

Mixed Species: Assessing FSC's 'Mixed Source' Certification

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ITS GLOBAL

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Contents

Acronyms	4
Executive Summary	5
1. Introduction	7
1.1 What is Forestry Certification?	7
1.2 The Forest Stewardship Council.....	7
1.3 Alternative Certification Schemes - PEFC	7
1.4 Mixed Tropical Hardwoods and NGO Campaigning	8
2. The FSC Standards: an Overview	9
2.1 Description of FSC Standards.....	9
2.2 The 'Mixed Sources' Label	10
2.3 Comparisons between FSC and PEFC	10
3. Fibre Sourcing – Forests and Harvesting	12
3.1 Forest Harvesting Techniques.....	12
3.2 Mixed Tropical Hardwood in FSC Certification	13
4. Wood Fibre Test Results	14
4.1 Objective	14
4.2 Methods	14
4.3 Results	14
4.4 Conclusions.....	16
Annex I: Microscopic Images	17
References	18

Acronyms

CoC	Chain of Custody
FSC	Forest Stewardship Council
IUCN	International Union for Conservation of Nature
KCC	Kimberly Clark Canada
MTH	Mixed Tropical Hardwoods
NGO	Non-Governmental Organisation
PEFC	Program for the Endorsement of Forest Certification
QMS	Quality Management System
SFI	Sustainable Forestry Initiative

Executive Summary

KEY POINTS

- **FSC's 'Mixed Source' certification does not exclude mixed tropical hardwood fibres from FSC labelled products;**
- **Independent wood fibre testing shows the presence of fibres likely sourced from endangered species in FSC labelled products;**
- **FSC 'Mixed Source' certification does not provide a high degree of confidence that FSC labelled products are free of 'controversial' wood fibres.**

The forestry certification system of the Forest Stewardship Council (FSC) is highly regarded in the business sector as well as the non-profit sector.

Environmental campaign groups generally contend that FSC certification generates superior environmental outputs to other certification systems, such as those endorsed by the Programme for the Endorsement of Forest Certification schemes (PEFC).

Supporters of the FSC system have criticised non-FSC certified products for containing a category of wood ("mixed tropical hardwood"), which is taken as a proxy indicator of unsustainable forest management.

The presence of this wood in a large range of products, particularly Chinese manufactures such as medium density fibreboard, paper products and books, has also been criticized by labour organizations in the United States.

Supporters of FSC recommend that operators should only use FSC certification to verify that the products support sustainable forest management – and therefore exclude mixed tropical hardwood. This report details the results of research on these claims and the systems. It includes the results of fibre testing of paper which has been endorsed under FSC systems.

There are alternative certification systems to FSC. PEFC, for example, is the world's most widely-used forest certification system. Comparative studies have shown that PEFC endorsed standards deliver strong environmental outputs in forestry management; comply with international best practice in standards and conformance; and share significant alignment with FSC's forestry management requirements in a number of key areas.

Both FSC and PEFC offer certification systems that provide different levels of verification of sustainability. The leading systems require rigorous demonstration that producers have been meticulous in applying specified sustainable practice in all steps of the production process. These are expensive. Accordingly, both systems also provide systems and labels which verify that timber has defined percentages of timber from both fully certified and partially certified or uncertified sources.

Advocates for FSC generally contend that the presence of mixed tropical hardwood in wood or paper products is evidence of poor forest management, citing fibre analysis to demonstrate they contain

mixed tropical timbers. They therefore urge consumers and corporations to switch to FSC – not PEFC – as a means of safeguarding against this.

In the opinion of ITS Global, this is misleading for two reasons:

- i) The existence of mixed tropical hardwood fibres does not *a priori* indicate the timber was procured by unsustainable methods. The term refers to forest resources that host a number of tropical hardwood species.
- ii) FSC's own 'Mixed Source' certification does not itself exclude mixed tropical hardwood fibres from FSC labelled products. Independent wood fibre testing shows the presence of mixed tropical hardwood fibres in FSC labelled products.

Wood fibre testing on FSC labelled paper in fact shows there is a reasonable probability that it contains controversial wood product. It showed the presence of wood fibres from the *Shorea* genus. These species - members of the *Dipterocarpaceae* family - are widely regarded as controversial, with the majority of the *Shorea* genus listed as endangered or vulnerable by the International Union for the Conservation of Nature (IUCN).

The conclusion of this report is that FSC certification does not preclude mixed tropical hardwood from entering supply chains. Nor does it provide a high degree of confidence that they may not contain controversial timber. The claim that FSC systems guarantee a higher environmental standard than other forestry certification schemes is therefore not supportable.

1. Introduction

1.1 What is Forestry Certification?

Forest certification is a voluntary system of standards and conformance. It provides a consumer with an assurance that wood products are sourced from well managed.

Generally speaking, forestry certification schemes involve four main elements:

- *A standard demonstrating sustainable forestry management* – Documents that set out the management requirements which must be met. They should be established by consensus, stakeholder consultation and transparent processes.
- *Forest certification* – The process by which a qualified and independent third party establishes whether the operator complies with the management standard.
- *Accreditation of certification bodies* – The process by which an authoritative body recognises the third party as competent to audit the forest operator
- *A mechanism for controlling claims* – A mechanism to trace wood from the certified forest to the final product and ensure that claims are clear, credible and honest. This may include chain of custody systems and labelling mechanisms to trace a product throughout all production stages.

1.2 The Forest Stewardship Council

The Forest Stewardship Council (FSC) was established in 1993. Today it is one of two global forest certification schemes operating worldwide, although not the largest. The organisation certifies operators against FSC standards through accredited certification bodies. Under the system, operators that meet the FSC standards and rules for logo usage are eligible to place the relevant FSC logo on their product.

FSC has developed an international Forest Management Standard as a framework to certify “responsible” forestry operators.¹ In a number of cases, FSC has interpreted this standard to meet the requirements of specific national or regional contexts (known as National Initiatives).

FSC enjoys the broad support of a number of other influential environmental campaign groups.²

1.3 Alternative Certification Schemes - PEFC

The Program for the Endorsement of Forest Certification (PEFC) is the largest global forestry certification scheme. Total certified forest area under the PEFC umbrella exceeds 220 million hectares, compared with 145 million hectares certified under FSC.^{3 4}

PEFC is an international system for the mutual recognition of national forest certification schemes. It employs a decentralized structure, whereby applicant schemes are developed by independent

¹ FSC International Standard (2002), *FSC Principles and Criteria for Forest Stewardship*, FSC_STD-01-001 (version 4-0)

² Schmidt, E. (1999), 'The Forest Stewardship Council: Using the Market to Promote Responsible Forestry', *Yearbook of International Co-operation and Development 1998/1999*

³ PEFC website (2011), *Facts and Figures*, available at <http://www.pefc.org/about-pefc/who-we-are/facts-a-figures>

⁴ FSC (2011), *Global FSC Certificates: Type and Distribution* (May), available at: http://www.fsc.org/fileadmin/web-data/public/document_center/powerpoints_graphs/facts_figures/2011-04-15-Global_FSC_certificates-EN.pdf

National Standards Bodies, often recognized by the International Organisation for Standardisation (ISO). These national standards may then be submitted to PEFC for endorsement. In order to achieve PEFC endorsement, the national scheme must conform to the requirements prescribed by the Criteria and Indicators documented in PEFC's international standard.⁵ Before recognition by PEFC, national forest management schemes must undergo a thorough independent assessment that includes a global public consultation process and a Panel of Experts review. Only then is the national scheme considered by the PEFC Board, and all PEFC members.

PEFC was established in 1999, with the initial backing of European small/family forest owners seeking certification under an independent umbrella organisation.

1.4 Mixed Tropical Hardwoods and environmental campaigning

A number of campaign groups have attacked forestry operators in tropical forested countries, making the general claim that the presence of certain tropical species in paper products, particularly from China, as a proxy indicator for unsustainable forest management.⁶

As the basis for this case, wood fibre testing of products has been utilised. In several instances, they claim testing shows the presence of 'mixed tropical hardwood' (MTH) fibres, in turn serving as evidence of unsustainable forest management.

To avoid using wood fibres linked to destructive logging practices, they recommend that manufactures and consumers only purchase FSC certified products. They do not suggest products certified to PEFC as an alternative.

⁵ PEFC Council (2010), *Sustainable Forest Management – Requirements* (PEFC ST 1003:2010)

⁶ Africa, Asia, the Pacific and South America

2. The FSC Standards: an Overview

2.1 Description of FSC Standards

Under the FSC system, wood and wood products can gain certification under several standards. The leading standards include Forestry Management, Controlled wood and Chain of Custody.

Forestry Management Standard

FSC's Forestry Management standard is based on 10 principles and 56 criteria, developed and amended by the FSC's General Assembly. The initial Principles and Criteria were approved in 1993 and have been amended several times subsequently.⁷

The ten principles address the following areas:

- 1) Compliance with Laws and FSC Principles
- 2) Tenure and use rights and responsibilities
- 3) Indigenous people's rights
- 4) Community relations and worker's rights
- 5) Benefits from the forest
- 6) Environmental impact
- 7) Management plan
- 8) Monitoring and assessment
- 9) Maintenance of high conservation value forests
- 10) Plantations

FSC has provisions to develop standards specific to a particular country or region by interpreting the International Forest Management Standard into a local or regional context. These National Initiatives - with their own members, Board of Director, staff and donors - are responsible for the development of the FSC national standard.

Controlled Wood Standard

The FSC website states that despite "continued and sustained growth" in the availability of products certified against FSC's Forest Management Standard, "some shortages still remain".^{8,9} To address this, FSC-created rules allow timber processors and manufacturers to make partial use of timber which has not been certified against FSC Forest Management Standard.

This timber must still meet several requirements, outlined under the FSC Controlled Wood Standard.¹⁰ Instead of requiring compliance with all of FSC's Principles and Criteria, 'Controlled Wood' must establish a Quality Management System (QMS) and comply with limited criteria. The 'Controlled Wood' standard specifies that wood from the following is avoided:

- Wood harvested illegally
- Wood harvested in violation of traditional and civil rights
- Wood harvested in High Conservation Values forests
- Wood harvested from areas being converted from natural forests to other uses

⁷ FSC International Standard (2002), *FSC Principles and Criteria for Forest Stewardship*, FSC_STD-01-001 (version 4-0)

⁸ FSC Website (2011), 'FSC Controlled Wood', accessed at: <http://www.fsc.org/cw.html>

⁹ Presumably this means that FSC recognises that often it is impracticable for companies to use only product certified to FSC's Forest Management standard because there is not enough on the market to meet demand.

¹⁰ FSC (2006), *Controlled Wood Standard for Forest Management Enterprises* (FSC-STD-30-010, Version 2-0, 2006); and FSC (2007), *Standard for Company Evaluation of FSC Controlled Wood* (FSC-STD-40-005, Version 2-1, 2007)

- Wood harvested from areas where genetically modified trees are planted

Chain of Custody Standard

Chain of custody (CoC) refers to the change of ownership of forest materials as they move down the production chain through harvesting, transport, processing, distribution and sale phases.

COC certification does not guarantee that a forest product is harvested in line with a management standard. Rather, it is a method of tracking claims that can assist in verifying the legality of wood supply in finished products.

FSC's CoC standard includes rules for controlling management systems, document requirements and inventory control methods.¹¹ The CoC standard requires the organization to classify input material in order to ascertain the proportion of certified material in their products. It also includes provisions for organizations to make FSC claims and labeling on final products.

Specifically it outlines three systems for controlling claims, each used during different stages of the supply chain: transfer system; percentage system; credit system. Under these systems, the final product is eligible to bear a label indicating the standard under which the product is certified - and in some cases the percentage of certified content - used in the product group.¹²

2.2 The 'Mixed Sources' Label

Depending on the type of certification of composite materials, the final product may be eligible to bear an FSC label. FSC has three labels:

- *FSC Pure* - This label signifies that the rolling average of the material used in the product group is 100% FSC pure i.e. that all of the supply comes from forest operators certified under FSC Forestry Management Standard.
- *FSC Recycled* - This label signifies that all of the wood fibre used in the product group is post-consumer reclaimed i.e. recycled fibres.
- *FSC Mixed Sources* - This label signifies that product group has a mixture of FSC certified sources (certified against the FSC Forestry Management Standard) and sources certified under FSC's Controlled Wood standard. There are several systems used to control the claims - transfer system, percentage system or credit system.

The system for controlling claims on final products - the transfer system - allows product groups to hold an FSC 'Mixed Source' label if either:

- there is at least 50% FSC certified content;¹³ or
- the label includes an FSC 'Mixed Credit' claim e.g. 'FSC Mixed XX %'

2.3 Comparisons between FSC and PEFC

Both FSC and PEFC have provisions to allow the use of a proportion of wood products not certified under their respective Forest Management standards.

¹¹ FSC (2008), *Standard for Chain of Custody Certification* (FSC-STD-40-004, Version 2-0)

¹² FSC system applies to 'product groups' rather than 'products', where 'product group' refers to products with the same inputs. FSC illustrate this distinction through the following example: *A specific type of garden chair would be an example of a product. Different lines of garden chairs made of the same material are examples for a "product group"*. (FSC website)

¹³ FSC (2011), *FSC Directive on Chain of Custody Certification* (FSC-DIR-40-004 EN)

In the case of PEFC, products that contain fibres certified against PEFC requirements are eligible for one of two on-product labels:

- *PEFC certified* - indicating the product group includes a minimum of 70% PEFC certified material from forests certified against a PEFC endorsed forest certification scheme.¹⁴
- *PEFC certified and recycled label* - indicating the product group includes a minimum of 70% of raw material from sustainably managed forest which has been certified against a PEFC endorsed forest certification scheme and post-consumer recycled raw material.

Under both PEFC labels, non-certified raw material must be controlled to ensure it is not harvested from controversial sources. This is done through applying the PEFC due diligence system for avoidance of raw material from controversial sources.

Fig 3.1 - Comparison between FSC 'Controlled Wood' standard and PEFC requirements for 'Non-Controversial Sources'

	FSC Controlled Wood	PEFC Non-Controversial Sources
Standards documentation	-FSC controlled wood standard for forest management enterprises (FSC-STD-30-010), and; -FSC Standard for Company Evaluation of FSC Controlled Wood (FSC-STD-40-005, Version 2-1, 2007).	PEFC Chain of Custody for Forest Based Products (PEFC 2002:2010); Appendix 2: PEFC Due Diligence System (DDS) for avoidance of raw material from controversial sources
Summary of requirements	Forest operators - establish a Quality Management System to ensure wood is harvested: i) legally; ii) in compliance with traditional and civil rights; iii) outside HCV Forests; iv) without resulting in forest conversion; and v) without genetically modified trees	Suppliers must establish a due diligence system that includes: -Suppliers self-declaration, -Purchaser risk assessment -Management of high risk suppliers
	Suppliers - set up a controlled wood verification program that includes a risk assessment	
Eligible label	FSC Mixed Source	PEFC Certified
Content requirements for label usage	-at least 50% of content is either reclaimed or FSC certified -or label to include credit claim e.g. 'FSC Mixed XX %'	-at least 70% of content comes from PEFC certified forests. All other sources must comply with due diligence requirements -requires label to include credit claim e.g. 'XX % PEFC certified'

¹⁴ PEFC (2008), *Logo usage rules – requirements* (PEFC ST 2001:2008, Second Edition)

3. Fibre Sourcing – Forests and Harvesting

3.1 Forest Harvesting Techniques

There are several types of forest resources, including mixed tropical hardwood Forests; Original Forest; Indigenous Plantations; Exotic Plantations; Managed Natural Regeneration and Un-managed Natural Regeneration.

Notably, none of these forest types represent environmentally 'bad' wood - mixed tropical hardwood forests is not in itself a pejorative term. It simply indicates a forest area that is made up of a variety of tropical hardwood species.

Although mixed tropical hardwood is a forest resource, it is sometimes confused with a logging practice. Broadly speaking, logging and timber harvesting operations tend to fall into one of the following techniques:

- *Conventional (non-selective) logging* - industrial scale logging to remove all valuable species in a designated area.
- *Selective logging or Reduced Impact Logging (RIL)* - harvesting a limited number of trees per hectare. Harvested trees are also targeted based on factors - such as species, size and age - in order to ensure minimal disruption and optimal regrowth.
- *Clear cutting* - all the trees in the forested lot are felled.

These harvesting techniques can be applied to any forest resource. Decisions on how to harvest are based on a range of economic, social, political, technological and environmental factors. Nonetheless, mixed tropical hardwood forests are not necessarily harvested through clear-cutting, and are not *a priori* indicative of large-scale environmental degradation.

DOES FSC MIXED SOURCES PRECLUDE CLEARFELLING IN MIXED TROPICAL HARDWOOD FORESTS?

It is possible for mixed tropical hardwood fibres to enter FSC 'Mixed Source' labelled products in several ways:

- 1) FSC's Controlled Wood Standard does not prohibit clear-felling in mixed tropical hardwood forests. The standard restricts clear-felling in certain contexts (such as High Conservation Value forests), and does not necessarily prohibit the harvesting of mixed tropical hardwood forests.
- 2) FSC 'Mixed Source' labels allow for a proportion of timber not certified under the FSC Forest Management Standard - potentially including mixed tropical hardwood fibres - to enter the final product group. Furthermore, FSC's CoC standard prescribes the use of a 'credit account'. This effectively allows an organisation to label a product even if its specific content is not certified, as long as the credit is appropriately transferred and maintained across the product group.
- 3) FSC's auditing system may allow non-certified supply to enter certified supply chains. In practice, few certified forest operations meet all FSC requirements.¹⁵ The FSC system requires ongoing audits to identify where operations fail to meet standards. An auditor may identify a minor infringement, and suggest a Corrective Action Request rather than suspension of certification. In this way operators can temporarily maintain certification despite harvesting wood fibres beyond FSC requirements.

¹⁵ Menne, W. (2010), 'FSC forest certification: promises or pretences?', *ETFRN News 51* (September)

3.2 Mixed Tropical Hardwood in FSC Certification

There is a common misconception that the FSC label is a guarantee that a final product does not include mixed tropical hardwood fibres. This has been perpetuated by supporters of FSC who have campaigned against forest operators that are harvesting mixed tropical hardwoods. Despite evidence that mixed tropical hardwood fibres can enter FSC labelled products, these supporters have presented FSC as a superior approach.

To avoid contributing to alleged rainforest destruction, supporters advise consumers to “use recycled paper or FSC-certified paper product”;¹⁶ or that manufacturers use FSC certified supply in order to comply with “Best Practice”.¹⁷

These statements imply that FSC represents a stricter standard, and that the system prohibits mixed tropical hardwoods from entering supply chains. ITS Global analysis shows this is not the case.

This is further demonstrated by the results of independent wood fibre testing - commissioned by ITS Global - showing samples of FSC certified paper include fibres. These results conclusively show that FSC certification scheme does not restrict FSC labelled products from containing mixed tropical hardwood fibres.

¹⁶ Greenpeace China (2009)

¹⁷ Rainforest Action Network (2010)

4. Wood Fibre Test Results

In February 2011, ITS Global commissioned leading independent scientists (Covey Consulting) to analyse three paper samples displaying the FSC 'Mixed Sources' label. An outline of the testing process and results follows.

4.1 Objective

ITS Global sought to identify the papermaking wood fibres in three samples of FSC certified paper and board, using standard light microscopy fibre analysis.

4.2 Methods

Three paper products with FSC 'Mixed Sources' labels were selected and examined for internal structure.

Torn pieces of each sample were disintegrated, sub-samples dried onto glass slides, stained and examined under light microscopy (according to the standard method AS/NZ 1301:451rp:2007 Fibre furnish analysis).

One of the samples (Sample 3) was composed of several different plys. In this case, the two outer plys were separated from the inner ply and analysed separately.

4.3 Results

Mixed Tropical Hardwoods:

The testing revealed that two of the three samples included fibres that were highly mixed tropical hardwoods.

Table 5.1 - Wood Species composition of three samples

	Sample 1		Sample 2		Sample 3			
	Species	% of total	Species	% of total	Outer Ply		Inner Ply	
					Species	% of total	Species	% of total
Chemical Hardwood	Mixed tropical hardwood (at least 4 species), Acacia/Eucalypt	58.2%	Eucalyptus	83.5%	Mixed tropical hardwood (at least 5 species), Acacia/Eucalypt	86.8%	Mixed tropical hardwood (at least 5 species), Acacia/Eucalypt	51.5%
Chemical Softwood	Spruce, Pine	33.0%	Scots Pine, Spruce	16.5%	Radiata Pine, Spruce(rare occurrence)	11.3%	Radiata Pine. Spruce(rare occurrence)	7.5%
Semichemical Hardwood	Acacia/Eucalyptus	8.8%						
Mechanical Softwood					Spruce, pine(rare occurrence)	1.8%	Spruce, pine(rare occurrence)	40.9%

Samples 1 and 3 included species deemed most likely mixed tropical hardwood by the independent testing scientists. The scientists concluded that although some plantation grown tropical hardwood species (such as Acacia) are used in paper making, the range of species identified in this analysis suggested non-plantation wood sources such as mixed tropical hardwood forests.

The fact that chemical hardwood - including mixed tropical hardwoods species - makes up the largest composite parts of samples 1 and 3 indicates its significant presence within the wood fibre sources.

Genus Identification:

Wood fibre tests were further able to identify the specific genus of several unidentified mixed tropical hardwoods fibres. Due to structural similarities, there is uncertainty involved in identifying beyond the genus level (for example identifying specific species). However, tests were able to confirm the presence of a number of genera in the samples.

Notably, Sample 3 included a number of fibres belonging to genera primarily of Southeast Asian origin. These include Red Lauan (*Shorea*), Wattle (*Acacia*), Gumari (*Gmelina*) and *Eucalyptus*. According to the independent scientists, these fibres indicate the forest source "is most likely mixed species forests and plantation forests (*Acacia* and *Eucalyptus*) in SE [South East] Asia."

These findings also highlighted the possibility that endangered species are present in the paper sample. Red Lauan (*Shorea*) is a genus of the *Dipterocarpaceae* family. This is a genus made up predominantly of tropical species associated with lowland rainforests.

The majority of the known species of this genera are listed as endangered by the International Union for Conservation of Nature's (IUCN). The *Shorea* genus consists of approximately 190 species.¹⁸ Of that, 148 species are listed on the IUCN's 'Red List' of endangered and threatened species.¹⁹ Listed species are ranked according to the classifications - 'not evaluated'; 'data deficient'; 'least concern'; 'near threatened'; 'vulnerable'; 'endangered'; 'critically endangered'; 'extinct in the wild'; and 'extinct'.

According to the IUCN, 102 *Shorea* species are critically endangered; 34 are endangered; and three species are listed as vulnerable. One *Shorea* species is already extinct.

Wood fibre testing involved comparing microscopic samples with characteristics of a 'marker' species. In this test, the unidentified fibre was compared with the 'marker' species - *Shorea Polysperma*.²⁰ This species - endemic to the Philippines - is critically endangered according to the IUCN. Scientists found that the wood fibres found in Sample 3 matched the characteristic of this critically endangered marker species.

Wood fibre testing is unable to ascertain the species of an identified wood fibre with certainty. However, based on the high probability of Red Lauan species being listed on the IUCN red list, and comparisons with endangered marker species, ITS Global conclude that there is a significant likelihood that wood fibres in Sample 3 come from endangered, threatened, or vulnerable species.

¹⁸ Marja-Sisko Ilvessalo-Pfaffli (1995), *Fibre Atlas - Identification of Papermaking Fibres*, Springer Series in Wood Science, Germany

¹⁹ IUCN (2010), *IUCN Red List of Threatened Species* (Version 2010.4), accessed at: <http://www.iucnredlist.org>, downloaded May 2011

²⁰ Ilvessalo-Pfaffli (1995)

4.4 Conclusions

Two of the three paper samples recorded the presence of mixed tropical hardwood in their composite wood fibers. These findings demonstrate that the FSC's 'Mixed Sources' label does not guarantee that mixed tropical hardwood fibers are excluded from FSC certified products.

Testing also revealed the presence of Red Lauan species. A significant number of these species have been listed as critically endangered and endangered, making Red Lauan a controversial wood product. In the US, NGO Rainforest Relief has actively campaigned against Home Depot's stocking of Lauan products.²¹ Other campaigners such as Greenpeace have linked the logging of Red Lauan with illegal forest operations and deforestation in South-East Asian tropical rainforests.²²

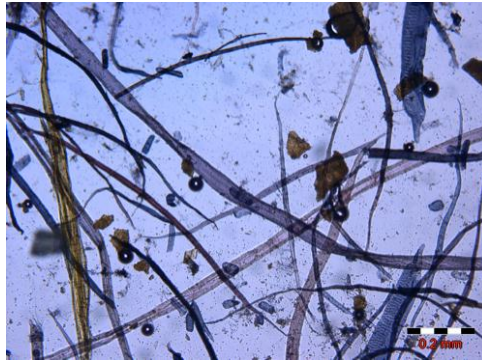
The results of these independent wood fibre tests demonstrate that FSC does not necessarily deliver the supported outcomes of FSC advocates. Findings show that mixed tropical hardwoods fibres - and potentially fibres from endangered species - are present in FSC labelled products.

²¹ Keating, T. (2004), *The Home Depot's, Lowe's and Menards' Continuing Sales of Old Growth Rainforest Destruction*, Rainforest Relief, Occasional Paper

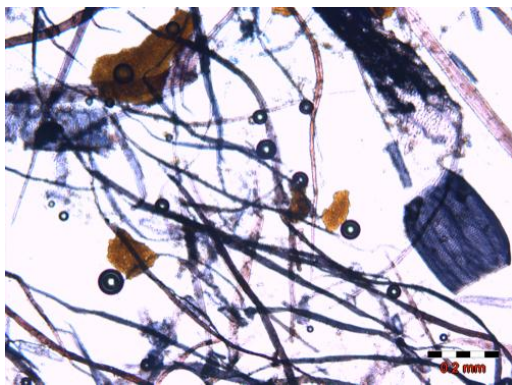
²² Greenpeace South East Asia (2006), *Sierra Madre: Under Threat*

Annex I: Microscopic Images

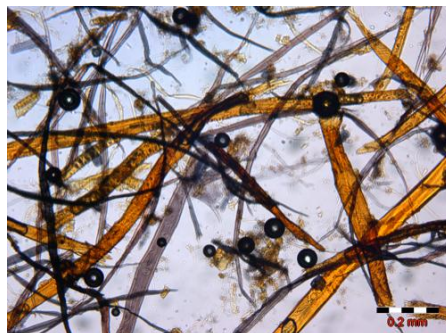
Sample 1 - shows chemical hardwood and softwood fibres, and hardwood vessels of unknown species. The yellowish fibre on the left is semi chemical hardwood. Yellow pieces of various shapes are fragments of coating and the small black dots are air bubble artefacts in the slides.



Sample 3 outer ply - shows chemical hardwood and softwood fibres and an Acacia type vessel, and vessels of other species.



Sample 3 - shows mechanical softwood in fibrous mix with chemical hardwood and softwood fibre.



References

- Bartley, T. (2007), 'How Foundations Shape Social Movements: The Construction of an Organized Field and the Rise of Forest Certification', *Social Problems*, Vol. 54(3)
- Butler, R., Laurance, W. (2008) 'New strategies for conserving tropical forests', *Trends in Ecology and Evolution*
- Central Point of Expertise on Timber (CPET) (2010), *Review of Forest Certification Schemes*, UK
- Friends of the Earth UK (2002), *Paper tiger, hidden dragons 2: April fools*, London, UK
- FSC (2006), *Controlled Wood Standard for Forest Management Enterprises* (FSC-STD-30-010, Version 2-0, 2006)
- FSC (2011), *FSC Directive on Chain of Custody Certification* (FSC-DIR-40-004 EN)
- FSC (2008), *Standard for Chain of Custody Certification* (FSC-STD-40-004, Version 2-0)
- FSC (2007) *Standard for Company Evaluation of FSC Controlled Wood* (FSC-STD-40-005, Version 2-1)
- FSC (2002) *FSC International Standard - FSC Principles and Criteria for Forest Stewardship*, (FSC_STD-01-001, version 4-0)
- Greenpeace (2006), *Sierra Madre: Under Threat*, Greenpeace South East Asia
- ITS Global (2010) *Forestry certification – Sustainability, Governance and Risk*, accessed at: <http://www.itsglobal.net/sites/default/files/itsglobal/Forestry%20Certification-Sustainability%20Governance%20and%20Risk%20%282011%29.pdf>
- IUCN (2010), *IUCN Red List of Threatened Species* (Version 2010.4), downloaded May 2011
- Keating, T. (2004), *The Home Depot's, Lowe's and Menards' Continuing Sales of Old Growth Rainforest Destruction*, Rainforest Relief, Occasional Paper
- Marja-Sisko Ilvessalo-Pfaffli (1995), *Fibre Atlas - Identification of Papermaking Fibres*, Springer Series in Wood Science, Germany
- Menne, W. (2010), 'FSC forest certification: promises or pretences?', *ETFRN News 51* (September)
- PEFC (2008), *Logo usage rules – requirements* (PEFC ST 2001:2008, Second Edition)
- PEFC (2010), *Sustainable Forest Management – Requirements*, PEFC ST 1003:2010
- Rainforest Action Network (2010), *Turning the page on rainforest destruction*, San Francisco, CA
- Sasser, E., Cashore, B., Prakash A., Auld G. (2006), 'Direct targeting as an NGO Political Strategy: Examining Private Authority Regimes in the Forestry Sector', *Business and Politics*, Vol. 8 (3)
- Schmidt, E. (1999), 'The Forest Stewardship Council: Using the Market to Promote Responsible Forestry', *Yearbook of International Co-operation and Development 1998/1999*
- WWF (2009), *Great Apes and Logging*, prepared by Ulucus Consultants