

Monitoring the Environmental Status of the Heart of Borneo

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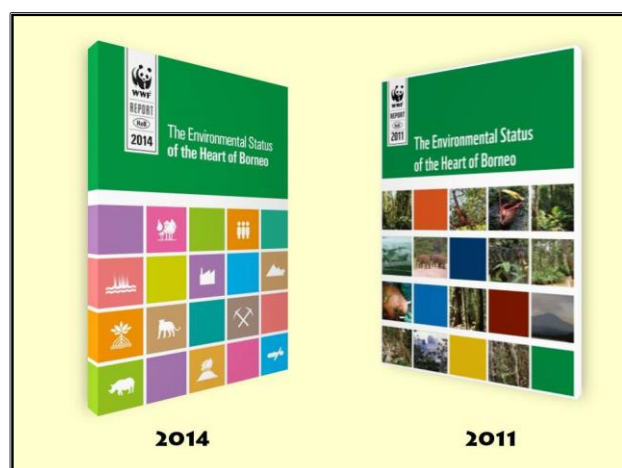
The Heart of Borneo conservation initiative has been going on now for several years and has gained increasing support from all of our major stakeholders. Naturally, we need to have a clear and comprehensive overview of the current and previous environmental status of the Heart of Borneo and see where major changes of the ecological conditions are occurring. This is done through a process of routine monitoring.

The development of a monitoring framework which could characterize both the ecological health and conservation status of the Heart of Borneo (HoB) was initiated in 2007. The objectives then were: (1) Develop a set of practical indicators that might be representative of the ecological status of the HoB and could be monitored at appropriate time intervals; (2) develop a larger set of indicators that are representative of the overall conservation status of the HoB and (3) analyze data for those indicators to assess the overall ecological and conservation health of the HoB.

The environmental status of the Heart of Borneo was measured for the first time in 2008 with historical data and spatial as well as field data from 2007. A comprehensive set of indicators was developed that proved to be informative while at the same time practical enough to provide a useful overview of the status. The indicators consisted of four types:

- biological indicators on the status of the major ecosystems and selected keystone species;
- socio-economic indicators on the wellbeing of the communities in the HoB;
- threat indicators rated for scope, severity and irreversibility (including conversion, timber harvest, forest fires, mining);
- conservation management indicators (including representation in protected areas, intactness, effectiveness)

The spatial data was derived mainly from MODIS satellite images. Cloud-free mosaics for 2007, 2010 and 2012 were produced by compiling suitable images for each year. Forest cover was mapped for each year using one standard methodology. Field data was acquired through surveys and research by WWF projects and various institutions.



The indicators were measured for the second time in 2013, using data from 2012 and 2010. These assessments are used for monitoring, followed by evaluation of effectiveness and then formulation of adaptive management.

Summary of the results

Size of HoB:

The total area of the HoB is 23.4 million hectare.

The total forest cover of the HoB is 17.4 million hectare, almost three-quarters of the HoB.

Forest cover of the HoB per state/province:

- Brunei- 0.63 million ha
- Sabah- 1.81 million ha
- Sarawak- 1.83 million ha
- East Kalimantan- 7.99 million ha
- West Kalimantan- 2.92 million ha
- Central Kalimantan- 2.43 million ha

Key ecosystems:

- Lowland rainforest- 3.54 million ha
- Upland rainforest- 7.78 million ha
- Montane forest- 5.30 million ha
- Peat swamp forest- 0.41 million ha
- Heath forest- 0.18 million ha
- Smaller areas of freshwater swamps, limestone forest, mangroves

Key species status:

- The elephant population is estimated to number about 2200 individuals, distributed over 2.23 million ha, with fair connectivity.
- An estimated 80% of the historical locations of banteng distribution within the HoB are still occupied.
- Clouded leopards still have almost 17 million ha of habitats available that are suitable for viable populations.
- The orangutans have a distribution of 3.3 million ha within the HoB.
- Probably less than 25 individuals of the Borneo rhinoceros are remaining.
- Endemic groups of key plant families are doing well with most of the historical locations still present.

Key land uses:

- Almost 3 million ha of the Heart of Borneo is inside protected areas (national parks, nature reserves), which is 12.6% of the HoB, and 17% of its forests.
- The extent of established oil palm plantations in the Indonesian part of the HoB was 1.03 million ha in 2012, and another 0.33 million ha of forest inside concessions are about to be converted to oil palm plantations. The land use planning has allocated 0.25 million ha inside the HoB for future conversions.
- 0.49 million ha timber plantations were already established in the Indonesian part of the HoB in 2012, while there were another 0.077 million of natural forests inside concessions to be converted.
- 4.4 million ha of the Indonesian part of the HoB is inside active logging concessions. Another 1.8 million ha of forests are allocated to future logging concessions.
- A total area of 2.1 million ha of the hoB is inside mining concessions, but this includes exploration concessions. The actual area that will be exploited is only a portion of this.

Comparison to Borneo as a whole:

- 8.3% of the the total area of Borneo is inside protected areas, compared to 12.6% of the HoB.
- Oil palm and timber plantations comprise 32% of the Indonesian part of Borneo, versus 9% of the Indonesian part of the HoB.
- 22% of the Indonesian part of Borneo is inside logging concessions, but the percentage for the HoB is 31%.
- The extent of mining concessions in Borneo is 4.5 million ha, and almost half of this is within the HoB. This makes a ratio of 6% for Borneo versus 18% for the HoB.

Overall rate of deforestation:

The overall rate of deforestation between 2007-2012 was 2.9%.

Key ecosystems/species suffering deforestation:

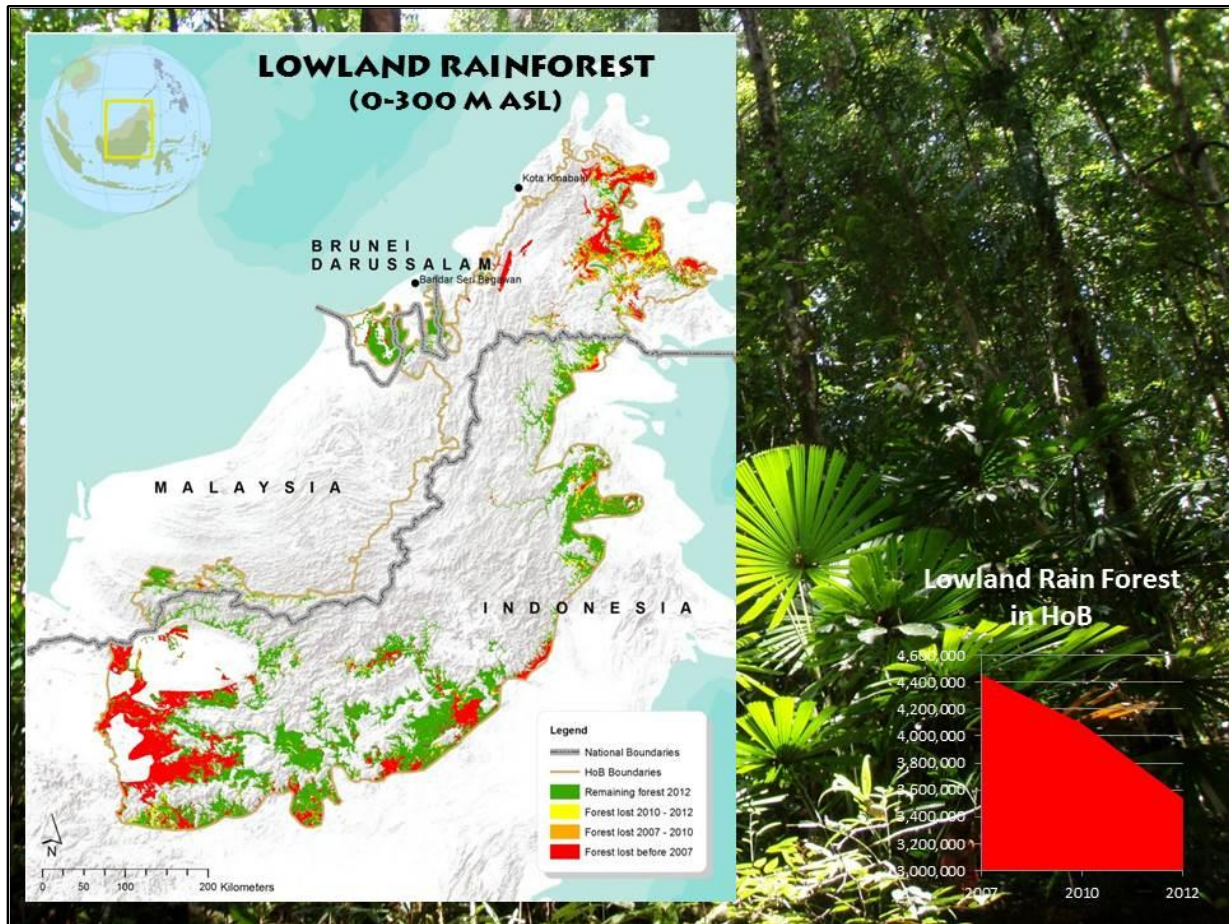
There are still considerable large areas remaining of most of the ecosystems of the HoB. Forest conversion however still continued to occur, though deforestation rates for the HoB were considerably lower than for the whole of Borneo.

- Lowland rainforest was one of the ecosystems affected most by forest conversion between 2007-2012. Deforestation rates were particularly high in Sabah and Central Kalimantan.
- Most of the heath forests of the HoB had been converted by 2012. This occurred particularly in West Kalimantan and in East Kalimantan.
- Peat swamp forest within the HoB is found mainly in West Kalimantan, and much of this had been converted by 2012.
- Upland rainforest is the largest ecosystem of the HoB and still more than 80% of the historical extent remains in 2013. Deforestation rates were however rather high between 2007-2012, particularly in Sarawak and Sabah.
- Although the total population of Bornean elephants is still good, the distribution of this population decreased between 2007-2012.
- The orangutan distribution decreased by 14% between 2007-2012. This occurred mainly in West Kalimantan and in Sabah.

Main drivers of deforestation:

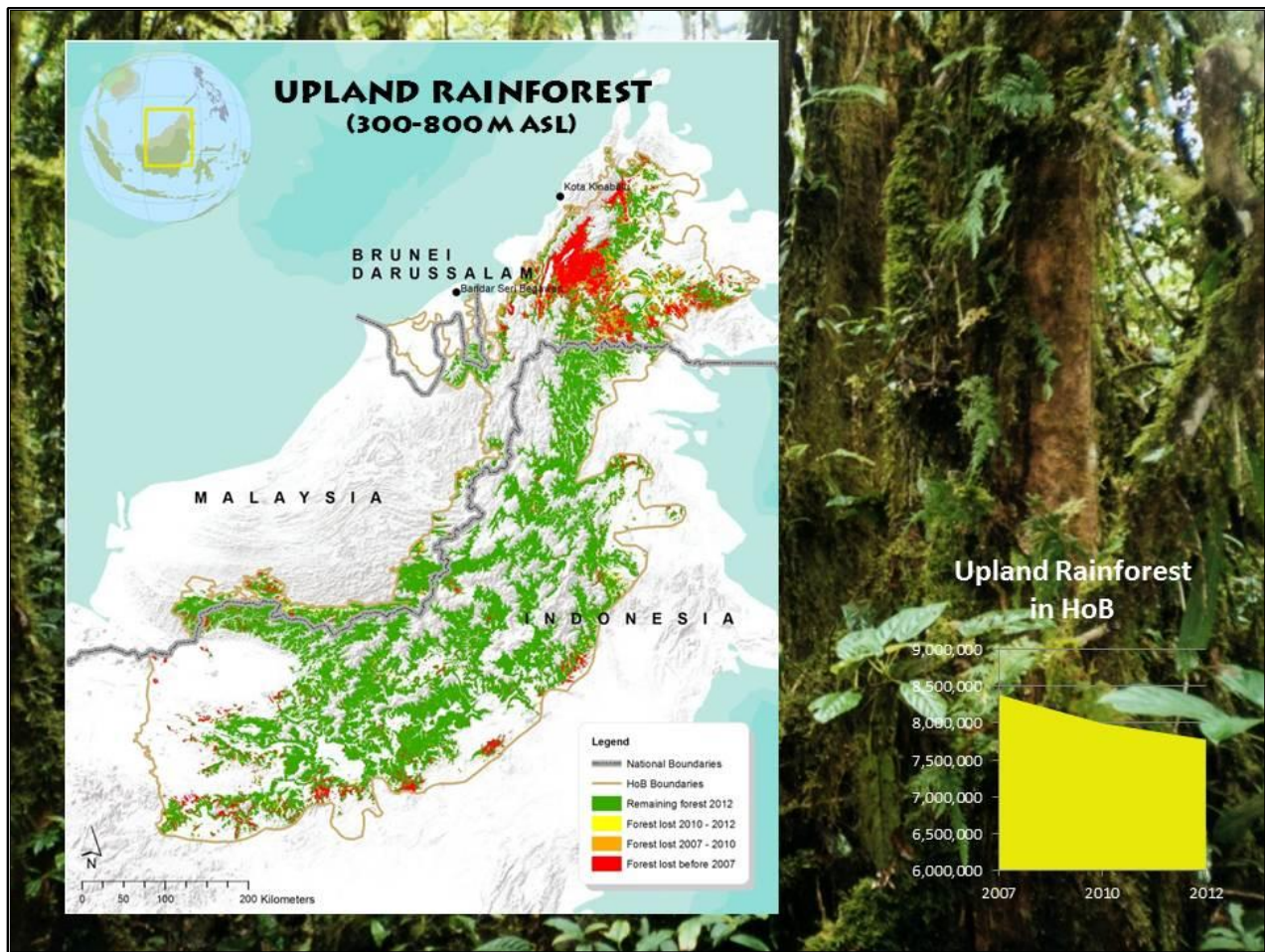
- Industrial conversion of forests into oil palm and timber plantations is the major driver of deforestation.
- Uncontrolled conversion by local communities needing land for subsistence agriculture occurred in areas without concession holders and a large portion of these are actually protection forests.
- Many of the forests of the HoB, particularly lowland, heath, peat swamp and upland forest, have suffered from forest fires. This is a severe issue in particularly in West Kalimantan, Central Kalimantan and in Sabah. Burnt tracts of forest are often not given the opportunity to recover.
- Encroachment by smallholders is causing fragmentation of many of the forest areas throughout the HoB. Fragmentation is frequently followed by conversion.

Example 1: Lowland rainforests of the HoB



Historically about a quarter of the HoB area was covered by lowland rainforests. In 2007 still 71% of the original area remained (4.46 million ha). In 2012, 56% remained (3.54 million ha). This percentage is still much higher than for the whole of Borneo, where less than 28% remains. Most of the remaining lowland rainforests are located in valleys surrounded by steep slopes. Many of these are still in good conditions, although fragmentation is a concern.

Example 2: Upland rainforests of the HoB



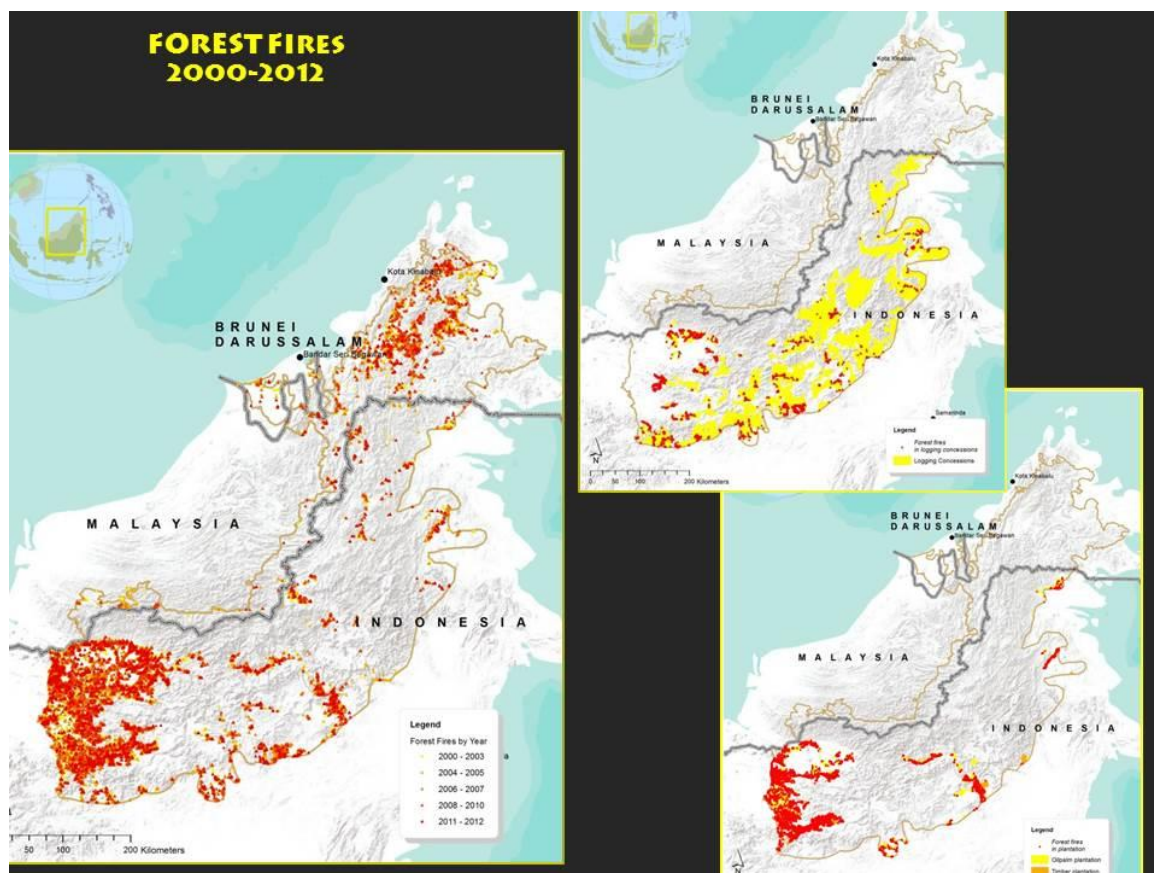
Upland rainforest is the largest ecosystem of the HoB, historically covering about 40% of the total land area. In 2012 still 81% of the original area remained (7.78 million ha). However, more than 600,000 ha was deforested between 2007-2012, although mainly along the edges.

Many of the remaining upland rainforests are inside protected areas. These forests are extremely rich in biodiversity. The uplands of the interior of the HoB are generally not very suitable for plantation developments.

Example 3: Forest fires

The highest threat to the preservation of the natural ecosystems of the HoB is industrial conversion of natural forests.

Forest fires are the second-highest threat. Monitoring of forest fires is done through the analysis of hotspot data and mapping of burnt areas verified by field checks. Forest fires in the HoB were still occurring annually and the areas most affected were the western section of West Kalimantan, the lowland valleys of Central Kalimantan HoB and the central part of Sabah. High numbers of hotspots were detected in nearly all of the (planned) oil palm plantations of the hoB. A remarkable high number of forest fires occurred inside logging concessions.



Projections and conservation goals for 2020

WWF has set goals for the ideal remaining extents of each of the major ecosystems of the Heart of Borneo in 2020. All of these goals were still met in 2012, with the exception of the heath forest goal.

Projections of the 2007-2012 deforestation rates up to 2020 indicate however that these goals will not be reached in 2020 if the current deforestation rates remain high. The good news is that there is a common willingness of the governments of Sabah, Sarawak, Brunei and Indonesia to reduce these deforestation rates and the goals can still be reached if sufficient conservation interventions are in place.

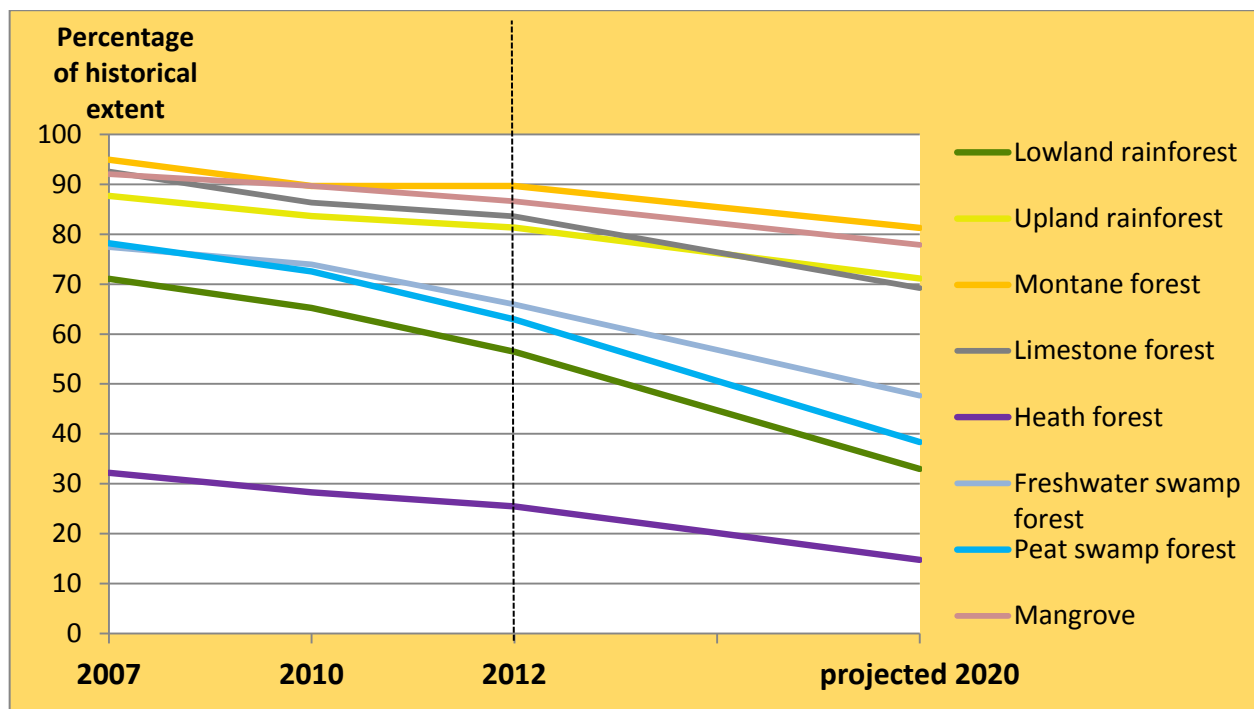
Projection with 2007-12 deforestation rates:

The goals for remaining extents for 2020 are:

- Lowland rainforest: 50-60% of historical extent;
- upland rainforest: at least 80%;
- montane forest: at least 80%;
- limestone forest: 60-80%; heath forest: 60-80%;
- freshwater swamp forest: 50-60%;
- peat swamp forest: 50-75%
- mangroves: at least 80% of historical extent remaining in 2020.

If the 2007-12 deforestation rates continue, then in 2020 the remaining extents will be:

- lowland rainforest: 33%;
- upland rainforest 71%;
- montane forests 81%;
- limestone forest 69%;
- heath forest 14%;
- freshwater swamp forest 48%;
- peat swamp forest 38%
- mangroves 78%.



Projection with conservation interventions:

It is still possible to reach the 2020 goals for most of the ecosystems of the Heart of Borneo:

To preserve at least 50% of the historical extent of lowland rainforest, annual deforestation should be below 0.8%;

To retain at least 80% of the upland rainforests, annual deforestation rates should not exceed 0.15%;

Montane forests and limestone ecosystems can be mostly preserved if deforestation rates remain as low as in 2010-12;

Most of the heath forests have gone but 25% can still be preserved only if all deforestation is stopped;
To preserve at least 50% of the peat swamp forest, annual deforestation rates should be below 1.6%.

