires of 1997/98, carbon emissions were so high that Indonesia became one of the world's largest polluters. It is estimated that between 0.8-2.5 Gt (1 Gt = 1 billion tonnes) of carbon were released to the atmosphere during the fires. This is equivalent to between 13-40 per cent of the annual global carbon emissions from fossil fuels.

This situation is repeated at different scales, with an increasing trend in recent years, especially with the increase of clearance and fires in peatlands. More than 50 per cent of the haze occurring since 1997/98 were from peat fires. WWF Indonesia's analysis indicates that most of the fires in Central Kalimantan in 2002 and 2003 were in peatlands.



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### WWF Forest Activities

WWF is helping Borneo's three nations to conserve the Heart of Borneo through a network of protected areas and sustainably-managed forests.

WWF Indonesia also has several activities to mitigate forest fires. These include community awareness programmes, forest fire hotspots monitoring, and a pilot project in Central Kalimantan using simple but effective approaches such as canal blocking to help peat swamp forest regeneration and fire prevention.

### Sources/References

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### Notes

The total greenhouse gas emissions for the UK, including its Crown Dependencies and relevant Overseas Territories, in 2005 is 655.4 Mt. Data sourced from the UK Greenhouse Gas Inventory, 1990-2005, published in April 2007 and prepared by the UK Department for Environment, Food and Rural Affairs for its annual reporting under the Framework Convention on Climate Change.



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<http://www.panda.org/borneo>

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