

The Greenpeace logo is located in the top right corner of the page. It consists of the word "GREENPEACE" in a bold, white, sans-serif font. The background of the entire page is a photograph of a dense tropical forest. On the left side, there is a large, vertical tree trunk with a thick, textured bark and a vine with small, dark green leaves wrapped around it. The rest of the image shows a vast expanse of green trees stretching into the distance under a cloudy, overcast sky.

Merbau's Last Stand

How Industrial Logging Is Driving
the Destruction of the Paradise Forests of Asia Pacific

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**How Industrial Logging Is Driving the Destruction of
the Paradise Forests of Asia Pacific**

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Abbreviations

CITES		Convention on International Trade in Endangered Species
EIA		Environmental Investigation Agency
ITTO		International Tropical Timber Organization
IUCN		The World Conservation Union
m³		cubic metres
PNG		Papua New Guinea
RWE		Round Wood Equivalent
UK		United Kingdom
USA		United States of America

Glossary

Ash	Latin name: <i>Fraxinus</i> spp.; Common name: ash; Origins: Northern and Eastern Europe, Russia, North Africa, Middle East; In China, nearly 100 per cent of ash imported by China comes from Russia.
Camphor Wood	Latin name: <i>Cinnamomum</i> spp.; large genus occurring throughout most parts of Asia. Bark and wood of different species supply spices (cinnamon) and aromatic oils (camphor).
Composite Flooring	Flooring made of various layers of wood, usually a base layer made of cheap plywood and a top layer of higher quality hardwood species
Hardwood	Wood species from broadleaved trees (mainly deciduous species, but not necessarily as in the case of tropical trees). On average, hardwood species are of higher density than softwoods, which are primarily coniferous, and are more suitable for the production of high-end products such as flooring and furniture.
High Conservation Value Forests	High conservation value forests (HCVF) are defined as forests of outstanding and critical importance due to their environmental, socio-economic, biodiversity or landscape values. ¹
HS Code	Harmonised System (HS) Codes are numeric codes used internationally to categorise trade commodities for import or export. For example, HS 4403 indicates 'wood in the rough, whether or not stripped of bark or sapwood or roughly squared.' The codes are internationally standardised up to the first 6 digits, with the remaining 2-4 digits depending on national standards.
Industrial roundwood	Roundwood that will be used in the production of other goods and services. This category excludes roundwood used as fuel.
Intact Forest Landscapes (IFLs)	Forest areas larger than 50,000 hectares in size, which have not been impacted by human activity. Many smaller areas of high conservation value ancient forestland are not included in this definition; these are also ecologically significant and warrant protection.
Mahogany	Latin name: <i>Swietenia</i> spp.; Common name: mahogany; Origins: Central and South America; commercially mainly from Brazil and Peru.
Merbau	Latin names: <i>Intsia bijuga</i> , <i>I. palembanica</i> ; Common names: merbau, kwila, ipil- Origin: commercial stands left mainly on the island of New Guinea.

New Guinea Island	The island is comprised of the Indonesian provinces of Papua and Irian Jaya Barat (Papua Land) in the west and the nation of Papua New Guinea (PNG) in the east.
Oak	Latin name: <i>Quercus spp.</i> ; Common Name: oak; Origin: throughout the northern hemisphere.
Ramin	Latin name: <i>Gonystylus spp.</i> ; Common name: ramin; Origins: Malaysia, Indonesia, Brunei, the Philippines, Papua New Guinea.
Rough sawnwood	Wood, sawn lengthwise with a thickness of more than 6 mm, not planed or sanded
Round Wood Equivalent(RWE)	The volume of roundwood needed to produce a specific wood product. E.g., it commonly needs around 1.7 m ³ of roundwood (logs) to produce 1 m ³ of sawn timber
Sawnwood	Wood, sawn lengthwise with a thickness of more than 6 mm
Semi-finished wood products	Wood products like mouldings for frames, strips or friezes for flooring, etc.
Solid wood flooring	Flooring made of one solid piece of timber, in contrast to: see Composite Flooring
Timber products	Products manufactured from wood, including all products summarized under Chapter 44 of the HS commodity codes (e.g. logs, veneer, sawnwood, plywood, joinery products) and some of the HS 94 commodity codes (furniture).

Key Findings

The highly prized merbau has already been severely depleted from much of its original range, and what remains is at high risk of extinction in the wild.

1. Although merbau was originally found from Eastern Africa through Southern India and onwards to Southeast Asia, Oceania and as far as Tahiti, today volumes of merbau exist in significant commercial quantities only in Papua Land, Indonesia (Papua Land) and in Papua New Guinea (PNG).
2. Even in these two countries, the range of merbau has already been heavily impacted by destructive and illegal logging. Over 60 per cent of the original merbau range has been affected by human activity and most merbau in these areas is gone.
3. The majority of the remaining merbau range has already been allocated to logging concessions, with over half of the merbau within intact forest landscapes already on the chopping block. Less than a fifth of its original area is not yet slated for destruction.
4. At the current rate of officially sanctioned logging, most of the remaining merbau will be gone within the next 35 years (this being the official rotation cycle for logging). This figure does not take into account illegal logging, which exacerbates the rate of destruction and will escalate the speed at which merbau disappears.

Despite some efforts by governments to crack down on illegal logging, trends within the international wood market, foremost in China, are helping to fuel the depletion of merbau from this ecosystem.

1. Most large international flooring producers include merbau in their product ranges, with the majority of them sourcing the wood from untraceable sources in Indonesia. Few, if any, of the producers are able to credibly prove the full legal origins of their merbau supply.
2. During the last decade, unprecedented economic growth, coupled with a shortage of domestic forest resources has driven China to become the world's largest importer of tropical logs. Specific to this report, China is now the world's largest market for merbau products.
3. When the Indonesian government cracked down on illegal logging and exports in early 2005, the import volumes of merbau logs into China dropped significantly, from 890,000 cubic metres in 2004 to approximately 60,000 in 2006, thereby proving that stringent monitoring can be extremely effective in slowing the trade of illegally logged wood.
4. However, Greenpeace investigations have revealed that when the primary smuggling route was closed down, the logging and manufacturing industries were quick to find new smuggling routes and sources of merbau. Papua New Guinea has now surpassed Indonesia and Malaysia as the

largest supplier of merbau logs to China, accounting for 78 per cent of all such imports. Indonesia remains the largest exporter of sawn merbau to China, accounting for 91 per cent of the total import volume, despite the current ban in Indonesia on the export of rough sawn timber.

5. Greenpeace investigators discovered at least four smuggling methods having been used to get illegal merbau into China. The first has been the use of forged Malaysian documents to disguise the true, Indonesian origin of the merbau. Second, merbau is imported from logging concessions in PNG that are in violation of that country's forestry laws or Constitution. Thirdly, merbau logs continue to be imported from Indonesia, in open violation of the country's export ban. A fourth, and last, is that squared-off logs from Indonesia, which are also banned for export, come into China, falsely labelled as "sawn timber".
6. Although some efforts to combat illegal logging of merbau have reduced the volume of merbau reaching the international market, in order to deal with this shortage China's wood manufacturing industry has simply replaced merbau with other species, some of which will also be derived from illegal and destructive logging. In order to not simply transfer the problem to another forest region, the industry needs to adopt credible third-party chain of custody tracking and shift to only purchasing timber that comes from the Forest Stewardship Council.



Executive Summary

The beautiful tropical hardwood species merbau, once so abundant throughout the Asia Pacific region, is today hovering on the brink of commercial extinction due to the increasing demand for luxury hardwood timber products. Unless current trends are reversed, merbau will be largely logged out within the next 35 years.

For centuries, the pattern has recurred: we humans come to value a particular plant or animal because of some unique and prized characteristic it possesses and then, with little consideration of the consequences of our actions, overexploit the species until we've virtually driven it out of existence.

In the 1800s, we did this to the rhinoceros, once commonly found throughout Southern China. Humans valued the rhino's horn for both its ornamental and medicinal values, and heavily concentrated hunting of the animal forced it over the brink by early the next century. Likewise in Indonesia, both the rhino and the tiger have been forced to the brink of extinction by destruction of their habitat and poaching.

More recently, the rich auburn grain of the wood from the tree species mahogany caused it to be singled out for over-exploitation. Viewed by the wealthy as highly desirable for the production of expensive furniture, pianos and boats, mahogany in the Amazon was targeted by the logging industry to the point where it became officially considered endangered. It now is listed on Appendix II of the United Nations' "Convention on International Trade in Endangered Species" (CITES), and its trade has been significantly restricted.

The Asian tropical hardwood ramin was similarly targeted by the logging industry and by the 1990s the main volumes were restricted to Indonesia and, to a much lesser extent, Malaysia. With prices reaching US\$ 1,000U.S. for a single cubic metre, ramin was highly prized and, with the decreasing supply, had also been listed by the World Conservation Union (IUCN) as vulnerable to extinction in the wild. Once again, listing the species on CITES became necessary to restrict the trade, although a small portion of the marketplace also played a positive role in addressing the problem: even though CITES still allowed some reduced trade in ramin, some international retailers such as IKEA and Lowe's chose to no longer sell products made of ramin.

Extinctions or the over-exploitation of a single species can have knock-on effects for entire ecosystems. The continued exploitation and shrinking of pristine wilderness areas globally has meant that even modest decreases in the number of one species can impact an area's health and ecological balance. Vast areas in the Amazon rainforest are today impoverished because of the single-minded pursuit of mahogany, and thousands of miles of logging roads have opened up the natural canopy, severely disturbing the delicate balance of this unique tropical rainforest.² An

increase in forest fires is commonly observed in these logged-over areas, and the carbon emissions from such fires are contributing significantly to climate change.³

Today, in the early years of the 21st century, we've turned our attention to merbau, another highly sought-after tropical hardwood species. Like mahogany, merbau is regarded as a high-end luxury wood, particularly in demand for hardwood flooring but also used to produce furniture and musical instruments such as drum frames and the necks of guitars. One of the distinctive characteristics of this beautifully rich reddish-brown timber is that, when finished, it can contain yellow specks in the pores of the wood, making it appear flecked with gold. Most certainly, it is being targeted as though the flecks of gold were real and if current trends continue, the virtual "gold rush" will soon be over.

The IUCN's Red List of Threatened Species 2006 has categorised merbau as "*facing a high risk of extinction in the wild in the near future*," with logging and habitat destruction being the major threats.⁴ However, the IUCN has not done any field research to review the status of merbau since 1998 and in the nine years that have passed there has been a huge increase in logging of this species. The volume of merbau exported from the producing countries indicates that "*the near future*" is now.

Merbau was once plentiful in Southeast Asian countries and on many Pacific islands, but due to excessive logging it is no longer present in commercial quantities throughout most of its original range: in most countries, only small pockets of merbau remain in the rainforest. Only on the island of New Guinea, comprised of Indonesia's provinces of Papua and Irian Jaya Barat (Papua Land) to the west and the independent country of Papua New Guinea (PNG) to the east, do commercially viable quantities of merbau still exist. But the logging industry has set its sights on these last stands, and merbau is being stripped from the forest at unprecedented rates, in much the same manner as mahogany was targeted in the Amazon in the 1980s and 1990s. As with mahogany, the high price merbau commands can make logging profitable in areas where costs would otherwise prohibit harvesting of timber, thereby opening up forest areas for further exploitation.

Another similarity to the mahogany story is that much of the rampant logging in the region is illegal. It is estimated that between 76-80 per cent of the logging in Indonesia is illegal,⁵ whilst the latest figures from the World Bank estimates that 70-80 per cent of the logging in PNG is illegal.⁶ With merbau drawing record prices in the international marketplace, it is hardly surprising that it has become the new prize for the logging industry or that it is being pursued with little regard for the law.

Despite this, some hope remains that it is not too late to save the last stands of this endangered tree species. The government of Indonesia has begun to crack down on the illegal logging of merbau and has met with some success in seizing shipments and reducing the amount of illegal merbau reaching the international marketplace. However, governance in the region is weak and,

with a corrupt industry determined to continue to export illegally logged wood, Greenpeace investigations found that as one shipping avenue is closed off another transport avenue opens up. Illegally and destructively logged merbau continues to leave the shores of Indonesia and PNG destined for overseas buyers.

While stronger law enforcement to combat illegal logging is a crucial step towards truly responsible management of forest resources, it is not sufficient on its own. As this report will show, logging of merbau inside concessions regarded by the governments of Indonesia and PNG as "legal" will nonetheless finish off most merbau within the next few decades. Merbau is a slow-growing species that takes at least 75-80 years to reach commercial size.⁷ It is also a rare species with average densities ranging from only 5 to 10 trees per hectare even in healthy, merbau-rich rainforests. In much of its range, there can be as little as one tree per hectare found.

Although the logging industry is primarily interested in selling only the merbau, the targeting of an individual species nevertheless leads to wholesale destruction of the forest area, since a dense network of logging roads needs to be created and other trees are also felled to get to the merbau. One study sponsored by the European Union showed that, in one PNG concession, for every one tree selected for commercial removal, another 45 were actually felled.⁸ A holistic management approach and control of the forestry sector in this region are desperately needed in order to ensure the survival of merbau as a species and, along with it, the survival of the entire ecosystem with all its ecological and cultural biodiversity.

Market demand is what drives the illegal and destructive logging of merbau. During the last decade, China has emerged as the largest market for merbau. Unprecedented economic growth and the creation of a global wood manufacturing industry, coupled with a shortage of domestic forest resources, have driven China to become the world's largest importer of tropical logs, including merbau, much of which is used to produce high-end flooring. Today merbau flooring is commonly found in home improvement retail stores in major Chinese cities such as Beijing and Shanghai.

A well-known home furnishing store in China has ten different brands of merbau flooring in their Beijing branch.⁹ However, Chinese citizens are by no means the only consumers with a craving for beautiful hardwood flooring. Significant amounts of merbau are also exported either directly or increasingly via China to the USA, Canada, Japan, Australia and Europe.

Merbau is hovering on the brink of commercial extinction, and the timber "mafia" is making a dash to harvest the last of this species, destroying along the way ancient forests that lie in its path. As long as the market tolerates the trade in this endangered species, the logging industry will continue to exploit the resources by whatever means possible. The time has now come to put an end to this destruction and severely restrict the global trade in merbau.

**The Paradise Forests of Asia Pacific
make up one of the last large regions
of intact rainforest left in the world.**



Part 1

Merbau, the jewel in the crown of the Paradise Forests

The Paradise Forests of Asia Pacific make up one of the last large regions of intact rainforest left in the world. Consequently, in the last decade it has become one of the world's most highly targeted regions for intensive logging, and no tree is being targeted more specifically than the highly prized merbau.

Due to its extraordinary value and beautifully rich texture and appearance, wood manufacturers view merbau as ideally suited for high-end flooring, furniture, decking, doors, cabinets and other joinery products. As a direct result, in most countries where

merbau originally existed there are now few trees left in natural stands. Today, the last large volumes of merbau are found on the island of New Guinea, which is comprised of the Indonesian provinces of Papua and Irian Jaya Barat (Papua Land) to the west and the independent country of Papua New Guinea (PNG) to the east. Here, too, the logging industry is rapidly advancing into the last intact rainforest areas. It is estimated that if the current official rates of logging continue, merbau could be largely logged out across most of its range within the next 35 years.¹⁰ Ongoing illegal logging has the potential to shorten this period considerably.



The Paradise Forests, the largest intact tropical rainforests in Asia Pacific, are suffering the worst rate of destruction among the world's remaining ancient forests.



Merbau

Latin name: *Intsia* spp.

Common names: merbau, kwila, ipil.

Origins: Throughout Southeast Asia and Oceania, and in East Africa¹¹. Commercial stands left mainly on the Island of New Guinea.

Description: Merbau is a widely distributed genus of about nine species. The nine species are similar in all aspects except for a few minor differences in the shape and structure of their leaves. Merbau trees can grow very large, attaining a height of up to 50 metres and a diameter of up to 2.5 metres.¹² Their trunks are branchless for half their height after which it has a spreading canopy¹³ Merbau is in general slow growing, and it takes at least 75-80 years to mature.¹⁴ Due to its slow growth, merbau has not yet been raised in plantations of commercial size.

The magnificent Paradise Forests

"It is as close to the Garden of Eden as you're going to find on Earth. We found dozens, if not hundreds, of new species in what is probably the most pristine ecosystem in the whole Asian-Pacific region. There were so many new things it was almost overwhelming. And we have only scratched the surface of what is there."¹⁵

Dr Bruce Beehler, co-leader of a 2005 expedition to New Guinea that discovered dozens of species previously unknown to western science.

Stretching from Southeast Asia, across the islands of Indonesia and on towards PNG and the Solomon Islands in the Pacific, the Paradise Forests contain some of the last large intact rainforests in the Asia Pacific region.

The Paradise Forests are one of the world's most important regions for biodiversity. An astonishing 10-15 per cent of the planet's known species of plants,



©WILSON TRIST/Overseas (2005)

The orangutan is the only Great Ape found in Asia and it shares 97 per cent of human DNA. The rapidly disappearing forests of Indonesia, depleted in large part due to the past targeting of ramin, are home to the vast majority of the world's remaining wild orang-utans and those forests represent the last sanctuary for this endangered species.



©Overseas

Although the Island of New Guinea is home to over 700 individual species of birds, it is the birds of Paradise which are amongst the most treasured: 38 out of the 42 known species are found in New Guinea, and 36 of these are found only there.

animals and birds are found in Indonesia.¹⁶ Orangutans, elephants, tigers, rhinoceroses, more than 1,500 species of birds and thousands of plant species are all a part of the natural legacy of Indonesia. In an area roughly the size of Sichuan Province or the

state of California, Papua New Guinea alone houses almost five per cent of the world's biodiversity, including hundreds of species that are found nowhere else on the planet.

In addition to being a veritable treasure trove of biodiversity, the Paradise Forests boast an extraordinarily rich cultural landscape, with 820

languages being spoken in PNG alone, and about one-sixth of all languages known on earth being spoken on the island of New Guinea as a whole.¹⁷ Anthropologists



Intensive industrial activities, especially commercial logging, are threatening the survival of the intact forests in the island of New Guinea.

believe that various Melanesian peoples came to the island of New Guinea from different islands around 50,000 years ago and, because of the imposing mountains and extremely rugged terrain, different population groups developed in virtual isolation.

It was perhaps inevitable that the Paradise Forests would attract so many economic interests seeking to profit from its resources, but the sheer level of rapacious industrial activity this region has experienced is almost unprecedented. For decades now the forests have been under siege by numerous industries, including the logging industry, the mining sector, oil and gas companies, and the palm oil industry. With many governments now promoting so-called "biofuel" as a solution to climate change, palm oil trees are today being viewed as a major raw

material. The ancient forest will be logged to plant palm trees, clearing huge swathes of natural rainforest and the palm oil industry is already threatening the last stands of merbau.

Indonesia and PNG have already lost 72 per cent and 60 per cent of their large intact ancient forests, respectively and the remaining, intact forests are under threat from illegal and destructive logging. According to the World Bank, the remaining lowland rainforests of Indonesia will be gone by 2010 unless the logging industry can be brought under control.

China is the largest market for timber from the Paradise Forests. Imported logs and lumber, much of which came from illegal logging, are turned into hardwood flooring, furniture and construction materials.



Papua New Guinea still has large intact areas of ancient forest that provide homes for over 5 million people, most of whom still depend on the forest for their daily subsistence.

The cultural importance of merbau

In many countries where merbau was originally found, its uses and significance are heavily embedded in the culture of the local peoples. To the Asmat tribe of Papua Land, the phrase "as asmat" actually means "we, the people of the tree" and for the Asmat, a tree is identical to a human being, inhabited with the souls of the dead. Myths tell that ancestors can emerge from trees, and the Asmat people carve ancestral figures from the tropical hardwood merbau. These carvings are important cultural artifacts to the Asmat, but are now also highly valued by the international art scene, where this unique artwork attracts high prices. Similarly, in Fiji where merbau is known as "vesi" it was used for many important cultural events, including to carve the sacred canoe that was reserved only for those of noble birth, and to

make the traditional gong, or lali, used to announce important community events. Many native expressions incorporate the word vesi to indicate a person of noble birth or of high character. "Sacirnavesi" - the vessel is afloat - is used when bidding farewell to a paramount chief.¹⁰

Tragically, however, the targeting of merbau by the logging industry has depleted the availability of this specialty wood for use by indigenous peoples. As the Sira Village head chief Joel Sremere recently told Greenpeace, "We regret that in the beginning our forest was well preserved, but then the companies came, only looking for merbau. They didn't use any other wood: they just cut it and left it in the forest. Especially merbau they take to sell, but other kinds of wood they leave. So, we regret this."

The threat of extinction

Because of the theft of timber from both Papua Land and PNG it is difficult to assess the rate in which merbau is being removed from the island's forests. Even so, the IUCN has classified the species as "*facing a high risk of extinction in the wild in the near future*," with logging and habitat destruction being the major threats.¹⁹ Greenpeace has used satellite mapping to determine where merbau still exists on the island of New Guinea and, based on current official logging rates, calculates that merbau will be logged out in the next 35 years in most of its remaining range. However, as illegal logging is not figured into these calculations, it is clear that merbau could be gone much sooner than that.

In 1998, Indonesia exported only 50,000 cubic metres (m³) of merbau, but the figure soared to 660,000 m³ in 2001.²⁰ A log export ban was introduced in 2001, but it failed to stop the illegal logging and export of merbau. In the last few years, merbau has been subject to extremely high levels of illegal exploitation in Papua Land, Indonesia. According to a report by the UK's Environmental Investigation Agency (EIA) and Telapak, an Indonesian non-governmental environmental group, up to 3.6 million m³ of merbau have been illegally harvested and exported from Papua Land every year.²¹

No thorough analysis has ever been done on the true distribution of merbau anywhere in the world. It has been described as originally having occurred from Eastern Africa through Southern India and most of

Southeast Asia to Oceania, and as far east as American Samoa and Tahiti.²² Today, however, commercial harvesting of merbau is limited mainly to Papua Land in Indonesia and PNG. Small volumes are supplied by other regions, such as Northern Sumatra and Malaysia, but those volumes are rapidly diminishing. For example, in 2004 Malaysia supplied less than 25,000 m³ of merbau to the international market, while China registered official imports of merbau equivalent to almost 900,000 m³. This figure does not include all merbau that was imported illegally.

EIA/Telapak reports released in 2006 confirmed the dominance of Papua Land and PNG as today's main merbau suppliers. The agencies questioned several European and North American flooring companies about the legality of their merbau supplies, and none were able to provide documentation of legal supply; nor could they supply any credible evidence that the merbau did not originate from either Indonesia or PNG. Those that claimed to source their merbau from Malaysia were proven wrong by subsequent EIA and Telapak investigations.²³

Based on ecological parameters, such as soil type and altitude, together with descriptions of merbau distribution found in scientific literature, Pius Piskaut (MSc) from the Division of Biological Sciences at the University of Papua New Guinea in 2006 produced a generalised distribution map for merbau in Papua Land and Papua New Guinea (see MAP 1).



©Plus Pribau/Greenpeace (2007)

MAP 1

These are the areas where merbau should have occurred originally. Much of this original habitat, however, has suffered from serious human impacts already; only 38 per cent of potential merbau habitat

remains in large intact forest landscapes (see MAP 2).²⁴ In other words, almost two-thirds of the merbau range in Papua Land and PNG has already disappeared, or will do so in the near future.²⁵



©Plus Pribau/Greenpeace (2007)

MAP 2



MAP 3

To make matters worse, the remaining third of the range is also under threat. More than half of it is found in officially allocated logging concessions²⁶ (see MAP 3) and will, unless action is taken, disappear within the next 35 years, this being the official rotation cycle for logging in Indonesia and PNG (see MAP 4). It is also worth noting that in PNG, logging companies often log out the concessions in half the time, so merbau's future may be even more limited.

As it stands today, a mere 17 per cent of the original merbau range in this area has not been either destroyed or placed on the chopping block. This portion of the range is safe for the moment, but allocation of new concessions for both logging and bio-fuel production, which are on the agenda in both Indonesia and PNG, will eventually wipe out the last stands of merbau on the planet completely.



MAP 4



©Greenpeace, (2006)

Merbau flooring in one well-known home furnishing store in China. Beijing, 2006

International market demand for high-quality timber products is fuelling the illegal and destructive logging of merbau. During the last decade, China has emerged as the largest market for merbau. Unprecedented economic growth, coupled with a shortage of domestic forest resources, has driven China to become the world's largest importer of tropical logs including merbau. Imported merbau is used mostly for producing up-market hardwood flooring. Merbau flooring is commonly found in the home furnishing market and in retail stores in major Chinese cities such as Beijing

and Shanghai. One well-known home furnishing store in China offers ten different brands of merbau flooring at one of its branches in Beijing.²⁷ China also exports a significant amount of flooring to the USA, Canada, Japan, Australia and Europe.

Merbau is vanishing at an alarming rate. Regulatory failures in Indonesia and PNG, together with the demand for high-quality timber products in China and other developed countries are driving this species to extinction. Given the high rate of illegal logging and uncontrolled exploitation of merbau, a review of its threatened status is urgently needed. According to PNG export data,²⁸ the downward trend in merbau export volumes for Papua New Guinea indicates a decline in population sizes and warrants an "urgent need to strengthen existing laws to control and regulate this high quality timber".²⁹ In view of its dramatic decline and with illegal logging being the norm rather than the exception, only strict harvesting and trade measures can secure a future for merbau.



©Greenpeace (2006)

Shortly after the crack down on illegal logging in Indonesia, European retailers also (above an example from Italy, August 2006), had problems securing the supply of Merbau flooring (fuori produzione meaning "out of production")

At the current rate of officially sanctioned logging, most of the remaining merbau will be gone within the next 35 years.

Part 2

Illegal Logging and Trade of Merbau

Merbau is an expensive tree species that is in high demand by customers of the Chinese wooden flooring market. Yet when they step onto their beautiful hardwood floors, most people never imagine that it comes from the far-away island of New Guinea, nor do they realize that merbau is an endangered species that is often obtained illegally. In sharp contrast, Chinese traders in major ports are quite sure of the illegal nature of much of the imported merbau, and are not ashamed to admit it. Although the Indonesian government has introduced laws that prohibit exporting logs, all the Chinese importers with whom Greenpeace spoke were extremely well-versed in how to smuggle illegal logs into China. Even the official data from Chinese Customs records illegal imports of Indonesian logs into the country.

1. The ebb and flow of illegal logging of merbau

"All the export of logs from Jayapura, Indonesia, is smuggling. They smuggle it with Malaysian shipping paper work. They have made a whole set of it, including the certificate of origin, the whole set of documents from Malaysia. I am an expert in this field."

A Hong Kong Merbau log broker ²⁶

The illegal logging and associated trade of merbau is no longer a secret. According to a report jointly issued by EIA and Telapak, in February, 2005 large-scale illegal logging of merbau was carried out by Malaysian companies in Papua Land. The wood was then smuggled into China and other countries with fake certificates of Malaysian origin. The smuggling was arranged by a criminal network composed of traders from Jakarta, Singapore and Hong Kong ²⁷. Immediately after this report was released, the Indonesian President Susilo Bambang Yudhoyono sent the National Police and army into Papua Land to crack down on illegal logging and exports. In the following two months, law enforcement staff confiscated close to 400,000 m³ of illegal logs ²⁸, equivalent to 3 per cent of the world's total trade volume of all tropical logs.

China remains the main market for illegal merbau. In 2004, China imported 890,000 m³ of merbau logs, accounting for 26 per cent of its total import volume of tropical logs. According to China's Customs' records, the major supplier of merbau logs was Malaysia but, in reality, Indonesia was the main source. As the Indonesian Government cracked down on illegal logging and exports in early 2005, the import volume of

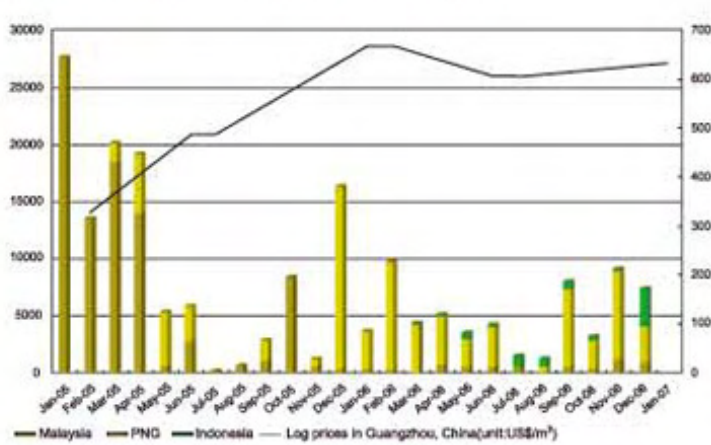


Log dealers print their phone numbers on the piled merbau logs at Guangzhou Yuzhu wharf, making it convenient for buyers to contact them directly. Far away, boats are busy in transporting shipments of logs. Taken in Guangzhou Yuzhu Wharf, 2006

merbau in China from 2005 to 2006 dropped significantly. In 2005, China only imported 120,000 m³ and about 60,000 m³ in 2006. Imports of merbau logs from "Malaysia" ceased almost entirely, while it is now PNG, Indonesia's neighbour to the east that supplies most of the official merbau imports. (Figure 1)

Due to the Indonesian government's crack down on illegal logging and associated trade, China's merbau log imports plummeted, which on the one hand illustrates that these efforts have been effective, but on the other hand proves that most of the merbau logs imported into China was, indeed, not from Malaysia, but instead smuggled from Indonesia.

Figure 1 China's Merbau Log Imports and Prices 2005-2006 ³³ (Unit: m³ and US\$/m³)

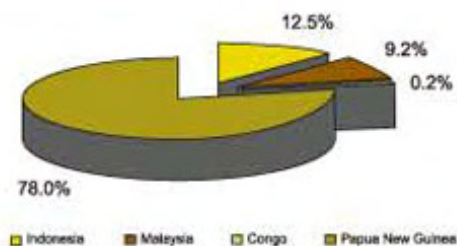


Data source: China Customs import and export data, 2005-2006, International Tropical Timber Organization (ITTO) Tropical Timber Market Reports, 2005-2007.

Field investigations by Greenpeace revealed that a high number of importers of tropical logs are fully aware that most of the merbau that came into China were actually smuggled from Indonesia. However, as the overall volume of Indonesian merbau decreased in the past two years, Chinese traders began to look elsewhere for a new source to fill their demand. Some Chinese traders increased their imports of merbau from PNG. Accounting now for 78 per cent of the total import volume of merbau logs,

PNG replaced Malaysia (i.e. Indonesia)³⁴ as China's biggest supplier of merbau logs (Figure 2).

Figure 2 Major Supplying Countries and Regions of Merbau Logs to China 2006 (Unit: m³)



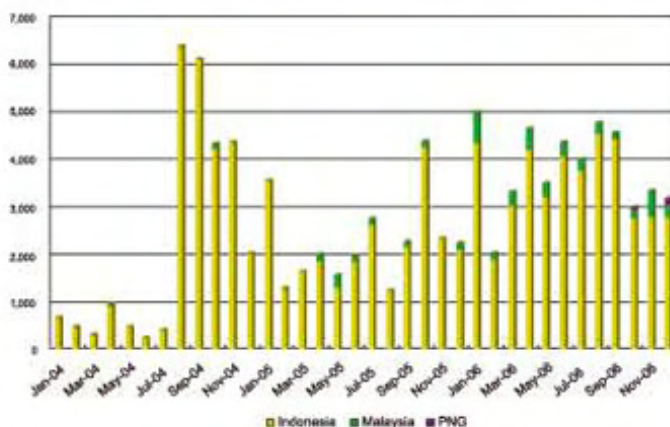
Data source: China Customs import and export data, 2006.

Other traders turned to importing sawn merbau from Indonesia, in place of merbau logs. Chinese Customs' data shows that the imported volume of sawn merbau in

2006 rose sharply, reaching 47,000 m³, a 71 per cent increase over 2005. Indonesia remained China's predominant supplier of merbau sawn timber, accounting for 91 per cent of the total import volume in 2006, with Malaysia ranking second with 8 per cent of the trade in sawn timber³⁵ (Figure 3).

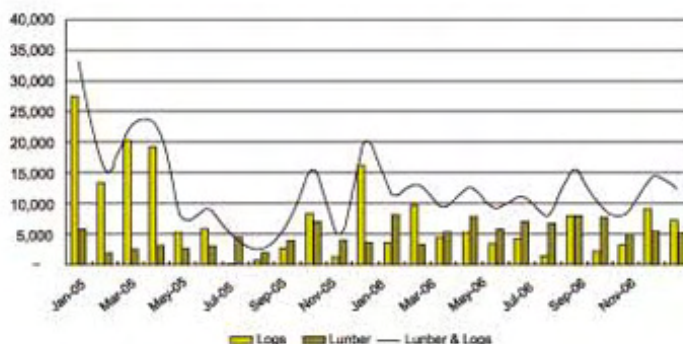
In total, however, the huge reduction in the quantity of merbau logs previously smuggled in from Indonesia has not been compensated for by either increased log imports from PNG or increased sawn timber imports from Indonesia. China's official figure of 937,000 m³ RWE³⁶ of merbau logs and sawn timber imported in 2004 contrasts sharply with 136,000 m³ RWE in 2006 (Figure 4).

Figure 3 China's Merbau Sawnwood Imports 2004-2006 (Unit: m³)



Data source: China Customs import and export data, 2004-2006.

Figure 4 China's Merbau Log & Lumber Imports 2005-2006 (Unit: m³ RWE)



Data source: China Customs import and export data, 2005-2006.



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As the log imports have decreased, in order to meet production requirements the import of merbau sawn wood has greatly increased. In the warehouse of Shanghai Furen Timber Market, there are full piles of merbau sawn wood. Shanghai, 2006

"The import and smuggling of merbau is forbidden in Indonesia. It is rather strict there. It was military smuggling, sometimes in a boat with 20,000 to 30,000 m³. But now there is none.

An import and export trade company in Guangdong, 2006

Merbau was once the most popular expensive hardwood on the Chinese flooring market. However, because of the Indonesian government's crackdown on illegal logging and trade, the supply of merbau logs into the Chinese timber market has dropped greatly. The import prices have consequently risen from US\$ 280 per m³ in October 2004 to US\$ 660 in June 2006,³⁷ raising the prices of flooring significantly and thereby reducing its popularity. However, even at this peak price there is too little merbau to meet market demand. Some factories relying on merbau as raw material have gone bankrupt whilst other companies, knowing that their customers place high value on merbau flooring, have begun using other tropical hardwoods from Africa, misleading consumers by describing

these hardwoods as "African merbau" which in fact does not exist, in e-commerce websites such as Alibaba.com.

It must be noted that this shift to utilizing African tree species would in no way ensure that the timber does not come from illegal or destructive logging, because both are equally common in many African countries. Merbau is by no means the only timber species supplied to China from disastrous logging operations. The trade in illegal and destructive timber depresses the market and drives down prices, which then undermines companies who are committed to legitimate and sustainable trade.

During the peak of the illegal merbau trade, it was sold at a third of its "real" cost, the cost observed after the smuggling routes had been largely shut down. If importers and processors continue to rely on destructive raw material sources, it will not only destroy unique forests around the world, but also bears high risks for the development of the whole industry, in China and elsewhere, as tougher law enforcement can shut down large supply chains from one day to the other.

2. Illegal logging and its associated trade continues

Although Chinese traders' smuggling of merbau logs from Indonesia has decreased in the past two years, Chinese Customs' figures and field investigations by Greenpeace indicate that the illegal trade of merbau has never fully stopped.

The merbau imported from Indonesia and PNG enters China through harbours such as Zhangjiagang and Yangzhou in Jiangsu Province, Pudong in Shanghai and Panyu

in Guangdong Province (Table 1).³⁶ Zhangjiagang, next to Shanghai, is by far the largest entry gate, because of its superior geographic position and the growth of the timber processing industry in Eastern China. It has long been the primary harbour for merbau log imports into China, receiving 63 per cent of the merbau logs in 2006. Sawn merbau enters mainly via Shanghai's Pudong port (Table 2).

Table 1 China's Main Import Ports for Merbau Logs 2006

	Import port	Import volume (m ³)	% of total import volume
1	Jiangsu Zhangjiagang	38,796	62.6%
2	Guangdong Panyu	7,096	11.4%
3	Jiangsu Yangzhou	4,198	6.8%
4	Shanghai Pudong New District	3,361	5.4%
5	Jiangsu Taizhou	1,771	2.9%
6	Guangdong Guangzhou	1,695	2.7%
7	Zhejiang Ningbo	1,683	2.7%
8	Guangdong Dongguan	1,244	2.0%
9	Jiangsu Nanjing	473	0.8%
10	Guangdong Shantou	372	0.6%
	Total	60,689	97.9%

Data source: China Customs import and export data, 2006.

Table 2 China's Main Import Ports for Merbau Sawnwood 2006

	Import port	Import volume (m ³)	% of total import volume
1	Shanghai Pudong New District	15,226	33.0%
2	Shanghai Xutui District	4,708	10.2%
3	Zhejiang Hangzhou	3,924	8.5%
4	Xiamen Special Economic Zone	3,604	7.8%
5	Shanghai Jing'an District	2,556	5.5%
6	Jiangsu Lianyungang	1,717	3.7%
7	Jiangsu Nanjing	1,430	3.1%
8	Fujian Fuzhou	1,180	2.6%
9	Zhejiang Ningbo	1,166	2.5%
10	Guangdong Guangzhou	1,117	2.4%
	Total	36,628	79.4%

Data source: China Customs import and export data, 2006.

Greenpeace conducted field investigations at the ports of Zhangjiagang and Guangdong in late 2006, and contacted 12 companies importing merbau logs. Through the information gathered during these investigations, together with analysis of data from Chinese Customs, we discovered that the illegal trade of merbau logs is still continuing, with various methods being utilized.

Illegal log trading: Method one

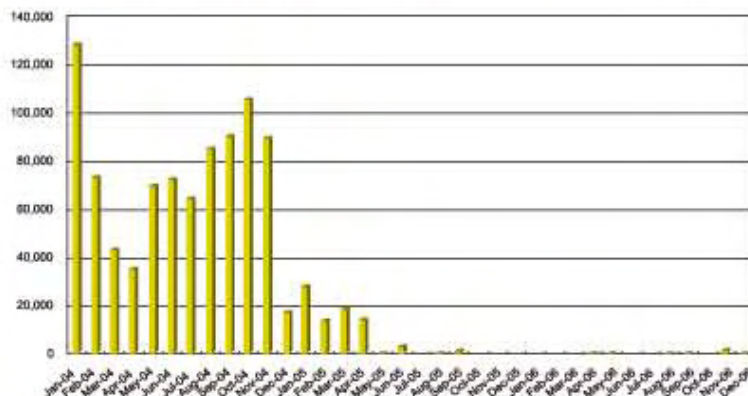
Using forged Malaysian documentation

Since the Indonesian government began to crack down on illegal logging and exports in early 2005, the volume of merbau logs supposedly imported from "Malaysia" to China has declined sharply ³⁹ (Figure 5) and the smuggling

route using forged Malaysian documentation appears to have largely stopped. Of course, should Indonesia or another country lessen their efforts to crack-down on illegal logging and trade, this smuggling route could easily re-emerge as a method of getting the illegal wood into China.

As EIA and Telapak had reported in 2005, also investigations conducted by Greenpeace confirmed that most merbau logs having been recorded as originating from Malaysia in reality originated in Indonesia. Some log businessmen clearly knew that their imported merbau logs were smuggled from Indonesia by using forged Malaysian documentation for Customs clearance. They knew the illegal source of the logs they purchased and were not at all ashamed or embarrassed to tell buyers the wood was shipped in illegally, which reflects that this method of smuggling used to be an open secret among log traders and this was a common smuggling route before the crack down in 2005.

Figure 5 China's Merbau Log Imports from Malaysia 2004-2006 (Unit: m³)



Data source: China Customs import and export data, 2004–2006.

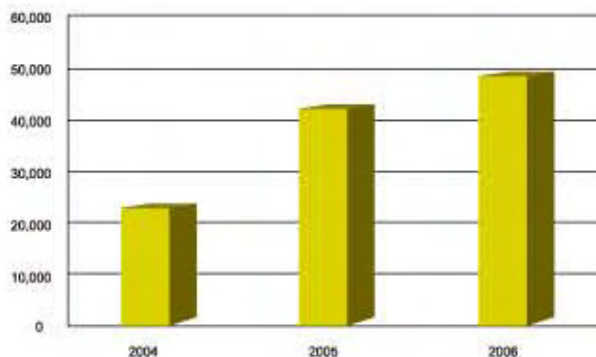
"We always import from Malaysia, where it is not monitored by international organizations. In fact, merbau with Malaysian documentation is smuggled in from Indonesia, for they have many channels. Owing to lots of islands in Indonesia, they log in a small island and transport by towboat, and then the logs are transported by sea from Indonesia to China."

A state-owned import and export trading company in Guangdong, 2006

Illegal log trading: Method two

Importing logs from PNG's illegal concessions

Figure 6 China's Merbau Log Imports from PNG 2004-2006 (Unit: m³)



Data source: China Customs import and export data, 2004-2006.

Since it has become more difficult to smuggle logs from Indonesia into China, some log traders have increased their imports of merbau logs from PNG. The

volume of merbau logs imported from PNG in 2006 reached 48,000 m³, having doubled since 2004, and PNG has now become the greatest official merbau log supplier to China (Figure 6).

PNG's largest exporter of logs and the main supplier to China is the notorious Rimbunan Hijau, a Malaysian company which has an established reputation for illegally accessing concession rights, causing environmental damage, being involved in human rights abuses, social conflicts and political corruption.⁴⁰

In 2002, the PNG government ordered an independent review in a number of disputed logging permits and extensions, three of which involved Rimbunan Hijau's logging projects.⁴¹ The review found that all three were illegal and stated that they had reached the *"unavoidable conclusion that there have been serious departures and*

breaches from due process and there are serious anomalies in the timber permits and agreements".⁴²

The findings of the independent Review also stated that *"the time has come for a full investigation into the affairs of both these companies (Rimbunan Hijau subsidiaries). They should be compelled to produce documents and account for their actions."*

Greenpeace commonly found PNG merbau logs from this company at log dealers at the ports of Zhangjiagang and Guangdong,



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Merbau log in Zhangjiagang port, Jiangsu province. The number on the label "10212" indicates the log came from concession "Turama" in Gulf Province, Papua New Guinea. Zhangjiagang, 2006

Some of these merbau logs originated, for example, from the "Turama" concession in Gulf Province (PNG), operated by "Niugini International Corporation Ltd.", a local subsidiary of Rimbunan Hijau.

Besides logs supplied by Rimbunan Hijau subsidiaries, Greenpeace also found merbau logs from other problematic logging operators such as the "Vanimo"

concession in Sandaun Province, operated by Vanimo Forest Products (VFP), a subsidiary of the Malaysian logging company WTK. This concession also underwent an independent investigation ordered by the PNG Government in 2004 that identified several serious violations of national law and regulations.

Regarding the VFP operation, the



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Merbau log in Zhangjiagang port, Jiangsu province. The number on the label "11008" indicates the log came from concession "Vanimo" in Sandaun Province, Papua New Guinea. Zhangjiagang, 2006

Review Team noted that the absence of the obligatory Environmental Management & Monitoring Officer resulted in logging that was in fundamental breach of the PNG Logging Code of Practices. Furthermore, VFP did not prepare or seek approval for logging set-ups and was found logging in buffer zones of rivers. This resulted in rivers drying up, thus depriving local landowners of their main source of water. VFP was also found to frequently re-enter closed set-ups, even those that had already received re-forestation treatments, destroying all efforts to secure long term timber yields, and the landowners complained that the company frequently uses police to threaten villagers with guns to address issues.⁴³

A third merbau logging company found supplying merbau logs to Zhangjiagang was Low Impact Logging Ltd, which

shipped logs from its "Buhem Mongi Busiga" concession in Morobe Province. This concession received an independent investigation ordered by the PNG Government in 2003 and turned out to be no better than its two larger competitors. Their list of failures included:⁴⁴

- Logging without prior informed consent from land owners,
- No sustainability in the log production or maintenance of the forest's ecological balance,
- The Logging Code of Practice being routinely ignored, included felling of trees into buffer zones, and excess damage during felling,
- The logging operation caused many environmental problems, including excessive vegetation clearance along road lines, soil erosion, and fuel spillage into creek and sea.



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Merbau log in Zhangjiagang port, Jiangsu province. The number on the label "11338" indicates the log came from concession "Buhem Mongi Busiga" in Morobe Province, Papua New Guinea. Zhangjiagang, 2006

Illegal log trading: Method three

Importing illegal logs from Indonesia

The Indonesian government prohibited any log exports as early as October 2001⁴⁵ but according to the import data from Chinese Customs logs were recorded as coming into China from Indonesia every month from January to December in 2006. A total of 35,806 m³ are officially recorded in clear violation of Indonesian laws. This volume included a total of 7,736 m³ of merbau logs (Figure 7).

Figure 7 China's Log Imports from Indonesia 2006 (Unit: m³)



Data source: China Customs import and export data, 2006.

Table 3 China's importers of Indonesian Logs 2006 (Jan-May)⁴⁶

Company	Import Volume (m ³)
Changshu Zhenfeng Wooden Co., Ltd.	6,784
Dongguan Golden Palm Furniture Co., Ltd.	1,304
Shanghai Huizan Import & Export Co., Ltd.	1,012
Tongyou Timber (Kunshan) Co., Ltd.	545
Ningbo Jiangbei Xinbao Trade Co., Ltd.	436
SUMEC International Technology Co., Ltd.	357
Huzhou Jurise Wooden Co., Ltd.	181
Shanghai China TUHSU Pudong Import & Export Co., Ltd.	162
Shanghai SFECO Import & Export Co., Ltd.	161
Shenzhen Baoan Foreign Economic Development Co., Ltd.	101
Zhejiang Material Industry (Group) Co.	94
Shanghai CHB Import & Export Co., Ltd.	92
Guangzhou Huaxu Import & Export Co., Ltd.	47
Shenzhen Weihuaifeng Industry Co., Ltd.	36
Shanghai Bridgewood Int'l Trade Co., Ltd.	35
Shanghai Li An Import & Export Corporation	30
Shanghai Yaoxin International Trading Co., Ltd.	29
Shanghai Xinyi Import & Export Co., Ltd.	27
Shanghai Foreign Trade Development Co., Ltd.	19
Zhejiang Willing Foreign Trading Co., Ltd.	19
Fuzhou Xiefa Trading Co., Ltd.	19
Tianjin TIENS Biology Development Co., Ltd.	8
Total	11,498

Data source: China Customs Import and Export Trade Database (CTI). 2006.

Table 4 China's Importers of Indonesian Merbau Logs 2006 (Jan-May)⁴⁷

Company	Import Volume (m ³)
Ningbo Jiangbei Xinbao Trade Co., Ltd.	436
SUMEC International Technology Co., Ltd.	357
Shanghai SFECO International Co., Ltd.	147
Huzhou Jurise Wooden Co., Ltd.	126
Shanghai CHB Import & Export Co., Ltd.	81
Shanghai Bridgewood Int'l Trade Co., Ltd.	35
Shanghai Li An Import & Export Corporation	30
Total	1,212

Data source: China Customs Import and Export Trade Database (CTI). 2006.



Imported squared merbau logs are stocked at Zhangjiagang Dock, and importers declare the import of these square logs in the name of sawn wood in order to replace the scarcity of merbau logs. Zhangjiagang, 2006

Along with the Indonesian log ban, the Chinese Government signed a "Memorandum of Understanding Concerning Cooperation in Combating Illegal Trade of Forest Products" with the Indonesian government in 2002. Despite this, Chinese businessmen still find ways to import merbau logs into China directly and these, surprisingly, are even recorded on the official import records of Chinese Customs.

Illegal log trading: Method four *Smuggling squared logs from Indonesia*

In recent investigations, Greenpeace observed that more and more squared merbau logs from Indonesia have begun appearing at the large log ports. "Squared logs" are minimally processed to become square instead of round. They are then cut into lengths of 2-6 meters and fit perfectly into shipping containers, which are then shipped to China as "sawn timber". Squared logs are, for the purposes of the log ban, considered to be logs not "sawn

timber", but the false description is used to illegally smuggle them through Customs. This is possible because sawn timber is permitted to be exported, but only if it has been sanded or planed. Therefore the category "sawn timber" itself describes a legitimate export commodity. The reality is that squared logs shipped in containers slip through customs more easily because they are much more difficult to detect and the description "sawn timber" does not raise the suspicions of Customs officials.

A recent report by EIA and Telepak confirmed Greenpeace's findings of squared merbau logs being smuggled from Indonesia into China, but revealed a new illegal trading route of even greater concern. As the groups documented, Indonesian logs are being offloaded at Malaysian ports, but during transit are marked as logs of Malaysian origin. Despite the fact that merbau in Malaysia is almost entirely logged out this wood enters the international market as "Malaysian Merbau", which helps to explain the relative abundance of the commodity in international trade.

3. What we can extrapolate from the case of merbau

The drop in illegal merbau log supplies to China caused by the Indonesian government's crack down on the timber mafia in Indonesia in early 2005 was never fully compensated for by supplies of merbau logs from other countries or semi-finished products such as lumber, semi-flooring, etc. There has been an increase in imports of other species from other tropical forest and non-tropical countries.

Chinese Customs data indicates that the import volume of, for example, camphor logs from Malaysia and Indonesia has increased by 164 per cent within three years, from 70,000 m³ in 2004 to 185,000 m³ in 2006. Meanwhile, in 2006 the imported volume of "other tropical logs" that are not classified by specific species (including various tropical logs that originated in Southeast Asia, Africa and South America) rose to 567,000 m³ compared with 434,000 m³ in 2004. At the same time, the imported volume of oak and ash logs from Russia, as well as temperate hardwood logs from North America, also increased greatly from 2005 to 2006. In fact, the total import volume of temperate hardwood logs exceeded that of tropical logs to become the leading hardwood logs found in China in 2005.

The decrease in merbau log import was

hence more than offset by imports of other hardwood species, often from regions where illegal and destructive logging is just as much a problem as it is on the island of New Guinea.

Despite the stringent measures adopted by the Indonesian Government to combat illegal logging, destructive and illegal logging operations are pushing the valuable merbau species to the brink of extinction. Greenpeace field investigations and Chinese Customs data prove that while the crackdown campaigns have been effective to some extent, ultimately they have not been sufficient to completely put an end to the illegal logging and trade in merbau logs.

The primary threat to merbau's survival, however, remains the fact that virtually no measures have been implemented to control destructive logging; destructive logging in PNG and Indonesia remains the norm, posing the highest threat to merbau, with illegal logging serving only to heighten the level of threat. While the measures taken to address illegal logging in Papua Land may have temporarily reduced this specific pressure on merbau, the pressure of legal destruction remains and additional pressure has been placed on other species, with vast increases in the import of other tropical and temperate hardwoods.

Unless significant bilateral and multilateral steps are taken by governments in the Asia Pacific region, as well as globally, the impact of illegal and destructive logging and trade is almost certain to worsen. China's manufacturing of flooring for domestic consumption and for export is already of global significance and projected to continue to increase, as is the case for plywood, furniture and other wood products. With a logging ban on domestic natural forests in place in China since 1998, the Chinese wood processing industries are forced to increasingly rely on imports from other countries where illegal and destructive logging are rampant. Raw materials used in an unsustainable way cannot form the basis of an industry with a long-term view of growth and prosperity. Chinese enterprises that import such timber both destroy China's international reputation and pose a major threat to the sustainable, long-term

development of the Chinese wood-based industry.

As half of the world's traded tropical logs are destined for China, the future of the world's tropical rainforests will largely depend on whether the industry in China will take immediate actions to tackle illegal and destructive logging and the associated trade. Without such efforts, a large section of the timber processing industry in China will be doomed to collapse when the supply of cheap timber inevitably runs out.

The industry will ultimately have to change, either due to increased political pressure bringing about tougher legislation, or due to the exotic species no longer being available. Alternatively, changes can be effected now, on a voluntary basis. Only if those changes come soon will our ancient forests, and magnificent species such as merbau, have a chance of survival.



The future of merbau depends largely on what decisive steps are taken today by governments and the logging and manufacturing industries.

Part 3

Conclusion and Recommendations

Destructive logging of merbau is pushing this beautiful tree species to the brink of extinction, and its impact is greatly exacerbated by the high levels of illegal logging that occur in countries where merbau is commercially available. If the current rates of logging of merbau continue, the species will be virtually wiped out within the next 35 years. Simultaneously, this reckless mining of merbau will destroy much of the last remaining ancient rainforests in Asia Pacific. In order to secure the viability of the species in the long-term, immediate and concrete action needs to be taken immediately. Greenpeace recommends that;

1. Merbau should be immediately listed on Appendix III of the Convention on International Trade in Endangered Species (CITES) with quotas severely restricting the trade in this highly vulnerable species. Governments and the CITES Secretariat must assess the possible upgrade of Merbau on CITES appendices at the 2009 CITES meeting to secure its population from massive logging activities in Indonesia and PNG;
2. The governments of the states where merbau is found should immediately embark on participatory landscape-level planning processes, leading to the establishment of a large-scale network of protected areas;
3. All governments should participate in bilateral and multilateral international cooperation and implement corresponding measures at home to eliminate illegal logging and ban the import of illegally logged timber products;
4. Wood manufacturing companies that continue to purchase merbau for high-end luxury products should immediately adopt credible third-party chain-of-custody procedures to ensure the legal supply of merbau from forest areas located outside Intact Forest Landscapes (IFLs) or other forest areas containing High Conservation Value Forests. As a necessary second step, companies should immediately begin requesting their suppliers to achieve certification according to the standards of the Forest Stewardship Council (FSC) within three years.

Given that less than 10 per cent of the planet's land area remains as intact forest landscapes, Greenpeace is calling on governments to adopt a moratorium on the issuing of new logging concessions and to not allow the expansion of existing concessions into the IFLs in order to safeguard conservation opportunities for the future.

The future of merbau and the future health of the Paradise Forests depend largely on what decisive steps are taken today by both governments and the logging and manufacturing industries. The time for concrete action is now.

Notes

1. The concept of High Conservation Value Forests (HCVF) was developed by FSC for use in forest certification (FSC Principle 9). High Conservation Values (HCVs) include environmental and social values that are considered to be of outstanding significance or critical importance. Examples may include concentrations of endangered species, protection of a stream that is the sole source of water to a local community, or a site with special religious significance. www.fsc.org/keepout/en/content_areas/45/2/files/fs_hcvf_web.pdf
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21. EIA and Telapak. *op. cit.*
22. Forestry Compendium. *op. cit.* or UNEP. www.unep-wcmc.org/trees/trade/int_bij.htm.
23. EIA and Telapak. March 2006. *Behind the Veneer, Giant European and North American Manufacturers and Retailers Still Trading Merbau Wood Flooring of Dubious Origin, An Update to the 'Behind the Veneer' Report*, Telapak/EIA, July 2006.

24. To learn more about large, intact forest landscapes (IFLs) visit www.intactforests.org.
25. It is assumed that in remaining forest areas outside IFLs, most of the merbau is already gone and if any does, in fact, remain it is assumed that it will be logged in the near future.
26. Including concessions for conversion into plantations and concessions in PNG, proposed for allocation.
27. Field investigation by Greenpeace researchers. February 2007.
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34. China Customs import and export data.
35. China Customs import and export data.
36. RWE = Round Wood Equivalent. This unit allows a volume based comparison of different wood products. It calculates the volume of round wood, i.e. logs, needed to produce an equivalent volume of processed product. In this case, the factor 1.65 was used to calculate the RWE of 1 m³ of sawn Merbau.
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