Chatham House Workshop:
Tackling the Trade in Illegal Precious Woods
23-24 April 2012

Background Paper 1:

Precious Woods: Exploitation of the Finest Timber

Prepared by TRAFFIC

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This review was commissioned from TRAFFIC by The Royal Institute of International Affairs (Chatham House), London UK. TRAFFIC supervised the elaboration of the review with support of Ethical Change Ltd, Llanidloes UK. The review was developed as one of three studies to explore the social and ecological impacts of trade, related exporting and importing country regulations as well as to develop recommendations to reduce the negative impacts of trade in precious woods species.

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Acknowledgments

Thanks are due to Tim Cumine and Hubert Kwisthout for the help they provided on the definition of precious wood species.

Note from the authors

The complexity of the subject of precious woods harvest and trade does not allow a claim that this study gives a complete, detailed, or even comprehensive summary of the trade precious woods. However this review was produced in the knowledge that it was likely to be incomplete; it is intended as a starting point for discussions at the *Tackling the Trade in Illegal Precious Woods* meeting at Chatham House 23-24 April 2012.

Section 1

This section was prepared by a team convened by Ethical Change: Anna Jenkins, Neil Bridgland and Rachel Hembery, in addition to Ulrich Malessa from TRAFFIC. The report Appendices 1 – 6 are prepared by the same team.

1.1 Definitions

These definitions have been developed and are meant as a starting point for the discussions at the Chatham House meeting *Tackling the Trade in Illegal Precious Woods* 23 -24 April 2012.

1.1.1 Precious Wood Definition

> *A precious wood (PW) species is one that is highly valued for a range of valuable inherent qualities including appearance, tone, physical, scent, chemical, medicinal or spiritual properties, and that is rare or of limited availability. The combination of inherent qualities and rarity usually results in higher trading prices than other categories or types of wood.*

Semi Precious Wood Definition

A category of semi precious wood (SPW) species was also noted during this study. These species are still highly valued but have less highly valued inherent qualities than PWs. They tend to be less expensive (yet nonetheless costly), due to higher biological production and regeneration rates and a wider ecological range or lower demand than PW species.

Commodity Wood Definition

A commodity wood is traded widely and has a wide distribution. Its market value is considerably less than that of PWs or even SPWs. This is due to a wider biological abundance and more favourable production and reproduction rates. Examples from certain places or certain grades may however attract PW or SPW prices and these grades may be traded as PWs or SPWs (see for example Honduras mahogany in the SPW species lists in Table 2 **Semi Precious Wood (SPW) Species (tropical and subtropical origins only)** The same species is listed as a commodity wood in

Table **3 Non precious wood (Commodity) species with certain grades that are considered semi precious or even precious (tropical and subtropical origins only)** commodity species, both in Appendix 1).

Discussion

Precious wood species are often restricted in geographical range or in habitat. This natural scarcity can increase the price further, as in addition to the desirable qualities of the PW that lead to its demand there is often limited availability. These species are usually slow-growing, and, according to the musical instrument trade, are almost never of sufficient quality if grown faster in plantations (the resultant wood is said to have a different density and therefore resonance due to the grow rings being further apart).[1] It may be, however, that if a deliberate attempt were made to grow species more slowly, and for longer, better quality wood would result. There can be pressure to cut PWs before they reach optimum size as trees become scarce. PWs are anecdotally cited as being harvested on a tree-by-tree basis rather than from formal concessions. This type of harvesting is more difficult to control than in well-delimited concessions and can be illegal.

These species are often listed in the IUCN Red List of Threatened Species. History shows that unabated

[1] Jenkins. A. (2012) *Pers. obs.* after talking to many musical instrument manufacturers over a 2 year period (1994-96) of working on the SoundWood project at Fauna & Flora International, UK.

trade pressure may result in PWs becoming extremely scarce and in very short supply, which may result in them becoming commercially or even biologically extinct. Species that are currently widespread but that have reasonably valuable inherent qualities, may become PWs in the future in the absence of careful management and responsible trade.

Our experience during this study was that semi PW species were less likely to be listed in the *IUCN Red List of Threatened Species* than PWs. However, this does not necessarily mean that they are not at risk; it often simply means that they have not been evaluated. This category of species may well become the PWs of the future. It is likely that some species currently considered PWs were in fact considered SPWs in the past. See

Table **3 Non precious wood (Commodity) species with certain grades that are considered semi precious or even precious (tropical and subtropical origins only)** in Appendix 1 for a list of SPWs.

The PW definition above talks about 'inherent qualities' of PWs. These qualities can often be subjective, and are very often culturally determined according to, for example, traditions, historical use, religion, or fashion. The demand for PWs may therefore remain static because of a traditional or continued 'normal' use, or it may vary because of fashion.

The definition states that the highly valued inherent qualities of PWs 'usually result in high trading prices' although this may not always be the case. We anticipate cases where PW characteristics do not result in high prices. There may be cultures that value certain species as precious, for instance due to traditional uses, but this may not necessarily result in high prices.

This report focuses almost entirely on international trade, and the demand for PW largely from a developed country perspective or that of the extremely wealthy in emerging economies. The first part of the definition, which excludes mention of monetary value, is however applicable in any situation, from the perspective of indigenous peoples of a relatively small region to the most specialist of timber merchants looking at the world as a whole.

The PW definition is not meant to suggest that those species that fall outside the definition, e.g. those defined as 'commodity wood', are of limited value (in terms of use, tradition or monetary value) nor that these species do not face ecological or trade threats. It is intended to focus attention on the PWs known and traded and the subsequent conservation and related social issues that are common and particular to this group of species. It can be legitimately argued that, ultimately, all wood is precious.

1.2 Selection and List of Precious Wood Species

The species designated as PWs in this list came from consideration of a combination of factors: the descriptive definition of PWs, the end use of the wood and its price.

Not all information is available to the authors of this report for all the species listed. Neither should the list in the table below be taken as exhaustive. Species were listed as PWs where:

- A very high price was known.
- A very high value end use was known (e.g. luxury Chinese furniture) but no price information was available.

Where high value end uses were only vaguely known, species were listed as candidate PWs requiring further research. Equally, species known to have a conservation status of concern from a PW genus were listed as candidates. All *Diospyros* spp. from Madagascar, those listed in IUCN and some others are listed as PW candidates. See Appendix 2 for the lists of candidate PWs.

Research for this report focused on tropical and sub-tropical hardwoods, not because softwoods or temperate woods aren't necessarily precious by nature, but because illegal logging of PWs is most prominently a problem in tropical regions. In addition, the existing PW trade is currently delivering little value from the perspective of local people (see the blackwood case study below for a notable exception). Change is most needed in these regions, which therefore offer the greatest opportunities to combat illegal logging and start to bring about a fair distribution of revenue from timber sales, resulting in positive social impact amongst forest-dependent communities.

The PW definition is equally applicable to specific temperate species and more commonly to specific qualities or grades of common or even commodity temperate species e.g. old growth sitka spruce, fiddleback sycamore or boxwood. Some of these 'grades' of species may be in need of protection through conservation efforts, but they are not covered in this report.

The list of tropical and sub-tropical PW species presented below as well as those listed as SPWs, commodity species and candidate PWs in the appendices of this report are not exhaustive lists. They represent the species that the authors were able to identify during the report-writing period. Doubtless some PW species are missing, most obviously from temperate zones. It is the hope of the authors that the species listed will be sufficient for useful discussion.

1.2.1 List of end uses of Precious Woods

Species with the following (and similar) end uses were looked for:

- Tonewoods for musical instrument manufacturing
- Furniture making (very high end)
- Boat and car fittings
- Firearms
- Knife handles
- Snooker/pool/billiard cues
- Gavels
- Trophy stands/bases
- Other high end ornamental uses – e.g. inlays, handicrafts
- Tools
- Medicine
- Perfume
- Incense/religious ceremonies
- Aphrodisiacs

1.2.2 Price

A selection of retail prices available predominantly online for candidate PWs were analysed (other PWs are listed without price information, see selection explanation above).[2] The species looked at with regard to price are predominantly 'tonewoods' used in the musical instrument trade. This emphasis was chosen firstly because tonewood is the most transparent trade in high quality PWs. Secondly, it has the advantage of standard sizes for instrument blanks (highly selected pieces of wood used by manufacturers and craftsmen to make instruments, for example guitar back and side sets, fingerboard or clarinet blanks). Tonewood instrument blanks represent a product with added value, the step before final products. Given that final products vary so greatly in shape, size, style, craftsmanship and final market, comparisons can be difficult. With instrument blanks prices could be calculated in US$/m^3 and therefore directly compared to each other.

The best place in the trade chain to measure the high level of price for PW is the moment when timber gets sold to the manufacturers that produce the end product. The analysis of tonewood musical instrument blanks matches this point of the supply chain. Timber often travels from the forest to this point through dozens of trading, transporting or processing operations. Often PWs are harvested in inequitable markets, where from the forest until a certain point the actual price undervalues what the product is worth. Precious wood timber leaving the forest and paid for at the forest road-side is frequently sold at a fraction of its real value. Additionally, the price might be depressed due to illicit practices by the buyer and/or the seller, or other unfair or illegal conduct.

The price of sawn woods was also considered, and this included species beyond tonewoods. The brevity of the study allowed only a cursory look at the price of sawn wood. Prices were converted into US dollars per cubic metre to allow for direct comparisons despite the fact that PW is almost never sold in these dimensions.

1.2.3 Conservation Status, CITES Status and Range

Conservation status as listed on the *IUCN Red Data List of Threatened Species*[3] and listing in the CITES Appendices were looked at.[4] Whilst a conservation status of concern or a CITES listing were not taken as confirmation of the PW status of a species, this information was used to complete a larger picture of the species, and such listing might be indicative of PWs in the presence of other information.

The range of species was used in a similar way, as an indicative factor rather than as absolute confirmation of the PW status of a species.

IUCN's conservation status categories are as follows:

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[2] The sources used were:

1 Gilmer: https://www.gilmerwood.com Accessed 21 March 2012
2 Octopus: http://www.octopus.com.tr Accessed 21 March 2012
3 Allied Luthier: http://www.alliedlutherie.com Accessed 21 March 2012
4 Luthier Supplies: http://www.luthierssupplies.co.uk/ Accessed 21 March 2012
5 Timberline: http://www.exotichardwoods.co.uk Accessed 21 March 2012 (printed catalogue also used)
6 Hibdon: http://www.hibdonhardwood.com Accessed 21 March 2012
7 Bowsupplies.com: http://www.bowsupplies.com Accessed 21 March 2012
8 Advantage: http://www.advantagelumber.com Accessed 21 March 2012
9 Wood Vendors: http://www.woodvendors.com Accessed 21 March 2012
10 Southgate: http://www.southgatetimber.co.uk Accessed 21 March 2012
11 Wood Flooring: http://woodfloorsrg.com Accessed 21 March 2012
12 Speciality Lumber: http://www.specialtylumbersolutions.com Accessed 21 March 2012
13 Wood of the Gods: http://www.aloeswood-agarwood-oud.com/agarwood-chips.html Accessed 24 March

The authors are happy to make the spreadsheets detailing the price analysis available upon request. Contact Ethical Change.

[3] http://www.iucnredlist.org Accessed 14 March – 1 April 2012

[4] http://www.cites.org/eng/resources/species.html Accessed 14 March – 1 April 2012

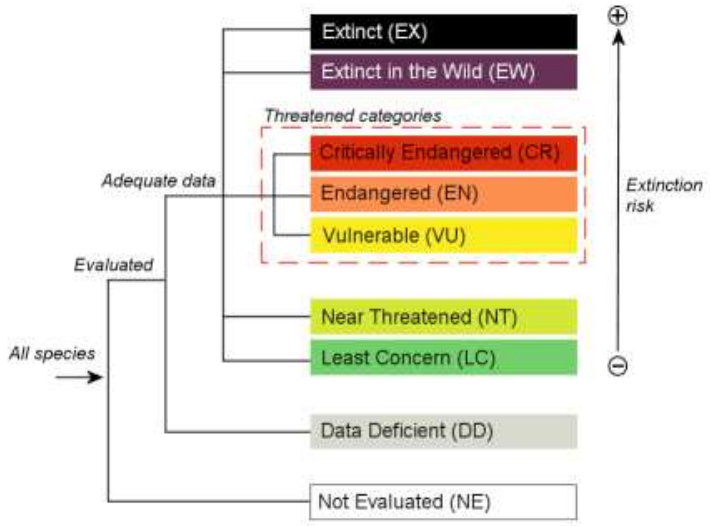

Figure 1 : IUCN Red Data Conservation Categories[5]

1.3 Findings – price thresholds

Our analysis of retail prices so far suggests that:

1. PWs selected for musical instruments (tonewoods) and sold as blanks for further working tend to cost a minimum of approx. US$60,000/m^3. (Our highest retail price: Snakewood (*Piratinera guianensis*) fingerboards US$396,825.40/m^3). NB: Many of these species do not, from our cursory research, appear to be available as sawn wood in the retail market. Further research may, however, prove otherwise.
2. SPW instrument blanks ranged from US$14,000 to US$60,000/m^3.
3. PWs in sawn wood form tend to cost a minimum of approx. US$5,000/m^3 and usually considerably more (Our highest average retail price was for Macassar ebony at US$35,000). The low end of the price range in at least some cases is likely due to poorer quality PW examples as opposed to highly selected instrument blanks.

Obviously prices of woods are a continuum, and there is no clear break between the prices of what has been defined PW, SPW and commodity wood in this report. In addition, some species show relatively lower prices for instrument blanks, yet higher prices for sawn wood and vice versa. In these cases there may be distinct differences between the grades used for the respective products. On the whole, the price of the instrument blanks was used as a leading indicator of PW unless the price of sawn timber was very high in comparison (e.g. Indian rosewood *Dalbergia latifolia*). Averaged prices are given for some PW species in Table 1 List of precious wood species below.

1.3.1 List of Precious Wood Species

Table 1 List of precious wood species

NB: This list is not exhaustive and only includes tropical and subtropical origins and species.

BOTANICAL NAME	COMMON NAMES	COUNTRY / REGION OF ORIGIN	USES	AVERAGE MARKET VALUE ($/CBM (m^3), *if not otherwise stated*)	CONSERVATION STATUS AND CITES LISTING (where applicable)
Aquilaria crassna	Agarwood, aloeswood, Oud, Eaglewood	Vietnam, Cambodia, Laos, Thailand	Incense, beads, Feng Shui, herbal medicine, sculptures, perfume	500 to >10,000/Kg (chips)[6]	CITES App II IUCN – critically endangered

[5] From: http://www.iucnredlist.org/about
[6] http://www.aloeswood-agarwood-oud.com/agarwood-chips.html Accessed 24 March 2012

Aquilaria malaccensis	Agarwood, aloeswood, Oud, Eaglewood	Malaysia, Indonesia, India, Myanmar, Philippines, Singapore, Thailand	Incense, beads, Feng Shui, herbal medicine, sculptures, perfume	500 to >10,000/Kg (chips)[7]	CITES App II IUCN - vulnerable
Bulnesia carrapo	Palo santo	Colombia	Substitute for Lignum vitae (Guaiacum coulteri)	16,620 (sawn timber)	IUCN - endangered
Bulnesia sarmientoi	Palo santo	Gran Chaco: Argentina-Bolivia-Paraguay border	Substitute for Lignum vitae (Guaiacum coulteri)	16,620 (sawn wood)	IUCN – conservation dependent
Berchemia zeyheri	Pink Ivory wood	Zimbabwe, Mozambique, South Africa	Tonewood, billiard cues, knives, gun stock	317,460 (instrument blanks)	IUCN – not evaluated[8]
Brosimum paraense	Satine bloodwood, Satine rubane	South America	Tonewood, furniture	63,492 (instrument blanks), 5,509 (sawn wood)	IUCN – not evaluated
Caesalpinia echinata	Brazilwood, Pau-Brazil, Pernambuco	Brazil (Only salvage wood from e.g. gateposts found)	Cello and violin bows	Commercially extinct.[9]	IUCN – endangered CITES App. II
Caesalpinia paraguariensis	Partridgewood, Guayacan wood, Argentine brown ebony	Argentina, Bolivia, Brazil, Paraguay	Musical instruments, ornamental, tools, decking	18,404 (sawn wood)	IUCN – vulnerable
Chloroxylon swietenia	Ceylon Satinwood, East Indian Satinwood, Sri Lanka satinwood , Buruta	India, Pakistan, Sri Lanka	Tonewood, luxury furniture and consumer items	143,086 (instrument blanks), 16,251 (sawn wood)	IUCN - vulnerable
Chloroxylon faho	Madagascar satinwood	Madagascar (restricted distribution[10])	Carving, luxury goods, furniture	14,423 (sawn wood)	IUCN – not evaluated
Cordia dodecandra	Ziricote	Central America	Tonewood, decorative items, furniture, boat decking	148,308 (instrument blanks)	IUCN – not evaluated
Cordia gerascanthus	Bocote, Spanish elm, Prince wood	West Indies, central America	Tonewood, fine furniture, ornamental uses, gun stocks	80,357 (instrument blanks)	IUCN – not evaluated
Dalbergia bariensis	Burmese Rosewood, Chingchan	Cambodia, Thailand, Vietnam	Chinese furniture		IUCN - endangered
Dalbergia baronii	Madagascar rosewood, Palissandre, Voamboana	Madagascar	Tonewood, luxury Chinese furniture	Available for sale[11]	IUCN - vulnerable
Dalbergia cearensis	Brazilian Kingwood, Jacarand Violeta, Jacarand –Cega-Machado, Jacarand –Violeta	Brazil	Tonewood, furniture, Chinese furniture	79,368 (instrument blanks), 13,985 (sawn timber)	IUCN – not evaluated
Dalbergia cochinchinensis	Thailand Rosewood, Flamewood Rosewood Tracwood, Siam Rosewood	Cambodia, Thailand, Vietnam, Laos	Luxury Chinese furniture		IUCN - vulnerable
Dalbergia cultrata	Burma blackwood / Khamphi rosewood	Cambodia, Laos, Myanmar, Thailand, Vietnam	Chinese furniture, tonewood (marimbas and other)		IUCN – not listed

[7] Ibid

[8] Considered one of the "rarest woods in the world" by timber merchants however information on ecological status or evaluation is scarce. See for example: www.bradturnsgreen.com/Wood%20Status%20List.pdf (Accessed 24 March 2012) and www.hobbithouseinc.com/personal/woodpics/pink%20ivory.htm (Accessed 24 March 2012). http://www.thewoodexplorer.com/maindata/we1033.html (Accessed 24 March 2012) states: "Known to be extremely rare and very difficult to find."

[9] Oldfield, S. (1988) *Rare Tropical Timbers*. IUCN. P 7. "Valuable hardwoods… have become very rare in the Atlantic coastal forests of Brazil… the once common Brazilwood tree *Caesalpinia echinata* now rarely occurs in native habitats."

[10] Prota database: http://database.prota.org/. http://tinyurl.com/7sd3qxt Accessed 24 March 2012

[11] Available from: https://www.gilmerwood.com/items.php?page=&CID=36&keywords=Search&size=100 Accessed 24 March 2012

Dalbergia decipularis	Brazilian Tulipwood [true tulipwood]	Brazil	Tonewood, furniture	76,190 (instrument blanks)	IUCN – not listed[12]
Dalbergia frutescens	Brazilian Tulipwood (mistakenly named this for trade purposes), Jacarand–Rosa	Brazil, Columbia, Guyana, Venezuela	Tonewood, furniture, Chinese furniture	79,190 (instrument blanks), 15,256 (sawn wood)	IUCN – not evaluated
Dalbergia granadillo	Tigerwood Rosewood	Mexico	Chinese furniture		IUCN – not listed
Dalbergia greveana	Madagascar rosewood, Madagascar Palisander, Majunga	Madagascar	Tonewood, luxury Chinese furniture	114,638 (instrument blanks),	IUCN – near threatened
Dalbergia latifolia (NB: Plantation grown 'sonokeling' is unlikely a PW)	Indian rosewood, Indonesian rosewood	Southern India, Indonesia, Nepal	Tonewood, luxury furniture and consumer items, Chinese furniture	49,656 (instrument blanks), 16,575 (sawn wood)	IUCN - vulnerable
Dalbergia louvelii	Violet Rosewood	Madagascar	Chinese furniture		IUCN - endangered CITES App III
Dalbergia maritima	Violet rosewood / Boise de rose	Madagascar	Tonewood	95,238 (instrument blanks)	IUCN - endangered
Dalbergia melanoxylon	African blackwood / Grenadilla	East / Southern Africa	Tonewood, Chinese furniture, knives, pens	150,242 (instrument blanks), 16,951 (sawn wood)	IUCN - lower risk / least concern
Dalbergia nigra	Brazilian rosewood / Palo santo de Brasil	Bolivia, Brazil, Peru	Tonewood, Chinese furniture	211,029 (instrument blanks),	IUCN – vulnerable CITES App I
Dalbergia odorifera	Scented Rosewood	China	Chinese furniture		IUCN – vulnerable
Dalbergia oliveri	Burma pallisander, Burma Rosewood, Burma Tulipwood, Pinkwood, Tamalan tree	Burma, India, Laos, Thailand, Vietnam	Tonewood, furniture, luxury consumer items, Chinese furniture		IUCN - endangered
Dalbergia palo-escrito	Palo escrito rosewood	Mexico	Tonewood	85,851 (instrument blanks)	IUCN – not listed[13]
Dalbergia retusa	Cocobolo	Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama	Tonewood, Chinese furniture, firearms (gun stock)	93,766 (instrument blanks), 13,116 (sawn wood)	IUCN - vulnerable CITES App III in Panama
Dalbergia stevensonii	Honduras Rosewood	Belize, Guatemala, Mexico	Tonewood, Chinese furniture	77,471 (instrument blanks), 11,004 (sawn wood)	IUCN – not evaluated
Dalbergia tucurensis	Colombian/Guatemalan/Panama rosewood, Cocobolo, Granadillo rojo	Honduras	Tonewood	62,756 (instrument blanks)	IUCN – not evaluated
Diospyros celebica	Indonesian ebony, Macassar ebony		Tonewood	143,119 (instrument blanks), 34,983 (sawn wood)	IUCN - vulnerable
Diospyros crassiflora	African ebony	Cameroon; Central African Republic; Congo;, D.R.Congo; Gabon; Nigeria	Tonewood, Chinese furniture	93,734 (instrument blanks), 16,831 (sawn wood)	IUCN - endangered
Diospyros durionoides	Sabah ebony	Sabah, Malaysia	Tonewood, ornamental use, furniture, knives	143,086 (instrument blanks)	IUCN – not evaluated
Diospyros ebenum	East Indian ebony, Malaysian blackwood, Asian ebony	India, Sri Lanka, United States (Florida)	Tonewood, Chinese furniture	139,302 (instrument blanks),	IUCN – data deficient

[12] https://www.gilmerwood.com/items.php?species=Tulipwood&CID=38 (Accessed 24 March 2012) states: "getting scarce on the world's market".
[13] http://www.gnutt.com/Lutherie/materials.html (Accessed 24 March 2012) states: "plentiful".

Diospyros ? (possibly *D. discolor)*	New Guinea striped ebony, Morola, Asian striped ebony, Mabolo	Papua New Guinea	Tonewood	111,111 (instrument blanks)	D. discolor: IUCN – not evaluated
Diospyros ferrea	Ata, Ata-ata	Africa, Oceania and S.E. Asia	Tonewood, furniture, luxury consumer items		IUCN - endangered
Diospyros hemiteles	Bois d'ébène feuilles	Mauritius	Tonewood[14]	Commercially extinct[15]	IUCN – critically endangered
Diospyros lotus	Mamegake Persimmon	Himalayas	Tonewood, piano keys, chess pieces.		IUCN - lower risk / least concern
Diospyros perrieri	Malagasy ebony	Madagascar	Tonewood	Available for sale[16]	IUCN – not evaluated
Guaiacum coulteri	Lignum vitae, Guayacan, Palo santo	Central America	Industrial, tools, propellers, ornamental, medicine		CITES App. II IUCN – conservation dependent
Guaiacum officinale	Commoner Lignum Vitae, Guayacan, Palo santo	Caribbean	Industrial, tools, propellers, ornamental, medicine		CITES App. II IUCN - endangered
Guaiacum sanctum	Holywood Lignum Vitae, Guayacan, Guayacan Real	Central America, Bahamas, Cuba, Haiti and Florida	Industrial, tools, propellers, ornamental, medicine		CITES App. II IUCN - endangered
Piratinera guianensis	Snakewood, Leopard-wood, Letterwood	Guyana and Surinam	Tonewood, tool handles, decorative use, walking sticks	396,825 (instrument blanks)	IUCN – not evaluated[17]
Pterocarpus indicus	Burmese rosewood, Narra, New Guinea Rosewood, Pasha Padauk, Amboyna (burl form)		Rosewood substitute, tonewood, furniture, medicine	6,357 (sawn wood)	IUCN - vulnerable
Pterocarpus marsupium	Indian Kino	India, Nepal, Sri Lanka	Chinese furniture		IUCN - vulnerable
Pterocarpus santalinus	Red Sanders, Red Sandalwood, Almug, Zitan (in China)	India, Nepal	Chinese furniture, Ayurvedic medicine (heartwood used), incense for Hindu rituals, tonewood (Japan).		IUCN - endangered
Swartzia spp.. (S. ingifolia; S. grandifolia; S. leiocalycina; S. panacoco)	Coracao de Negro, Ironwood, Wamara	South America	Tonewood, high class furniture, ornamental	156,250 (instrument blanks)	IUCN – not evaluated

[14] Read. M. (1993). *Ebonies & Rosewoods Requiem or Revival?* London. Fauna and Flora Preservation Society. 1993.

[15] Oldfield, S. (1988) Op. cit. P7: "Examples of tropical timbers which have become extinct through over-exploitation are hard to find but there are endemic island species which have been brought perilously close to extinction through centuries of commercial utilisation. *Diospyros hemiteles,* an ebony restricted to Mauritius… [is one such example of a] species which [has been] severely depleted in historic times."

[16] Available from: gilmerwood.com. Op. Cit.

[17] https://www.gilmerwood.com/items_new.php?species=Snakewood (Accessed 24 March 2012) states: "Very rare and very expensive."

1.4 Case Studies

Four PW situation overviews are given in this section, covering four distinct regions. More detailed case studies for each of these situations are given in the Appendices, along with full references. Please note that these case studies are intended as overviews of four particular situations. They should not be taken as exhaustive pictures of those situations. All case studies would benefit from further research.

1.4.1 Central American Dalbergias

See Appendix 3 *for full case study and references.*

Illegal logging is a prevalent problem in Central America. For instance, it was estimated in 2003 that up to 85% of the total harvest in broadleaf forests in Honduras was illegal. There is very little information on the volume of international trade although cocobolo wood is available from numerous sources online. All rosewoods in the region are collectively known as 'rosul' wood. The most valued species are *Dalbergia retusa* (the true cocobolo), which occurs from Mexico to Panama and *D. stevensonii* (Honduras rosewood), which is principally from Belize. *Dalbergia retusa* is listed by the IUCN as vulnerable while *D. stevensonii* has not been evaluated but is likely to qualify for listing (it is listed on Appendix III of CITES in Guatamala). These woods have a long tradition of use in musical instruments, particularly marimbas and other percussion instruments, having been exported from Belize for 200 years. They are currently subject to high demand in China, most probably for the luxury furniture trade.

Seizures of illegally trafficked timber in Guatamala suggest that there is an organised smuggling ring capable of exporting large quantities. There are allegations that members of law enforcement agencies are involved in the trafficking both in Guatemala and Belize, and there is evidence of forest officials' involvement in Belize. The demand for *D. retusa* from the Darien Region of Panama has been described as "out of control" with "hundreds of settlers looting" the species.

Little is known about the biology and status of *D. stevensonii.* It is however known that it is slow growing and requires ample seed for survival (because of high seed abortion rates). The situation as it stands at the moment, with current levels of extraction in Belize, has been described as "a potential disaster." Indigenous peoples, other citizen groups and NGOs have expressed great concern, particularly in Belize and Panama. There are claims that Forest Department personnel have declined to enter Maya land in Belize to monitor logging. Despite a Supreme Court ruling that the land belongs to Maya villages in common, the government is appealing the legal judgment and has refused to enforce it. The villagers therefore still lack communal legal title to their lands.

The Government in Belize banned the harvesting and export of rosewood in March 2012 in response to the heavy rate of illegal extraction. It states that it will now carry out "an orderly assessment of the situation on the ground". Nicaragua has created an "eco-battalion" military unit to focus solely on Natural Resource protection. In 2011 Guatemala announced a crackdown on what its calling "eco-trafficking," stating they would enforce stricter security measures at airports. However, the initiative left the country's seaports off the list of priorities, arguably a serious omission. In Darien, Panama, in May 2011, the Government of Panama's Environmental Authority (ANAM) commissioned inspections of different sites where wood is gathered for local use or export. The inspections investigated illegal rosewood logging and selling methods, and collaborated on a "combative response". Subsequently, custom officials prevented the shipment of two teak containers en route to China, which were filled with illegally harvested rosewood.

Dalbergia retusa is grown in plantations, and a 2007 CITES proposal stated that a significant volume already comes from plantations planted up to 80 - 90 years ago. *Dalbergia stevensonii* is not believed to be grown commercially in plantations, although it has been used in at least one tree-planting scheme in Belize.

1.4.2 African Blackwood

See Appendix 4 *for full case study and references*

African blackwood, *Dalbergia melanoxylon* is primarily processed into blanks for woodwind instrument manufacturing, most significantly clarinets. Smaller quantities of blackwood are processed into other specialist tonewood pieces such as guitar fingerboards, bridges, headplates and backs/sides. Smaller markets exist for blackwood, including the manufacturing of luxury furniture in China. The species is listed as 'lower risk/least concern' by IUCN and is not listed on CITES. The IUCN categorisation may be out of date; the principal author of the full blackwood case study in this report believes the species to be more severely threatened. Blackwood trees grow in dry miombo woodland in Tanzania and Mozambique. Formerly common across Southern, Eastern, Central and Western Africa, today blackwood is principally viable for commercial timber extraction only in southeast Tanzania and northern Mozambique.

Official export data indicates that Mozambique and Tanzania export roughly similar quantities of blackwood, which over the past 10 years have averaged 100m3 from each country. Research on illegal logging in the region is limited, but the work that has been done in both countries showed high levels of illegal logging (as high as 96% in Tanzania) and actual timber exports far exceeding official exports. Usage by the music industry is stable and averages 255m^3 per annum, but new tonewood markets are emerging for blackwood which may increase demand in near future – for example, guitar-makers are increasingly interested in using blackwood as a FSC certified substitute for ebony and other similar species. Currently, the music industry alone uses more blackwood than is officially exported before other uses are even taken into consideration. Little is known about the volumes of blackwood used in China for making furniture. It seems that this market is supplied primarily from Mozambique, where raw logs are routinely exported. Raw log export is banned in Tanzania, and this law seems to have been successfully implemented. In the absence of official forest inventories in Tanzania and Mozambique, it is difficult to estimate remaining timber stocks and assess the impact of current extraction rates accurately. It has, however, been estimated, that the total annual harvesting rate of blackwood in Tanzania is 4,500m^3, and that the two main areas of blackwood in Tanzania together represent 40-45 years of supply at current extraction rates. Comparable figures are not available for Mozambique. Trade is currently stable.

The Tanzanian government has implemented a policy of Participatory Forest Management (PFM) that enables forest-dependent people to establish Village Land Forest Reserves (VLFRs) with clearly defined boundaries and representative committees. VLFRs are entitled to retain all proceeds from the sale of forest resources, the most significant of these being timber, especially in areas where the forest hasn't already been stripped of the most valuable tree species such as blackwood. Sound & Fair, an organisation that aims to realise a sustainable trade in African blackwood through a certified chain of custody linking forest-dependent people in Tanzania to musicians throughout the world, has achieved the establishment of a small and growing supply of FSC certified blackwood to the music instrument trade. Currently there are seven FSC certified forest areas in Tanzania t listed as having the potential to supply FSC (or controlled wood) blackwood. There is a single FSC chain of custody in Mozambique that is certified to handle FSC (or controlled wood) blackwood. Early VLFR harvests have generated income increases of up to 40,000% over what communities would have previously received from the harvesting of timber in their forests. Prior to PFM/FSC, VLFR residents' potential incomes from timber extraction were limited to tiny, piecemeal rates helping outside agents extract timber from the forest – literally pennies.

1.4.3 Madagascar

See Appendix 5 *for full case study and references.*

The *IUCN Red List* lists 44 species of the genus *Dalbergia* native to Madagascar, amongst which there are believed to be 10 species of 'real' rosewood, most of which are vulnerable or endangered. Other sources detail 47 *Dalbergia* spp. Several are particularly valued for the export trade, including *Dalbergia baronii*, *D. louvelii*, *D. maritime*, *D. madagascariensis* and *D. greveana.* Common names for the rosewoods include Rosewood, Bois de rose, Madagascar rosewood, Malagasy rosewood, and occasionally Pallisander or Palisander, the latter two names are most commonly associated with *D. madagascariensis* a species that lacks the typical red lustre of rosewood but which was apparently not covered by an 'unconditional' export ban of 2010. There are over 100 species of ebony *Diospyros* spp. in Madagascar. CITES lists 85 Madagascan ebony *Diospyros* spp*.* and five rosewood species *Dalbergia* spp*.*

In recent years Madagascar has experienced very high levels of illegal logging of ebonies and rosewoods from its rainforest national parks, particularly since a coup d'état in March 2009. This illegal logging has been described as the most severe threat to Madagascar's north-eastern rain forests. In 2010 UNESCO added the Madagascan World Heritage Site Rainforests to its list of 'World Heritage in Danger'. The vast quantities being felled have been valued at several hundred million dollars worth extracted during 2009. There are estimates of 100 – 200 trees being felled daily with a collective value of up to US$460,000/day. Most of the rosewood being extracted is destined for China, for luxury furniture. Foreign traders and local traders dubbed 'timber barons' dominate the illegal logging with the vast majority of money generated leaving the local community; local people engaged in the activity earn very little. The illegal logging has angered local people. In Sakalava culture ebony is a sacred wood, only cut by priests for ceremonial staffs. It is also said to have 'decimated the tourism industry', which had become a growing source of local income. The selective logging has degraded forests and decreased genetic diversity, leaving an impaired habitat for animals and allowing the invasion of dominant plant species. Logging camps also rely on trapping endangered lemurs for food.

International environmental NGOs have spoken out against the illegal logging and continue to do so. Global Witness and The Environmental Investigation Agency conducted detailed investigations in 2009 and 2010. The Illegal logging is said to have peaked during 2009 and 2010 and then slowed due to an unconditional export ban in 2010, with heavier penalties being introduced in 2011. However, the order was lifted in January 2012, re-authorizing export, although it is reported that this is now under review due to concerns about the trade being dominated by foreign traders as well as pressure from the tourism industry and conservation groups to reinstate the ban. A report in the *L'Express de Madagascar* of the 15 March 2012 states that the provisions of the decree 2010-141 are back in place, banning bans the harvest, transport or export of rosewood and ebony.

Despite reports that those previously importing Malagasy timber into the US and Europe have ceased this activity entirely, research for this report found several rosewood species readily available for sale from specialist timber traders on the internet.

1.4.4 Red Sanders

See Appendix 6 *for full case study and references.*

Red sanders, *Pterocarpus santalinus*, is an Indian PW found primarily in the southern parts of the Eastern Ghats region in the State of Andhra Pradesh. It has medicinal properties and is in high demand in China for furniture, and Japan for musical instruments and furniture. It is listed as endangered by IUCN and is on Appendix II of CITES. In February 2012, the Indian Supreme Court passed directions to the central government to take steps to include Red Sanders in Schedule VI of the Wild Life Protection Act making it an endangered species in India.

Illegal logging is apparently rife, though no clear picture of its extent appears to exist. Whilst numerous seizures and confiscations have taken place, their continuation is evidence that they don't stop trees being cut down. In 2008, tension was reported between the Andrah Pradesh and Central Governments over the matter of stockpiled confiscated logs, the former wanting to sell them and the latter wishing to maintain the policy banning export of timber. Similarly, the Ministry for Commerce and Industry was reported as seeking to regulate the trade of the species, while the Forestry Department was seeking to engage trade. A lack of clarity on federal and State policy at that time seems likely to have exacerbated existing problems in controlling harvest and trade.

In December 2009, a series of seizures of Red Sanders took place with indications that smugglers are getting increasingly sophisticated in transporting the valuable timber out of India. According to TRAFFIC, it is evident from these seizures taking place that smugglers of Red Sanders are operating on a massive scale and are running highly organized international smuggling rackets. For example, logs are being transported via different routes overland and are being shipped to the Middle East, although whether this is to markets in that region or in transit remains to be seen. As well as stopping the smuggling in India, there is an urgent need to explore what can be done to control the drivers of the Red Sanders demand in China, Japan and elsewhere.

Plantations of Red Sanders have been established, though plantation-grown wood has been shown to have less sapwood than that grown in the wild. Cultivation trials are reported to be aimed primarily at producing higher value wood. Success has been reported with vegetative propagation techniques. It is not clear, however, whether plantations can actually produce the higher value wavy grained wood.

1.5 Section 1 Conclusions and Recommendations

1.5.1 Conclusions

Precious woods are those that are valued over and above the 'very useful'. PWs are, above all, highly desired, and this drives illegal trade where the 'preciousness' and subsequent monetary value of the wood makes it worth taking the risk of illegal logging. Precious wood species are seen as desirable for both their inherent qualities and fashion. Demand for them may therefore be relatively static for certain uses (e.g. woodwind instruments) or exponentially growing (e.g. Chinese luxury furniture).

Throughout the research for this section of the report the two most prominent and prevalent uses for PWs that emerged were tonewoods for musical instruments and raw material for Chinese luxury furniture. There is evidence in our case studies of illegal logging supplying both markets, although the incredible growth in demand for rosewood for the Chinese market appears to be by far the greatest driver of recent accelerated illegal logging in the Central American countries and Madagascar (in 2009 and 2010). Undoubtedly it plays a part in the ongoing significant illegal logging of Red Sanders in India and potentially in the export of large quantities of unprocessed African blackwood logs from Mozambique, although little was discovered about the latter in this study. Other areas that are known to be similarly affected were not looked at during this study. The rosewoods *Dalbergia cochinchinensis* and *Dalbergia bariensis* in Thailand, Laos, Cambodia and Vietnam are obvious such cases.

This section of the study set out to define precious woods (PWs) in terms of the end-use of wood species, qualities of the wood and monetary value. It found that there are broadly three categories of wood type ranging from commodity woods, to semi precious woods (SPWs) to PWs. Whilst the actual monetary value of PWs as opposed to SPWs or commodity woods is something that may very well need to be further debated, the observation that there is a difference between these categories of wood is, we hope, correct, though perception of such categories may be very subjective, varying between cultures and subject to the vagaries of fashion. The same species or indeed the same tree may cross-cut through two or more of these categories, depending on, for example, the cut of the wood, the part of the tree bole, the region of growth, the conditions of growth (e.g. altitude, speed of growth) and serendipitous random qualities such as grain type. All these factors can affect the perception of 'preciousness' of the wood by affecting for example the colour and grain of the wood.

The list of species presented as PWs in this report is not exhaustive. Much further information would be needed to draw up a comprehensive list. The gaps in (our) knowledge and readily available information are visible in the tables of PW species we present both above and in the Appendices (SPWs, commodity woods and potential PWs). More broadly, detailed and orderly information on the illegal trade in PWs is difficult to come by. Inevitably, information is often anecdotal or has to be gleaned through comparing and contrasting export and import data and estimates of usage by key end users. This study has pulled together some of the information that is more readily available. However, there is potential for a great deal more such work, and analysis of trade data, cataloguing the information as it is found to build up a more accurate picture.

The levels of illegal logging of some species and in certain regions are staggeringly high and increasing rapidly, causing alarm amongst local people and local authorities as well as international organisations and commentators. Illegal PW trade appears from this brief look (anecdotally) to have been accelerating in the last few years, particularly for rosewood species. This section of the study has observed the problem of illegal rosewood extraction to be particularly rife in Central America, with a recent renewed relaxation of export bans in Madagascar also a serious concern. It may be the case that the very recent escalation in illegal rosewood extraction from Central America is due to Madagascar clamping down on the illegal rosewood trade from 2010 and therefore this supply drying up for the Chinese market. Areas where

rosewood occurs closer to China have been all but exhausted of rosewood, with estimates from traders that the species has just five years left.[18] This rosewood and other PW 'species hopping' and 'source area shifting' is a trend that has been known about and commented upon for many years, not least within the musical instrument trade. The blackwood case study we present shows how a source area can shrink over successive years of extraction. Concerted action is needed to reverse these trends and ensure that the highly unsustainable extraction practices of the illegal PW trade are curtailed as soon as possible.

1.5.2 Recommendations

1. Listing the species most at threat in the CITES Appendices should be considered, as this would help gather clearer and more consistent and comprehensive trade data.
2. Further research is needed into whether the PW definition is applicable at the local or indigenous community level. For the PW definition to be valid it needs to be applicable throughout the world, though monetary value thresholds may need to be determined locally to the community or market.
3. The PW definition also needs to be tested for temperate wood species, which were not considered in this study. If the definition, or version of it, is taken forward, it is recommended to look at the value and propensity for illegal logging of the most valuable temperate species such as sitka spruce fit for stringed instrument sound boards, fiddleback sycamore and maple and the highest quality walnut.
4. More research is needed as well as resources to monitor the PW trade (both legal and illegal), observe trends and determine what the most important threats to peoples and ecosystems are, if clearer pictures are to be established. Such efforts must be targeted at priority areas/species, known to be most vulnerable and where illegal/unsustainable trade is most rife. There are already several such visible species and areas that would benefit from further attention and analysis into what can best be done to address the trade (some are covered in this section of the report, but many potential priority areas/species were not).
5. This section of the report details in passing many actions taken by various governments, enforcement authorities and NGOs seeking to stop illegal logging, including at the consumer country end of the chain. These initiatives and those carried out elsewhere could be analysed further to determine what might best be done to stem the threat to so many forest landscapes and species.

[18] Anon (2012) *Rosewood Robbery. The Case for Thailand to List Rosewood on CITES.* Environmental Investigation Agency. February 2012.

Section 2

This section was prepared by James Hewitt, Ulrich Malessa and Chen Hin Keong.

2.1 Sources of Trade Data and their interpretation

There are a number of sources for trade data, most of which is derived from Customs statistics. These include FAO, ITTO, Comtrade, Eurostat, UNECE, and of course the customs statistics of the countries. However, even though there are provisions in customs to capture species information, this is not obligatory in general, with the exception of CITES listed species, and scheduled protected species in a country's legislation.

The ITTO, the foremost international body that captures trade data for tropical tree species no longer publishes the fortnightly Tropical Timber Market Report (terminated in November 2011). However, ITTO does not report trade in items such as wooden furniture, ornaments, musical instruments, etc. which use much of these woods and is elaborated further in this study. Consequently, information about unit prices for any tropical species has ceased to be readily available. The species for which the Tropical Timber Market Report gave prices did not include Precious Wood as listed in this report.

ITTO, however, does publish annual review reports that include species and value information for both countries of export and imports. While not up date, it does give a good indication of the average volumes and prices from each country that reported the information to ITTO. Most information does not relate to species classified as Semi-Precious or Precious Woods.

UNECE data excludes tropical timber.

UN Comtrade was used where appropriate but some of its data are based on a constant factor of value and so the various anomalies would need to be revised. Comtrade is the source of at least some (and perhaps an increasing amount) of the data published by the ITTO and FAO. Comtrade provides data under commodity codes having no more than six digits, and these do not relate to individual species (except for some logs and sawn wood and only then for species which are not Precious Wood). It does provide statistics which indicate whether the product is of coniferous species or not, but only for some products. Except for a few products, Comtrade does not distinguish between timber from tropical forest and non-coniferous wood from either other forest or plantations. Having access to monthly rather than annual data would be useful in order to help users revise anomalies. The prevalence of anomalies, even concerning trade in finished products such as stringed instruments, make it likely that assessments of trends in the quantities and unit prices implicit from Comtrade data are not robust. Above all, however, Comtrade does not publish data for several of the countries which are the source of Precious Wood – particularly Myanmar, Laos and Vietnam.

The study uses official customs statistics of countries and territories where possible, as well as other datasets from agencies above for the period 2000–2010 for analysis. In terms of the data sets that are readily available and accessible, customs statistics is one of the few that is comparable across countries. The official Customs statistics are classified according to the Harmonized Commodity Description and Coding System (HS) of the World Customs Organization (WCO): an internationally standardized system of names and numbers for categorizing traded products. The HS codes used by all Customs agencies, which are members of the WCO are similar, to the 6 digit level and there is national discretion about how to interpret the description assigned even at the 4 digit level.

National statistics derived from customs are the most comprehensive available. Many countries do have readily accessible statistics online, some are free, and some have to be paid for. Nations with good

governance have those data on a timely basis, usually monthly, and for others on a quarterly, semi-annual or annual basis. Much of the data is not related to species, but some species data isS available at the 8 or 10 digit codes. Usually the species information is specific to a country's need for information for policy analysis and development and are usually only captured at the 8 or 10 digit codes. Hence species of interest to the country would only appear in the customs statistics, and not necessarily at the dataset of international agencies which usually only compile statistics to 6 digit levels.

The study did not use data from FAO Statistical Database (FAOSTAT) as the data is usually two years out of date as well as incomplete. For instance, it does not include elaborated wood products.

For several products, Eurostat no longer requires that weight is declared for intra-EU trade.[19] This makes it difficult to identify the not infrequent anomalies in Eurostat's volume data. Although the statistics published by Eurostat should be identical to those published by each EU Member State, they are not, and judging by the UK's data Eurostat data is the less reliable of the two.

The USA does not declare more than value for several high unit value products, although with Lacey Act implementation, more and more HS codes are included in the declaration that includes species, volume, and country of origin.[20]

The requirements of the USA's Lacey Act and the EC's Regulation 995/2010 include the naming of all species - not only those which give the products their primary marketing attribute(s) – contained in each consignment imported or first placed on the market. This move will ensure that in future there will be more information on timber species in trade, but only to the USA. The EC's Regulation 995/2010 does not require that the additional information of those who first place the qualifying products on the market is communicated to the custom services. Other countries are following suit, and Switzerland and Australia have also implemented the requirement to inform customs of timber species in trade. The capture of species, but also volumes, country of origin and value will go a long way towards achieving greater transparency in international timber trade, and hopefully capture new information on Semi-Precious and Precious Wood trade.

Roundwood equivalent (RWE) volume is a measure of the volume of logs used in making a given volume or weight of a wood-based product. For each type of product, the volume of logs used might vary, perhaps substantially, depending on such factors as the type of mill and the diameter and quality of those logs. In this assessment, RWE has been estimated by multiplying source data (revised where anomalous or estimated from trade value) by specific conversion rates.[21]

It is important to note that the statistics compiled contain some anomalies and inconsistencies and should therefore be taken as indicative estimation of the extent of the trade only.

It could be that some proportion of the quantity of Precious Wood exported as logs and sawn wood from countries of origin is not declared. If this were so, then this is a serious fault in customs protocol as all exports and imports have to go through customs. Otherwise it would be a clear smuggling case. A more problematic issue and challenge is the laundering of timber, illegally extracted and shipped out of a country to be legally imported as long as proper documents accompanied the shipment at the country of import. Consequently, one's assessments of trends using even the most comprehensive sets of customs data might be misleading. Even so, an evaluation and analysis of customs data may be able to highlight and flag issues in bilateral trade for further investigation.

[19] http://epp.eurostat.ec.europa.eu/newxtweb/

20 http://dataweb.usitc.gov/scripts/user_set.asp

[21] In cubic metres per cubic metre—1.4 (particleboard), 1.8 (sawn timber and fibre board), 1.9 (veneer and mouldings), 2.3 (plywood); and, in cubic metres per tonne: 1.6 (wood chips) and 2.8 (wooden furniture).

Statistics for trade in qualifying products of species listed in CITES are not comprehensive as shown by numerous studies.[22]

2.1.1 Supply chains

This subsection provides an historical overview of trade in relevant products before considering the drivers of this trade and attempts to ensure the sustainability of the trade . It continues by assessing the change in the price of wood at various stages in the supply chain and trends in competition between traders. It then discusses the manufacturing sector for a number of products which are made at least partly from Precious Wood species before suggesting which countries of origin supply the trade to particular destination countries.

Historical overview

Wood and other products deriving from trees have been traded for millennia. The scale of trade has expanded as modes of transport have changed, leading to concerns about the sustainability of supply and the ethics of consumption of such products.

The trade will have been confined initially to small quantities of light weight products. Much of this will have comprised items which are aromatic or perceived as having medicinal value. Arab states and parts of East Asia have a particularly long history of importing such products, for example agarwood and frankincense.[23] For two or three centuries before the mid-1990s, Europe seems to have dominated trade in tropical timber from South America and Africa – particularly in species referred to as mahogany and historically to accessible stock along the coast and rivers. For a somewhat longer period, China has dominated the trade in Asia, especially in connection with rosewoods. As shown in the trade studies and in the text below China does so now, as ornamentation evoking the fashions of the Qing and Ming dynasties appear currently to be in great demand there.

Drivers of the trade

As with other products deriving from flora or fauna, some of this trade has tended to be associated with prestige and power. The desirability or, in the case of medicinal uses, the perceived efficacy of these products, tends to reflect price as a proxy for quality and rarity. High price is an essential attribute of products whose primary function is to display wealth or power, and tends to be associated with rarity. Price is also an important criterium for those who purchase these products for purposes of investment and to gain favour in court when given as gifts.

Due to economic growth end-users have become wealthier, so that more people have come to aspire to possess products similar to those associated with prestige, thereby stimulating trade and production.

In contrast to other segments of the market for products which derive from trees and which are characterised by high price, the quality of musical instruments and related accessories such as bows is largely dependent on the quality of the wood from which their components are made. The price of the wood used in making those components can be very high, as shown in the species lists in this document, if the best quality of sound is to be produced when playing the instruments. Of course, the use of Precious Wood for parts of some instruments is motivated for ornamental purposes and so also to convey prestige – which is more likely to be significant as a purchasing criterium than sound quality in instruments made for use outside the classical music sector.

22 http://www.cites.org/eng/resources/trade.shtml; Chen, H.K. (2006). *The role of CITES in combating illegal logging - Current and potential.* TRAFFIC International, Cambridge, UK. Lim, T.W., Soehartono, T. and Chen, H.K. (2004). Framing the picture: An assessment of ramin trade in Indonesia, Malaysia and Singapore. TRAFFIC Southeast Asia, Kuala Lumpur.

23 Angela Barden, Noorainie Awang Anak, Teresa Mulliken and Michael Song, (undated), *Heart of the Matter: Agarwood Use and Trade and CITES Implementation for* Aquilaria Malaccensis, P v. Accessed 4th April 2012, http://www.traffic.org/forestry-reports/traffic_pub_forestry7.pdf.; Elizabeth Weise, *Frankincense Threatened by Conditions in Ethiopia*, USA Today, http://www.usatoday.com/tech/science/environment/story/2011-12-20/frankincense-endangered-ethiopia/52130102/1. Accessed 4th April 2012,

It is likely that end-users will switch to whatever alternatives are marketed when prices become prohibitively high – without a significant decline in perceived quality, unless of course the product is a musical instrument, in which case the loss of quality will be physically measurable.

Attempts to ensure sustainable trade

In order to ensureaccess to long-term supplies of high quality wood, some in the musical instrument industry, primarily in the USA and European Union, are taking active steps to ensure the sustainable management of relevant woodland in conjunction with local communities and government.

An indication of their success is the small but increasing number of areas where *Dalbergia* species grow and which are certified as sustainably managed in accordance with the Forest Stewardship Council certification scheme.[24]

Allegations such as those made under the Lacey Act against a leading manufacturer of guitars and exposés of illegal logging and trade is likely to increase pressure on timber resource owners (and others) to ensure the sustainable management of trees.[25] They will also tend to stimulate debate about the merit of seeking to segment the market for timber by price.

The number of species of tree listed in CITES, with the intention of ensuring sustainable levels of trade, is increasing. A number of these are not listed in Table 1 but are nevertheless traded in substantial quantities (*Gonystylus spp., Pericopsis elata, Swietenia macrophylla*, and *Cedrela odorata*), and are therefore not (yet) Precious Wood as defined in this report. Vested interests, inertia and capacity issues have tended to constrain the effectiveness of CITES and to inhibit the listing of tree species.[26] The governments of Cambodia and Laos have opposed a proposal by neighbouring Thailand to list *Dalbergia cochinensis*.[27] The Annex below indicates that several species that are traded internationally, declining, and used in making very expensive wooden furniture and similar ornaments, are not listed in CITES.

The trade database for species listed in CITES, which is only as comprehensive as the data which relevant Management Authorities provide (and for which traders follow CITES rules and choose to obtain relevant permits), indicates that trade in the qualifying products of timber of species listed in CITES tends to be intermittent and currently involves small quantities (if any) – including trade in the species listed in Table 1 above.[28]

However, the quantity traded might be very much less than the quantity of wood (or resin) taken from the tree, particularly if the quality (and implicitly the potential profit available) of the product is not readily apparent from the tree or subsequent products.

These conversion losses are reflected in the change in price of the wood as it proceeds down the supply chain (see
Figure 2).

Price levels along the supply chain

The next few paragraphs consider the way in which price varies along the supply chain, the forms in which the products are traded, trends in the trading companies which specialise in some products, and the importance of branding.

[24] FSC Certificate Database (search terms: species – Dalbergia; category - FM/COC), http://www.info.fsc.org. Accessed 4th April 2012
[25] EIA-Global, (2011), *EIA Statement Regarding 24 August 2011 Gibson Guitars Raid by US Fish & Wildlife Service*, http://www.eia-global.org/News/Update_GibsonRaid.html. Accessed 4th April 2012
[26] James Hewitt, (2007), *An `of Tree Species which Warrant Listing in CITES*, Milieudefensie, http://www.milieudefensie.nl/publicaties/rapporten/an-assessment-of-tree-species-which-warrant-listing-in-cites/at_download/file.
[27] Anon., (2012), *Rosewood Robbery – the Case for Thailand to List Rosewood on CITES*, Environmental Investigation Agency, P1, http://www.eia-international.org/wp-content/uploads/Rosewood-Robbery.pdf. Accessed 4th April 2012
[28] UNEP-WCMC, *CITES Trade Database*, http://www.unep-wcmc-apps.org/citestrade/. Accessed 4th April 2012

An example of the extent to which the price paid to the owner of a tree changes as the supply of wood proceeds from the source to the end-user is presented below in Figure 2.

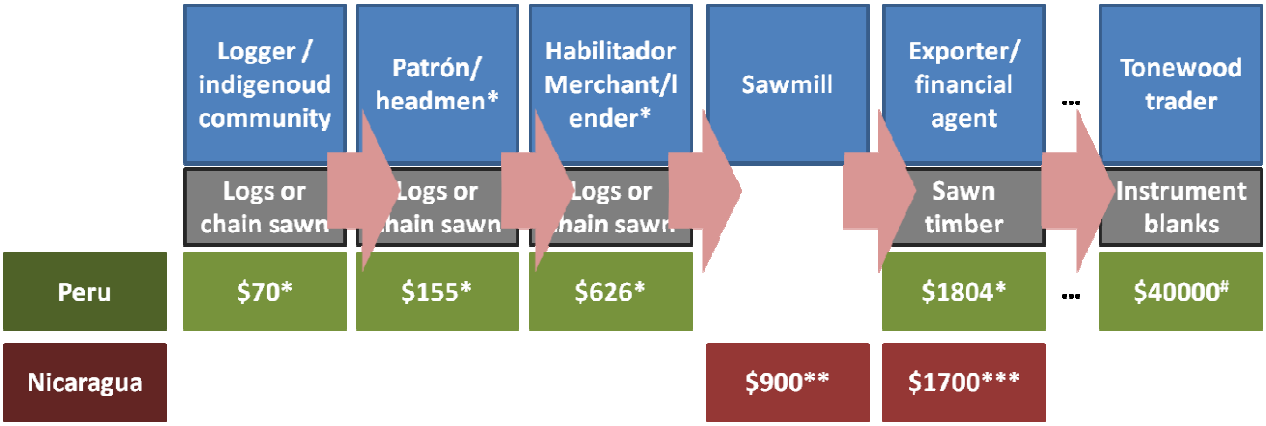

Figure 2: Stages in the supply chain and prices in USD per m^3 of Mahogany (*Swietenia macrophylla*) timber from Peru and Nicaragua Sources: adapted from Maravi, Edgar et al.. 2008. *Timber extraction and trade in Peru*. EFTERN News No. 49, and updated from EIA 2012. *The Laundering Machine*. Report. Washington, DC, USA: Environmental Investigation Agency** Gutierrez G. 2009, *Estudio de precios*, GIZ Nicaragua ***OIMT MIS report Feb´2011; # See list of semi precious woods, Annex

Concerning trade in Semi Precious Woods and Precious Woods, the price paid to the owner of the tree (or, in the case of theft, the logger) tends to be small relative to the price paid by end-users. The gradient in price is likely to vary according to the quality of the product – which might only become apparent at the point where the final product is made. It would seem from Figure 2 above that the amount of profit available to loggers or the owner of the trees is smaller than at most other nodes in the supply chain, implying that the trade is inequitable, probably deeply so in the country of origin.

Logs or sawn wood are probably the forms in which the great majority of timber of species listed in Table 1 above tends to be exported from the country of origin. Prior to export, some volume is converted into end products e.g. furniture of *Dalbergia oliveri* is made for export in Myanmar.[29]

The imported logs or sawn wood are either made into the finished product in the country to which it has been exported or is re-exported to a further country. Indications of the export value per unit of physical quantity for sawn wood of various species, including Precious Wood, are provided in Table 1 and the Annex. Similar indications for logs would be helpful, particularly if most Precious Wood leaves the country of origin as logs, but this would exceed the capacity of the team elaborating this study.

Reflecting poor governance, it would not be surprising if much logging takes place opportunistically, even from concessions which have documents purporting to be credible plans for sustainable forest management, and that concessions are abandoned once the most profitable trees have been felled. However, if those who have use and ownership rights to individual trees are aware of the commercial value of their trees and give their free, prior informed consent for legal logging, then they should be able to gain higher prices for the logs, particularly if they have direct access to buyers further up the supply chain (for example exporters, importers or manufacturers).[30]

Trends in competition between traders

Reflecting a geographic shift in the market for Precious Wood, the established traders account for a declining share of the global market for the species listed in Table 1 above. New Precious Woods business opportunities have arisen in fast growing markets, primarily China, and established traders battle with stagnating or declining business in their primary markets. One reason for this is that retailers increasingly

[29] http://www.myanmarbeautifulwood.com/index.php?id=49. Accessed 4th April 2012
[30] See any edition of recent years of the Market Information Service of the ITTO: http://www.itto.int/mis_detail/

source their products from Asian countries such as China that offer products with a more competitive price, partly due to social and environmental standards which may not be acceptable in some of their markets.

In relation to the growing demand from China, the enterprises which supply the majority of Precious Woods are likely to be ethnically Chinese. It would not be surprising if the ancestry of many of these traders links them to Fujian (a province known for the enterprise of its diaspora) not least because companies and people having family ties to Fujian have a major presence in the supply of timber in China (notably that from Russia[31] and Myanmar[32]) as well as from a number of other tropical countries including Indonesia, Malaysia, Papua New Guinea, parts of the Congo Basin.[33] The support of such individuals and enterprises might be helpful when seeking to improve norms of practice, particularly in the relevant range states – but in general with respect to rare species of high unit price of Precious Woods.

Manufacturing – musical instruments

The trends implied in the previous paragraph seem apparent even in markets for musical instruments, where particular brands (which might now include Chinese brands for entry-level instruments) are recognised by musicians (both professionals and hobbyists). Some of these brands sell products which are made at least partly from Precious Wood. Martin Guitars[34] and Taylor Guitars[35], both of the USA, and Ramirez[36], a leading maker of classical guitars for professional musicians, are examples in the market for guitars.

Steinway - which uses tropical timber as a superficial veneer for some of its products but not for its soundboards[37] - is a brand of piano known globally. This, and information about the market for second-hand Steinway pianos made from ebony, rosewood and other species which are probably listed in Table 1 above,[38] implies that the company used to use rather more of those species than it does now.

From major brands to individual craftspeople, music instrument makers in the European Union and the USA are particularly aware of the damage to their brand and industry which uses illegal wood and/or from unsustainable sources, even for any products which they make primarily for decorative purposes rather than sound quality. However, this does not stop consumers from buying such illegal (implicitly cheaper) products from others.

As indicated in Figure 3 below, statistics for China's exports of pianos (like other stringed instruments and woodwind) indicate a rapid increase last decade, primarily during the years preceding the recession in the European Union and the USA. Since the price of Precious Woods would tend to relate to economic growth worldwide and the wealth of citizens to purchase those products made thereof, a recession as during 2007-2009, could have caused a dip in exports.

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[31] Song Weiming, Cheng Baodong, Zhang Shengdong, and Meng Xianggang, (2007), *Russian Logs in China – The Softwood Commodity Chain & Economic Development in China*, Forest Trends, Rights and Resources Group, Beijing Forestry University, P12, http://www.forest-trends.org/documents/files/doc_102.pdf. Accessed 4th April 2012

[32] Fredrich Kahrl, Horst Weyerhaeuser, and Su Yufang, (2008), *An Overview of the Market Chain for China's Timber Product Imports from Myanmar*, Forest Trends, CIFOR, World Agroforestry Centre, Department for International Development, P8, http://www.forest-trends.org/documents/files/doc_152.pdf. Accessed 4th April 2012

[33] See for example Rimbunan Hijau http://www.rhg.com.my/ coupled with http://app1.chinadaily.com.cn/fortune2005/ft050517p11n.pdf. Accessed 5th April 2012

[34] http://www.martinguitar.com/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=40&Itemid=91. Accessed 4th April 2012

[35] http://www.taylorguitars.com/guitars/acoustic. Accessed 4th April 2012

[36] http://www.guitarrasramirez.com/english/guitarrasDeProfesionalEn.html. Accessed 4th April 2012

[37] Anon., *Piano Buyer's Guide*, Steinway, http://www.steinway.com/pianos/buyers-guide/#. Accessed 4th April 2012

[38] http://american-steinway.com/. Accessed 4th April 2012

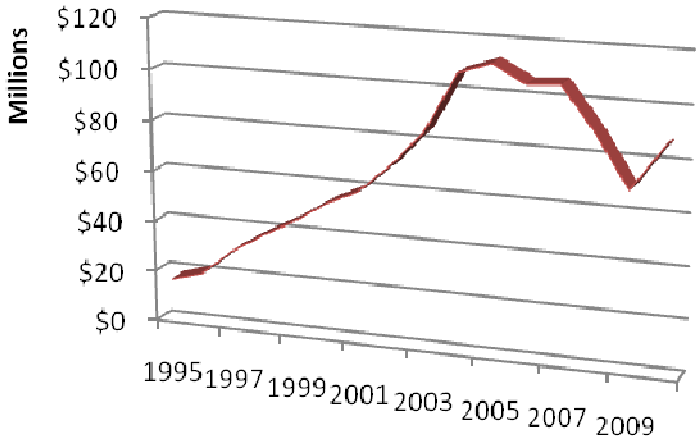

Figure 3: China's export of pianos (HS Code 9201), 1995 – 2011, in million USD. Source: UN Comtrade (31.3.2012)

When interpreting such statistics and trends, one should take into account other countries' trade in pianos – not only the imports of the countries to which China exports most of its pianos but also the exports of countries, such as Japan and South Korea which have established piano manufacturing sectors. Considering both the trade of importing countries and exporting countries is likely to be prudent given the frequency of apparent anomalies in the data.

That said, concerning other wooden products, trade statistics indicate that the trend in China's exports reflects a rapid rise during much of the last decade and volatility during the last few years due to the recession. Figure 4 illustrates the European Union's imports of various wooden products from a selection of countries whose export content may include illegal wood. China's share of the total shown was almost 50% during 2010. However, as with pianos, it might be misleading to assume that trends in trade statistics for these other products are similar to those for Precious Wood.

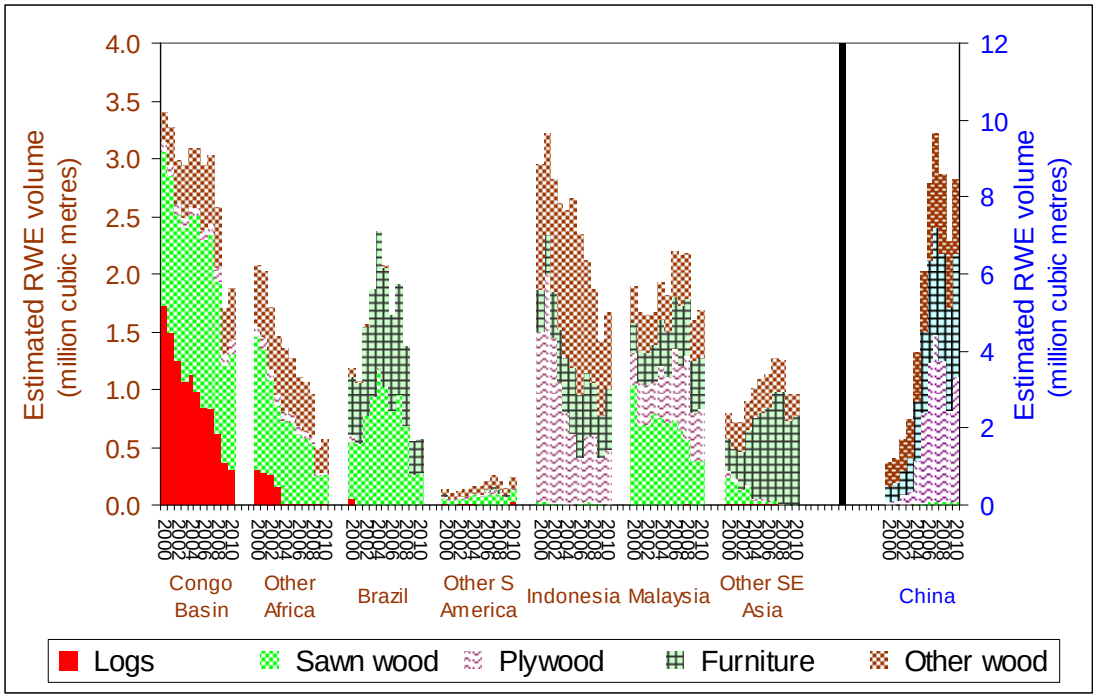

Figure 4: The European Union's imports from tropical countries and China, of wooden furniture and products classified with the HS codes 4403 to 4421 inclusive, 2000-2010. Source: based on Eurostat.[39] Note: excludes timber from plantations in Brazil

[39] http://epp.eurostat.ec.europa.eu/newxtweb/ (CN8, monthly). Accessed on many dates during the last few years

Many of China's musical instrument manufacturers are clustered around a few locations. The largest cluster for stringed instruments – in the Xiqiao area of Taixing (Jiangsu province) – claims to account for roughly 30% of the world's production of violins. Its output includes instruments whose finger boards are described as "rosewood" or "ebony" – which might respectively be of the Dalbergia or Diospyros species which this report describes as "Precious Wood". These manufacturers also use other species – for example "thinwin" Millettia pendula from Myanmar - which are highly valued by end-users. Some of Xiqiao's manufacturers export stringed instruments, including to North America and Europe.

Manufacturing – boat building, coachwork, firearms, ceremonial objects

Having focussed above primarily on musical instruments, the following few paragraphs introduce the market for other products, which are likely to be made at least partly from species listed in Table 1 above.

A simple Internet search on ornamental firearms, ceremonial objects, and panelling for yachts and cars as well as tools shows that Precious Woods are used in making those products. The largest markets for such products are likely to be in the same countries as similar products which are made of expensive wood of rare species. For ornamental firearms the USA is the primary market and for yachts, particularly as veneer, coastal member states of the European Union.[40]

In contrast, as shall be shown in Section 3b below, the market for furniture and other furnishings made entirely or partly of Precious Wood appears to be very large and expanding rapidly. China probably makes most such products. Given their design (typically, imitations of products fashionable during the Ming and Qing dynasties), most furniture and other wooden furnishings made in China from expensive tropical species, particularly those referred to as rosewood, is unlikely to be exported, other than to the wealthy Chinese Diaspora.

Manufacturing – wood furniture and furnishings

Having highlighted above the probability that a large majority of wooden products made at least partly from Precious Wood enters end-use as either furniture or other furnishing in China, the following paragraphs consider the countries from which much of this wood is likely to originate.

China has a long history of making wooden furniture from the sort of species, which are or might soon fall under the Precious Wood definition; the most notable of these are described in the trade as rosewood. Most of this rosewood furniture imitates designs popular during the Qing and Ming dynasties, and appeals to a primarily Chinese clientele.

The Dachong area of Zhonghsan (Guangdong province), is said to account for 60% of the "rosewood" furniture made in China.[41]

Countries of origin and their export destinations

Burma, Cambodia, Laos, Thailand, and Vietnam are the countries of origin for most of the Precious Wood which is imported into China. Reports in the media and elsewhere suggest that *Dalbergia cochinensis*, a Precious Woods species, is currently a particular focus of those seeking to profit from trade in illegal timber, including, it is alleged, government officials. Allegations about illegal timber trade in Cambodia have been made against individuals and organizations ranging from international conservation groups,[42] through forestry officials, to the military[43]. China is said to be a main destination for some of this illegal wood.[44]

Note: source data has been converted to estimated roundwood equivalent volume as indicated in the library of trade statistics held by the European Forest Institute http://www.efi.int/portal/policy_advice/flegt/trade_statistics/

[40] Kuiper Dutch Marine Panels, http://www.fineer.nl/veneer-index. Accessed 5th April 2012

[41] http://www.dachong.gov.cn/main/english/index.action

[42] Chris Lang, (2012), *Conservation International turns a blind eye to illegal logging in the Cardamom Mountains, Cambodia*, redd-monitor.org, http://www.redd-monitor.org/2012/01/19/conservation-international-turns-a-blind-eye-to-illegal-logging-in-the-cardamom-mountains-cambodia/. Accessed 4th April 2012

[43] Anon., (2007), *Cambodia's Family Trees*, Global Witness, http://www.globalwitness.org/library/cambodias-family-trees. Accessed 4th April 2012

The scarcity of suitable quality wood and the expanding size of the market will tend to have prompted traders to seek substitute species from elsewhere, even though these might not be able to command such high prices. Madagascar has been a particularly controversial alternative source of supply. Other countries in Africa which supply substantial volumes of logs and/or sawn wood of species referred to as rosewood include Mozambique, and, more recently, Benin, Gambia and Togo. In the case of Gambia the country's export statistics show a tenfold increase over the last years, however the Chinese import figures show a up to 100-times higher import value in some years.[45]

The results of the FAO Forest Resource Assessment in 2010, that shows that these countries have no large forest stock that can sustain such levels of trade, indicate that the level of trade is unsustainable.[46] It would be consistent with migrant entrepreneurs now being sufficiently pervasive in range states that opportunity for short term profit is being taken. Under such circumstances, greater monitoring and enforcement of protected areas should be undertaken to ensure the export of Previous Woods is not from those forests.

From Latin America, China increasingly imports quantities of wood from Semi Precious Woods and Precious Woods species. China appears to have displaced the USA, including its indirect imports via Mexico, as the leading destination for expensive, rare wood, particularly from Peru, but also from Argentina in the case of *Bulnesia sarmentoi*.[47]

Judging from Internet postings by traders, India seems to supply China with substantial quantities of wood from *Pterocarpus santalinus,* despite CITES having recommended that imports be suspended from 2010[48] – in consignments of a couple of dozen cubic metres or monthly amounts of a few hundred cubic metres per trader.[49]

China's imports of tropical logs from most tropical countries tend greatly to exceed the volumes which are imported into the European Union and the USA. The European Union and the USA import small volumes of wood from most of the countries of origin of the species listed in Table 1 above. This tends to confirm that China accounts for the great majority of trade in logs and sawn wood of non-aromatic Precious Wood.

2.1.2 Market data

The market from sources of supply to end-use for Semi Precious Woods and Precious Wood has been introduced in Section 2.2 above. Section 2.2 sets out to quantify the trade in Precious Woods species listed.

However, as outlined above in Section 2.1, the insufficiency of statistics pertaining to this market, make it necessary to describe the estimates presented in this report as first iterations – to be refined if and when robust alternatives become available.

Such data as there is concerning the physical quantity and value of trade in Precious Woods tends not to be comprehensive or official and tends to relate to a short period of time which might not be representative and which, implicitly, does not indicate the trend. Some such data is provided from time to time in the media and, less frequently, exposés by civil society.

Information about seizures of illegal wood products of any species might, if available (as in the case of *Pterocarpus santalinus* presented in Section 1.3 above) provide a very rough approximate indication of the

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[44] Anon., (2012), *Rosewood Robbery – the Case for Thailand to List Rosewood on CITES*, Environmental Investigation Agency, P3, http://www.eia-international.org/wp-content/uploads/Rosewood-Robbery.pdf. Accessed 4th April 2012

[45] UN Comtrade, http://comtrade.un.org/db/. Accessed March 30th, 2012

[46] FAO 2010. Global Forest Resource Accessment 2010, Rome

[47] Proposal to list B. sarmentoi in Appendix II of CITES, COP 15, 2010: http://www.cites.org/eng/cop/15/prop/index.shtml

[48] Anon., (2012), *Review of Significant Trade in specimens of Appendix-II species*, Convention on Trade in Endangered Species, Table 3, http://www.cites.org/eng/com/pc/20/E20-14-01.pdf. Accessed 5th April 2012

[49] http://india.alibaba.com/country/products_india-red-sandalwood.html. Accessed 5th April 2012

scale of trade. However, the rationale for making seizures is not always apparent, particularly where corruption is likely.

The EU Timber Regulation (EC Regulation 995/2010) and the amended Lacey Act of the USA require the declaration of the Latin name for each species used in each consignment first placed on the market in European Union or imported into the USA respectively.

The above mentioned and with only few other exceptions, official statistics of bilateral trade in wood-based products do not provide data by species (except for some logs and sawn wood), and these species are not those which are listed in Table 1 above and trends in their trade might differ substantially.

As indicated in Section 2.1.1 above, it might be misleading to suggest that trends in the trade of finished products made at least partly from wood - such as musical instruments, firearms, ornaments or furniture – or of logs and sawn wood reflects the trend in trade in Precious Woods species.

The descriptions of production and trade given in Section 1.3 above for some of the species classified as Precious Wood for this report tend to confirm the lack of comprehensive trade data from which to assess such parameters as trends in prices or quantities for trade in Precious Woods species.

One should conclude from the above that, given the data currently available, it is not feasible to quantify the size of the market for any of the end-uses of the species listed in Table 1 above.

Nevertheless, in order to stimulate constructive discussion, an attempt is made below to assess the size of particular markets for Precious Wood. This should help focus attention on the products and countries which account for most of the total. It would not help identify which species are most threatened by the trade or the level of logging which would not be detrimental to the survival of these species.

Qualitative assessment for 2011

In order to make this qualitative assessment, one might first consider the volume of logs and sawn wood which is exported from tropical countries – tropical logs and tropical sawn wood being the forms in which most Precious Wood is exported from countries of origin. The data shown in Figures 5 and 6 below exclude the volume of logs and sawn wood which probably derive from plantations.

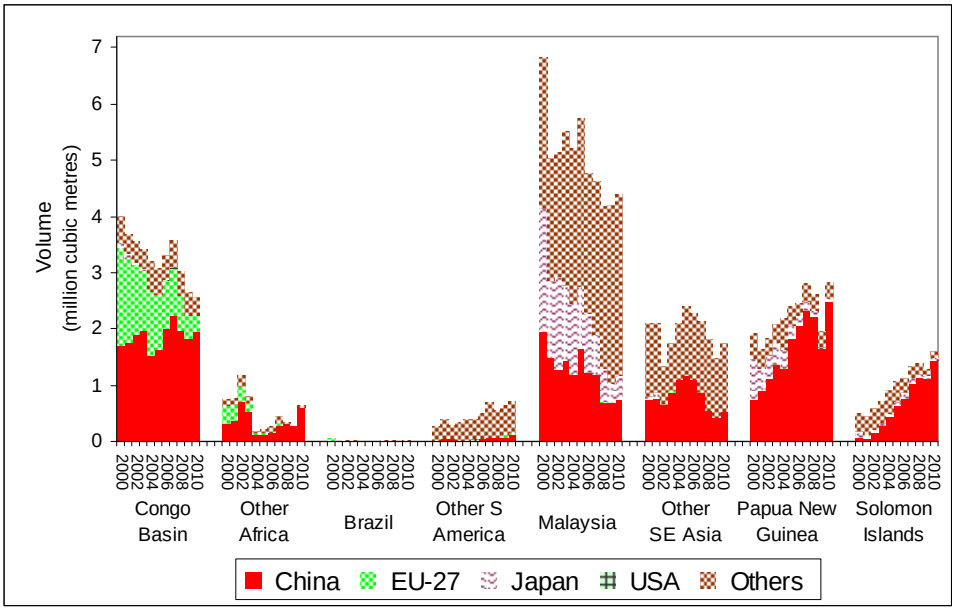

Figure 5: Export of logs of tropical timber from tropical regions and countries, 2000 – 2010, Source: based UN Comtrade and on importing countries' statistics including Eurostat, USITC Trade DataWeb, Trade Statistics of Japan, Korea Customs Service and China Customs

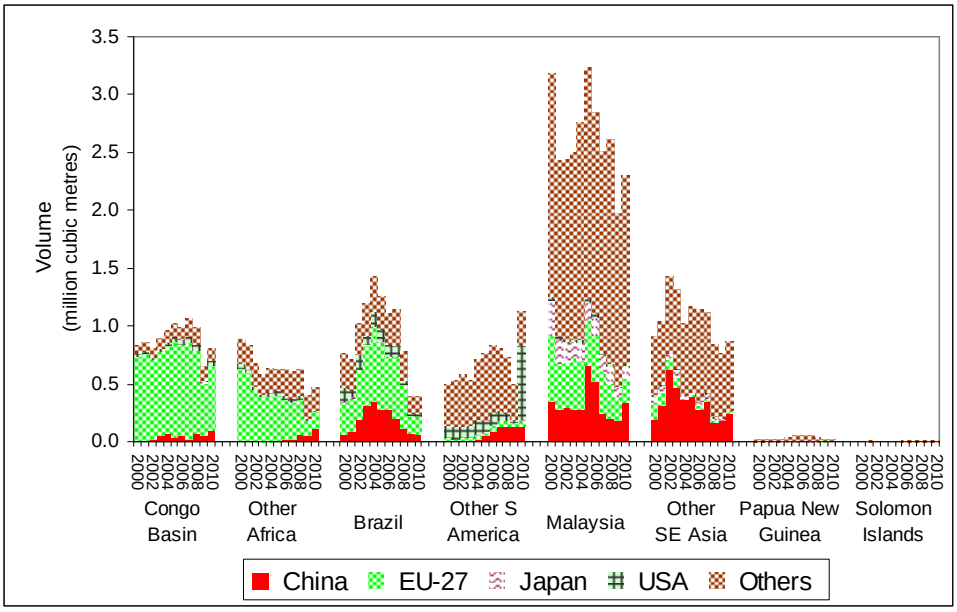

Figure 6: Exports of tropical sawn wood from tropical regions and countries, 2000 – 2010, Source: based on UN Comtrade and other sources including AliceWeb (Brazil) and Badan Pusat Statistik (Indonesia), Eurostat, USITC Trade DataWeb, Trade Statistics of Japan, Korea Customs Service and China Customs

Figures 5 and 6, which exclude trade in wood which probably derived from plantations, indicate the extent to which logs exported to China tend to dominate the supply of logs and sawn wood from tropical countries. Further, China accounts for most of the timber exports of several tropical countries including several which are probably range states for Precious Woods species.

It is likely that China's imports of Precious Woods species comprise both logs and sawn wood, but the relative quantities are unclear.

China publishes data for its trade in logs of species which are described as rosewood[50] (or Padauk[51]). It does so under a commodity code, 44039930, specific to China. It is unclear whether this commodity code includes either all Dalbergia species (i.e. rosewood) or all Pterocarpus species (i.e Padauk) – perhaps both, perhaps also other species.

It is possible that some logs which should be reported under commodity code 44039930 are reported under other commodity codes – and vice versa. However, the great majority of the logs reported under this commodity code are likely to be of valuable species and to have a high unit price.

Figure 7 below illustrates the scale and trend in China's imports of logs under this commodity code – particularly the six-fold increase in volume which has taken place during the last two years. The great majority of these imports enter China through Customs Districts in Guangdong and, to a lesser extent, Shanghai and for overland supplies, Yunnan.

[50] http://www.chinabookshop.net/hscode.php?currency=CNY&type_id=4403&term=. Accessed 5th April 2012
[51] Anon., (2005), *China Customs Statistics Yearbook 2005*, Customs General Administration of the People's Republic of China, P35

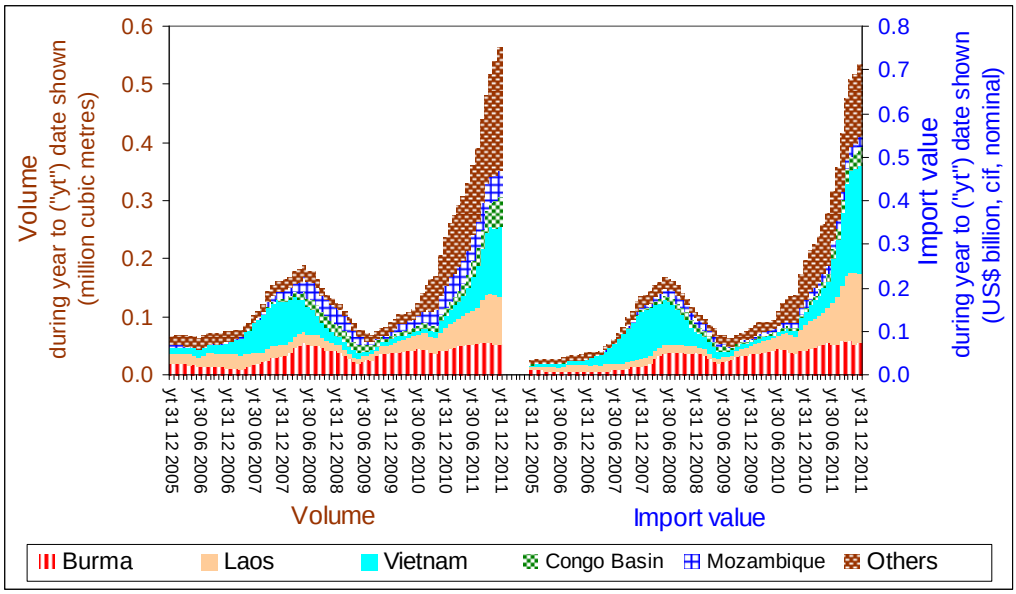

Figure 7: China's imports of Rosewood (trade name) logs, by source of supply, 2005-2011, Source: based on China Customs[52]

Figure 7 above indicates that, the volume and import value of logs from Dalbergia and/or Pterocarpus species which were imported into China during 2011 amounted to roughly 500,000 cubic metres and approximately US$600 million respectively.

Roughly half of this was supplied either from or via Burma, Laos and Vietnam – countries which have historically supplied China with wood for its furniture and ornament markets. Much of the volume imported from Vietnam during 2007 and 2008 was supplied overland through Guangxi – parts of which are known for their output of rosewood furnishings.

During 2011, a number of countries in Africa supplied substantial volumes to China, notably Democratic Republic of Congo, Benin, Togo and Gambia. The latter three are not thought of as having large areas of natural forest. This implies that the timber being exported to China from those three countries could be derived from unsustainable levels of logging or illicit practices or other avenues including from transit. It would not be surprising if, as in Mozambique which exports more of these logs to China than any other African country, migrant entrepreneurs commission the logging of these trees.[53]

South America and Oceania supply a small proportion of the total.

It is unclear how much of the total is attributable to Precious Woods species – or whether China's import of any of the sawn wood or the other logs included substantial volumes of those species.

Most of this would have been destined for end use within China, particularly as furniture and ornaments – products which are likely to use a much greater volume of Precious Wood per item than, for example, musical instruments.

The music industries of the European Union and the USA are each unlikely to consume more than double that amount. If this is so, and musical instruments account for the majority of their imports of species listed in Table 1 above, and the size of their markets for those species were similar, then they might each account for a roundwood equivalent volume of approximately 20,000 cubic metres – each roughly one fifth of the overall quantity imported by China.

[52] Based on detailed monthly data provided on a subscription basis from General Administration of Customs of the People's Republic of China - abbreviated to "China Customs"

[53] Catherine Mackenzie, (2006), *Forest Governance in Zambézia, Mozambique – Chinese Takeaway!*, FONGZA, http://www.illegal-logging.info/uploads/Mozambique_China.pdf. Accessed 5th April 2012

Japan and the Middle East are likely to import significant quantities of those species: estimated 5,000 cubic metres and 10,000 cubic metres respectively in terms of roundwood equivalent volume.

The rest of the world might import a roundwood equivalent volume of a further 20,000 cubic metres in total.

If this were so, then the roundwood equivalent volume of world trade in the species listed in Table 1 above would, during 2011, have amounted to approximately 200,000 cubic metres, of which China accounted for half. Furniture would have accounted for half of the total, ornaments a further 20%, musical instruments for a further 10%, and boat building, coachwork, firearms and others for a further 10% in total.

The export value of this trade, assuming a conservative estimation of the value of US$500 per cubic metre of roundwood equivalent volume, would have amounted to approximately US$100 million.

Given that the roundwood equivalent volume of world trade is tropical logs and tropical sawnwood (as illustrated in Figures 5 and 6 above) was in the order of 300 million cubic metres during 2011, trade in logs and sawn wood of the species listed in table 1 above would have amounted to roughly 1% of the total. This small percentage does not seem unreasonable given the exceptional nature of Precious Wood.

The USA and the European Union are likely to import most of their logs and sawn wood of species listed in Table 1 from Africa and South America given their historic links.

Although the quantity of products which China exports and which are made at least partly from species listed in Table 1 is probably increasing, the great majority (perhaps exceeding 90%) of the roundwood equivalent volume which China imports enters end-use in China.

2.2 Illegal Supply Chains

This section introduces the way in which trade in illegal wood-based products tends to be quantified. It then indicates probable trends in a number of countries' imports of such products. Following this, it considers the likely impact of measures in end-user countries on trade in illegal Precious Wood before discussing the illegal production of Precious Wood.

Quantifying illegal trade

The following paragraphs focus on trade in wood-based products in general. They do not necessarily relate to illegalities pertaining to the supply of products made from the species listed in Table 1 – some of which are described in Appendices 3-6 below.

There is little robust published information about the extent of trade in illegal wood-based products. Attempts to quantify this trade have tended either to assume that if the sum of production and imports is less than the sum of imports and local end-use is negative, then the difference is the amount of illegal timber, or to assume that a fixed percentage of a country's exports is always applicable, irrespective of the variability of sub-national conditions, species, product and changes in government policy.

The amount US$10-15 billion is frequently assumed to be the sum which countries forego in revenue each year due to illegalities associated with wood production.[54] Indonesia, which seems to have accounted for a large majority of that total, has with some success taken steps to address such illegalities and the quantity

[54] Anon., (2004), Sustaining Forests – A Development Strategy, World Bank, P1, http://siteresources.worldbank.org/INTFORESTS/Resources/SustainingForests.pdf. Accessed 6th April 2012

of timber being felled has reduced substantially.[55] This shows that there has probably been considerable change in the flow of illegal wood-based products during the last two decades.

For example, certified products now account for a significant share of the tropical timber which the European Union now imports from the Congo Basin, Malaysia and Brazil. The volume of products wholly of tropical timber which the European Union now imports tended to decline last decade – as illustrated (for logs and sawn wood) in Figures 5 and 6 above. Implicitly, the quantity of illegal products made wholly of tropical timber which the European Union imports is likely to have declined even more rapidly. However, as illustrated in Figure 4, the quantity of wood which the European Union imports from China, which is reputed to be a hub for trade in timber, has increased substantially during that same period.

The changes are reflected in Figure 8 below. It pertains only to wooden furniture and products which have commodity codes from 4403 to 4421 inclusive. It has been derived from bilateral trade statistics (published by Eurostat), multiplying these by the illegal content of the products concerned according to an expert knowledge and perception – the percentage varying between Member State, between products and from year to year for any given source of supply. This method of assessment is discussed and more information can be found in a publication of Chatham House.[56]

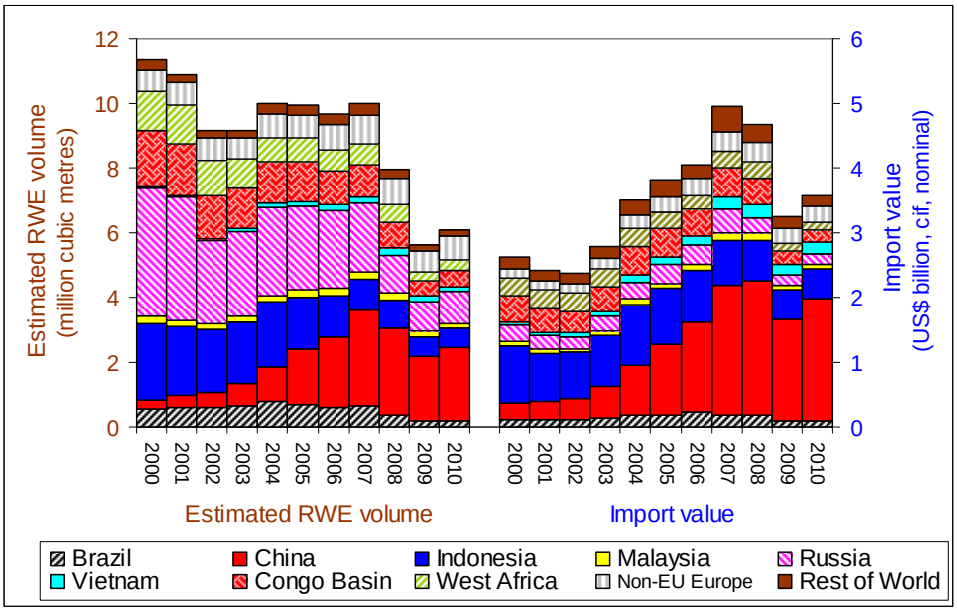

Figure 8: Estimates of the European Union's imports of illegal wooden products, 2000-2010, Source: see text above

In contrast, Figure 9 below illustrates estimates of the quantity of illegal wood being imported into China from tropical countries. Figure 8, which covers the same range of products as figure 9, is not confined to tropical countries. Figures 8 and 9 use the same method of assessment, but Figure 9 is based on trade statistics published by China Customs.

[55] Anon., (2006), *East Asia Region Forest Strategy Draft for Comment*, World Bank, Table 2.3, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/10/10/000011823_20061010160645/Rendered/PDF/376960EAP0whit1ry0Strategy01PUBLIC1.pdf. Accessed 6th April 2012

[56] Sam Lawson and Larry MacFaul, (2010), *Illegal Logging and Related Trade Indicators of the Global Response*, Section 5.2.1, http://www.illegal-logging.info/uploads/CHillegalloggingpaperwebready1.pdf. Accessed 6th April 2012

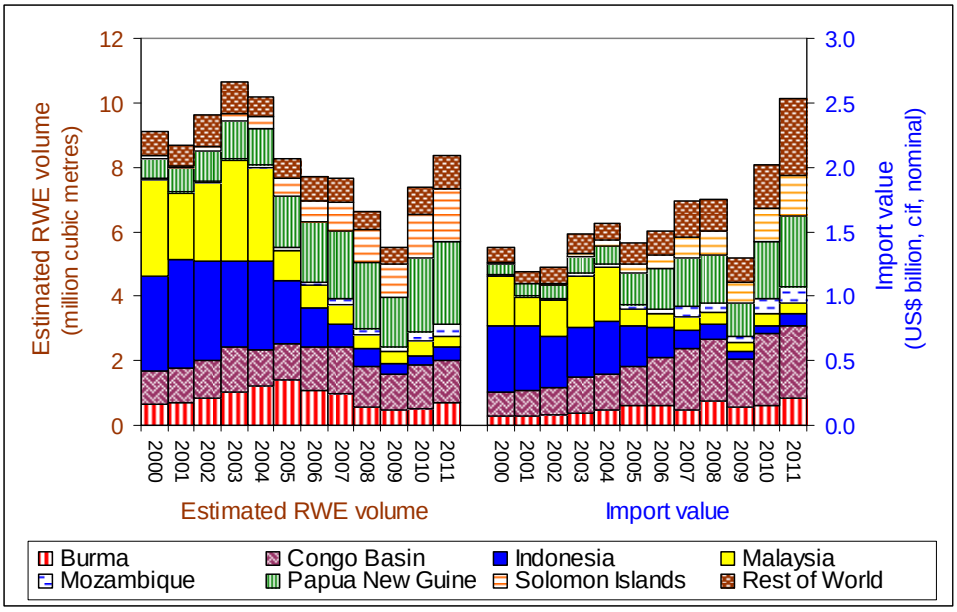

Figure 9: Estimates of the China's imports of illegal wooden products, 2000-2011, Source: see text above

Figure 9 indicates that there is likely to have been a strong upwards trend in China's imports of these illegal products during the last two years. There is little to suggest that the trend in China's imports of Precious Woods species differs from this.

However, it does not follow that China's exports of illegal wooden products have correspondingly increased. Indeed, the increase has probably been destined for end-use within China.

If measures adopted in the USA and European Union seeking to combat trade in illegal wood-based products are implemented effectively, this will encourage exporters in China to distance themselves from illegal timber even from countries which currently do not export substantial volumes of timber to either the USA or the European Union.

Illegality in the supply of Precious Wood

The profits to be gained from exploiting Precious Wood given the definition adopted for this report are likely to be exceptional. This coupled with poor governance and/or enforcement makes it likely that illegality is more prevalent in the supply of Precious Wood than products of other tree species.

Perhaps inevitably the media and others tend to report examples either of "success stories" such as those of FSC-certified mpingo woodland in Tanzania mentioned in Appendix 4 below, or examples of illegality.

Other circumstances being equal, in order to maximise cash, trees of species listed in Table 1 above are likely to be amongst the first to be felled in logging concessions, although this depends on how effectively any credible plan for the sustainable management of the concession is enforced. Unfortunately, as the FAO in its Forest Resource Assessment[57] and the ITTO[58] have repeatedly shown, the great majority of tropical forest is not being logged sustainably and progress towards their harvest with a management plan is rather incremental.

Those who illegally exploit trees of Precious Wood will of course tend to become interested in trees of other species if and when these become profitable relative to the risk and cost of being caught. This will be particularly the case near the Precious Wood trees are located because the loggers and traffickers costs would to some extent be subsidised by exploiting the Precious Wood.

[57] FAO 2010. Global Forest Resource Accessment 2010, Rome
[58] ITTO. 2006. Status of tropical forest management 2005. ITTO Technical Series No 24. Yokohama, Japan: International Tropical Timber Organization.

Although poor governance tends to be an essential ingredient in the production and trade of illegal products from species listed in Table 1 above (and of course other tree species), transnational organised crime seems also be involved.[59] The expansion of migrant diasporas in range states of these species might make it more difficult for governments in range states to combat such crime – particularly if trading networks are flexible and links with government are informal.[60]

Examples of illegality in countries of origin

The nature and extent of illegality in relation to the production and export of products from a number of species listed in Table1 are presented below in the case studies (Appendices 3-6) in as much detail as is readily available.

2.3 Conclusions and Recommendations

It seems that the market for Precious Woods has changed during recent years. The number of countries exporting substantial quantities has probably increased, particularly in Africa – notably Madagascar, Mozambique, Benin, Gambia and Togo. This can be called the "source area hopping" phenomenon. This phenomenon is increasing in intensity and the number of areas involved.

China is likely to be both the initial and final destination for most of the increase, and to account for roughly half of the roundwood equivalent volume exported from countries of origin.

Ornamental furnishing, particularly furniture, is probably the end-use which accounts for most of the logs and sawn wood of the species listed in Table 1 which is exported from countries of origin.

It is not feasible, given currently available data, particularly the inadequacy of norms for customs statistics, to quantify the size of the market for Precious Woods – other than by presenting an educated guess for revision. However, this is changing as the USA, EU, Switzerland and Australia are taking the lead in ensuring species information is captured through legislation changes that require reporting of species information during imports. This should in future help to provide better sets of data on species in trade, and subsequently of Precious Woods, which links to volumes and values and country of origin.

However, for Semi-Precious and Precious Wood species and the norm of using trade names for species, which may or may not encompass all the species listed in Table 1, there might be little merit in trying to assess trends in volumes and prices for the group of species as a whole. This is in light of the small volumes in trade, and that China is the major destination and final consumer. The very rough estimation of the world trade of the species listed in Table 1 accounted for about 1% of world trade in tropical logs and sawn wood, and that China imported half of the total (five times more than either the European Union or the USA), predominantly for end-use in China as furniture or ornaments, and that musical instruments accounted for only about 10% of the total.

It would appear that, from major brands to individual craftspeople, the musical instrument industry in the European Union and the USA is taking active steps to minimise its use of illegal wood and its use of wood from unsustainable sources - but this does not prevent consumers from buying from less responsible suppliers. The quality of sound as well as the appearance of musical instruments made using some of the species listed in Table 1 makes it particularly important that supplies of those species are not exhausted. However it probably accounts for a small minority of the roundwood equivalent volume exported from countries of origin, particularly in China. Nevertheless it probably consumes sufficient Precious Wood to justify promoting steps in other markets, particularly to demonstrate how proactively seeking to exclude illegal wood from supply chains is good for business. Such sustainability strategies might fail, if undermined constantly by demand from other end-uses, with less strict requirements for legality or sustainability.

[59] http://www.interpol.int/Crime-areas/Environmental-crime/Projects/Project-LEAF, Accessed 6th April, 2012

[60] Interpol & World Bank 2008. Chainsaw Project. An INTERPOL perspective on law enforcement in illegal logging. Geneva, Switzerland: Interpol & Washington DC, USA: World Bank

It is likely that trading structures have also changed, long established enterprises being displaced by new businesses, often of owners of the same ethnic background as the destination of the timber, and less formally structured networks, a number of which might be similar to those which exploit other illegal forms of flora and fauna.[61]

Illegality rather than sustainability should, as with timber in general - be a focus of initial engagement – provided that this explicitly includes corruption and criminal justice, not least because it seems that illegality is a very significant phenomenon in Precious Woods trade.

[61] among others EIA 2008. *Environmental Crime. A threat to our future*. London, UK: Environmental Investigation Agency or Center for Conservation Biology http://conservationbiology.net/research-programs/tracking-poached-ivory-2/ Accessed 5th April, 2012

Appendix 1

Semi Precious Wood (SPW) and Non Precious Wood (Commodity) Species

Table 2 Semi Precious Wood (SPW) Species (tropical and subtropical origins only)

Andira inermis	Angelim, Machiche, Partridge wood	South and Central America	Tonewood, boat-building, furniture, flooring, decking, Billiard cues	40,064 (instrument blanks)	IUCN – not listed
Aningeria spp	Anigre, Anegre	West, East, Central Africa	Tonewood, boat-building, furniture, veneers	54,373 (instrument blanks)	IUCN – not listed
Astronium fraxinifolium -	Tigerwood, Goncalo alves		Tonewood, flooring, decking	2,119 (decking)	IUCN – not listed
Cedrela Odorata	Spanish cedar, Brazilian cedar, Cigar-box Wood	West Indies to the Amazon	Tonewood (neckboard) NB: This is also a commodity wood	15,748 (instrument blanks), 2,119 (sawn timber)	IUCN - vulnerable
Chlorophora excelsa	Iroko, African teak	West coast of tropical Africa	Tonewood (guitar back and sides) NB: This is also a commodity wood	29,747 (instrument blanks), 2,046 (sawn timber)	IUCN – not assessed
Guibourtia demeusei	African rosewood, Ebana, Paka, Bubinga	Cameroon, Central African Rep., Congo, Gabon, Zaire	Tonewood, archery bows, furniture, gun stocks, vehicle interiors (Lexus)	17,078 (instrument blanks) 5,243 (sawn wood (UK price))	IUCN – not assessed
Lysiloma spp. (possibly *L. bahamensis)*	T'zalam, Mayan walnut, Caribbean walnut	Belize, Mexico, Guatemala	Tonewood, furniture, knives, flooring	51,511 (instrument blanks)	IUCN – not assessed
Guibourtia ehie	Ovangkol, Amazaque, Black hyedua	Cameroon; Côte d'Ivoire; Gabon; Ghana; Liberia; Nigeria	Tonewood, substitute for rosewood, carving, cabinetry, flooring	44,643 (instrument blanks), 5,482 (sawn wood)	IUCN - vulnerable
Machaerium scleroxylon	Morado, Bolivian Rosewood, Pau Ferro, Santos Rosewood, Jacaranda pardo	Brazil, Paraguay, Bolivia	Tonewood, furniture, decorative uses	65,697 (instrument blanks), 3,390 (sawn wood)	IUCN – not evaluated
Metopium brownii	Chechen, Che che'en, Chechem, poisonwood, Black poisonwood, Caribbean rosewood	Central American and Caribbean	Tonewood, decorative uses, furniture (including utility furniture)	51,511 (instrument blanks), 4,979 (sawn wood)	IUCN – not assessed
Microberlina Brazzavillensis	Zebrano, Zebrawood	Gabon, Congo	Tonewood, gun stocks, decorative use, car interiors in the past	36,320 (instrument blanks), 7,649 (sawn wood)	IUCN - vulnerable
Millettia laurentii	Wenge, African pallisander, Panga panga	Cameroon, Central African Republic, Congo, The Democratic Republic of the Congo, Equatorial Guinea, Gabon	Tonewood, Chinese furniture, flooring	14,027 (instrument blanks), 6,801 (sawn wood)	IUCN - endangered
Pterocarpus Soyauxii	Padouk, Palo rojo	Central and tropical West Africa	Tonewood	33,330 (instrument blanks), 5,227 (sawn wood)	IUCN – not assessed
Roupala brasiliensis	Lacewood, Leopardwood,	Brazil	Tonewood, decorative uses	37,946 (instrument blanks), 3,814 (sawn wood)	IUCN – not assessed
Swietenia	Honduras	Honduras	Tonewood	42,067 (instrument	IUCN –

macrophylla	mahogany, Large-leaf mahogany, Big-leaf mahogany	(NB: Species present elsewhere but Semi Precious Wood is from Honduras. i.e. Not Brazilian mahogany)	(Honduras mahogany only) (NB: Also a commodity wood)	blanks)	vulnerable
Tectona grandis	Burmese Teak	Burma	Furniture and various relatively high value uses.	9,747 (sawn wood)	IUCN – not listed
Tieghemella Heckelii	Makore, African cherry	Cameroon, Ivory Coast, Gabon, Ghana, Liberia, Nigeria and Sierra Leone		3,814 (sawn wood)	IUCN – endangered

Table 3 Non precious wood (Commodity) species with certain grades that are considered semi precious or even precious (tropical and subtropical origins only)

Cedrela Odorata	Spanish Cedar, Brazilian cedar, Cigar-box Wood	West Indies to the Amazon	NB: This is also a Semi Precious Wood: Tonewood (neckboard).	15,748 (instrument blanks), 2,119 (sawn timber)	IUCN - vulnerable
Chlorophora excelsa	Iroko, African teak	West coast of tropical Africa	NB: This is also a Semi Precious Wood: Tonewood (guitar back and sides).	29,747 (instrument blanks), 4,619 (sawn timber)	IUCN – not assessed
Dalbergia latifolia	Sonokeling Rosewood	Plantation grown	Tonewood		IUCN – not listed
Dipteryx odorata	Brazilian Teak, Cumaru	South America	Decking, furniture		IUCN – not listed
Swietenia macrophylla	Brazilian mahogany, Large-leaf mahogany, Big-leaf mahogany	South America and plantation grown elsewhere e.g. Indonesia	NB: This is also a Semi Precious Wood: Tonewood. See Table 2	4,132 (sawn wood)	IUCN – vulnerable

Appendix 2

Potential Precious Wood Species

Requiring further research on use, price/value and conservation status

Table 4 Potential Precious Wood Species (tropical and subtropical origins only)

SCIENTIFIC NAME	COMMON NAMES	COUNTRY / REGION OF ORIGIN	COMMERCIAL USES	AVERAGE MARKET VALUE $/CBM	CONSERVATION STATUS
Aspidosperma curranii	Quina	South America	decking / furniture		IUCN - vulnerable
Aspidosperma darienense		South America	decking / furniture		IUCN - endangered
Aspidosperma megalocarpon		South America	decking / furniture		IUCN – near threatened
Aspidosperma triternatum	Quebracho Blanco Lagunero	South America	decking / furniture		IUCN – near threatened
Aniba canelilla	Preciosa				IUCN – not listed
Cassia artensis	Cote d'Ivoire				IUCN - endangered
Cassia fikifiki	New Caledonia				IUCN - endangered
Cassia siamea	Thailand Shower	Africa, Asia, Oceania			UCN – not listed
Caryota urens	Black palmira				IUCN – not listed
Calycophyllum multiflorum	Lemonwood, Castello boxwood / Palo Blanco	Brazil	Boxwood substitute, inlay work, archery bows		IUCN – not listed
Dalbergia abrahamii					IUCN - endangered
Dalbergia acariiantha					IUCN - vulnerable
Dalbergia andapensis					IUCN - endangered
Dalbergia annamensis					IUCN - endangered
Dalbergia aurea					IUCN - vulnerable
Dalbergia balansae					IUCN - vulnerable
Dalbergia bathiei					IUCN - endangered
Dalbergia boniana					IUCN – data deficient
Dalbergia congestifolia	Amazon rosewood				IUCN – not listed
Dalbergia bojeri					IUCN - endangered
Dalbergia brachystachya					IUCN - endangered
Dalbergia bracteolata					IUCN – near threatened
Dalbergia browneii	Coin Vine / Brown's Indian rosewood				IUCN – not listed
Dalbergia cambodiana					IUCN - endangered
Dalbergia campechiana	Campeche rosewood				IUCN – not listed
Dalbergia capuronii					IUCN - endangered
Dalbergia catipenonii					IUCN - vulnerable
Dalbergia chapelieri					IUCN - vulnerable
Dalbergia chlorocarpa					IUCN - vulnerable
Dalbergia cibix	Costa Rican rosewood				IUCN – not listed
Dalbergia cuscatlantica	Funera rosewood				IUCN – not listed
Dalbergia cubiquitzensis	Guatemalan rosewood				IUCN – not listed
Dalbergia darienensis	Black rosewood	Panama	?		IUCN – not evaluated CITES App III in Panama
Dalbergia davidii					IUCN - endangered

Dalbergia delphinensis					IUCN - endangered
Dalbergia emirnensis					IUCN – near threatened
Dalbergia eremicola					IUCN – near threatened
Dalbergia erubescens					IUCN - endangered
Dalbergia glaberrima					IUCN - vulnerable
Dalbergia glaucocarpa					IUCN - endangered
Dalbergia ecastaphyllum	Maraimaray rosewood				IUCN – not listed
Dalbergia emarginata	Indian rosewood				IUCN – not listed
Dalbergia entadoides					IUCN – data deficient
Dalbergia funera					IUCN – data deficient
Dalbergia fusca			Chinese furniture		IUCN – not listed
Dalbergia glabra	Coin Vine				IUCN – not listed
Dalbergia glomerata					IUCN - vulnerable
Dalbergia grandiflora	Mampati rosewood				IUCN – not listed
Dalbergia hildebrandtii					IUCN - vulnerable
Dalbergia hirticalyx					IUCN - endangered
Dalbergia humbertii					IUCN - endangered
Dalbergia hutibertii					IUCN - vulnerable
Dalbergia hypoleuca	Mexican Coco Bolo				IUCN – not listed
Dalbergia intibucana					IUCN – critically endangered
Dalbergia javanica	Indian rosewood				IUCN – not listed
Dalbergia lemurica					IUCN - vulnerable
Dalbergia lineata	Rosewood				IUCN – not listed
Dalbergia madagascariensis	Madagascar rosewood				IUCN - vulnerable
Dalbergia mammosa					IUCN - endangered
Dalbergia mollis					IUCN – near threatened
Dalbergia monticola		Madagascar			IUCN – vulnerable CITES App 3
Dalbergia neoperrieri	Madagascar rosewood	Madagascar			IUCN – vulnerable
Dalbergia normandii		Madagascar			IUCN - endangered CITES App 3
Dalbergia obtusa	Madagascar Tulipwood				IUCN – not listed
Dalbergia oligophylla					IUCN - endangered
Dalbergia orientalis					IUCN - vulnerable
Dalbergia pacifica	Ocelot's Ear rosewood				IUCN – not listed
Dalbergia peltieri					IUCN – near threatened
Dalbergia pervillei					IUCN – near threatened
Dalbergia pseudobaronii					IUCN - vulnerable
Dalbergia purpurascens		Madagascar			IUCN - vulnerable CITES App 3
Dalbergia purpusii	Guatemalan rosewood				IUCN – not listed
Dalbergia rimosa	Asian rosewood				IUCN – not listed
Dalbergia sambesiaca					IUCN – data deficient
Dalbergia setifera					IUCN - endangered
Dalbergia simpsonii					IUCN - vulnerable
Dalbergia sissoides	Indian rosewood, Malabar blackwood	India	Carving, premium grade furniture and cabinets, possibly tonewood (very similar to D. latifolia)		IUCN – not listed

Dalbergia sissoo	Sissoo	East and SE Asia	Tonewood, furniture, luxury consumer items, tool handles, boat building		IUCN – not listed
Dalbergia spruceana	Amazon rosewood, Jacarand -Do-Par	Bolivia, Brazil, Peru	Tonewood, knives, pens, often used as substitute for Brazilian rosewood, Chinese furniture		IUCN – not listed
Dalbergia suaresensis					IUCN - endangered
Dalbergia tonkinensis	Sua	Vietnam	Medicinal		IUCN - vulnerable
Dalbergia tricolor					IUCN - vulnerable
Dalbergia tsaratananensis					IUCN - endangered
Dalbergia tsiandalana					IUCN - endangered
Dalbergia urschii					IUCN - endangered
Dalbergia vacciniifolia					IUCN - vulnerable
Dalbergia viguieri					IUCN - vulnerable
Dalbergia xerophila		Madagascar			IUCN - endangered CITES App 3
Dalbergia tabascana	Tabasco rosewood				IUCN – not listed
Dalbergia trichocarpa					IUCN – lower Risk/least concern
Dalbergia variabilis	Tulipwood		Tonewood		IUCN – not listed
Diospyros celehica	Indonesian Ebony	Indonesia	Chinese furniture		IUCN – not listed
Diospyros discolor	Kamagon /Indian ebony		Tonewood		IUCN – not listed
Diospyros philippensis	Phillipine Ebony / Mabola tree	Indonesia, Malaysia, Phillipines	Chinese furniture		IUCN – not listed
Diospyros pilosanthera		Brunei / Darussalam, Indonesia, Philippines	Chinese furniture		IUCN – not listed
Diospyros poncej	African Persimmon	Cameroon, Central African Republic, Congo, D.R.Congo, Gabon, Niger, Nigeria			IUCN – not listed
Diospyros ridleyi / Diospyros pyrrhocarpa	East Indian ebony / Anang / Kamagong	Philippines	Tonewood, bows, piano keys, drum sticks		IUCN - lower risk / least concern
Euxylophora paraensis	Brazilian satinwood / Pau amerelo				IUCN – not listed
Guibourtia ehie	Ovangkol, Amazaque, Black Hyedua				IUCN - vulnerable
Guibourtia schliebenii	Unknown	East Africa			IUCN - vulnerable
Juglans Neotropica	Peruvian walnut				IUCN - endangered
Hymenaea courbaril	Jatoba / Brazilian cherry				IUCN – not listed
Metopium brownii	Chechen / Caribbean rosewood		tonewood		IUCN – not listed
Millettia stuhlmanii	Panga-panga / African pallisander	East Africa	Tonewood, Chinese furniture, flooring. Commonly substituted for Wenge		IUCN – not listed
Millettia leucantha			Chinese furniture		IUCN – not evaluated
Myroxylon Balsamo	Santos Mahogany				IUCN – not listed
Ougenia dalbergioides	Asainda ,	SE Asia, Oceania	Furniture, tool		IUCN – not listed

(Syn: Dalbergia oogeinensis)			handles, boat building		
Peltogyne pubescens	Purple Heart				IUCN – not listed
Pterocarpus cambodianus Pierre	Vietnam Padauk	Vietnam	Chinese furniture		IUCN – not listed
Pterocarpus dalbergioides	Andaman Redwood / East Indian Mahogany / Narra	Andaman Islands of India only	Chinese furniture		IUCN - Data Deficient
Pterocarpus erinaceus Poir	Ambila	West and Central Africa	Chinese furniture		IUCN – not listed
Pterocarpus macrocarpus	Burma Padauk	Burma, India, Laos, Thailand, Vietnam	Chinese furniture		IUCN – not listed
Pterocarpus pedatus	Maidu	Thailand, Vietnam	Chinese furniture		IUCN – not listed
Phoebe porosa	Imbuia				IUCN – not listed
Roupala brasiliensis	Lacewood				IUCN – not listed
Tabebuia serratifolia	Ipe, Pau d'arco	Central and South America	Decking, marine uses, medicinal		IUCN – not listed

Table 5 list of Madagascan *Diospyros* species added to cites Appendix III in December 2011 – for consideration as precious woods

Diospyros aculeata (includes var. meridionalis)
Diospyros analamerensis
Diospyros anosivolensis
Diospyros baroniana
Diospyros bemarivensis
Diospyros bernieri
Diospyros bernieriana
Diospyros bezofensis
Diospyros boinensis
Diospyros boivinii (includes var. *manongarivensis*)
Diospyros calophylla
Diospyros caucheana
Diospyros cinnamomoides
Diospyros clusiifolia
Diospyros conifera
Diospyros coursiana
Diospyros crassiflorides (Diospyros crassiflora)
Diospyros cupulifera
Diospyros danguyana
Diospyros decaryana
Diospyros dycorypheoides (includes *var. meridionalis)*
Diospyros ebenifera
Diospyros enervis
Diospyros erinacea
Diospyros erythrosperma
Diospyros filipes
Diospyros fuscovelutina
Diospyros geayana
Diospyros gneissicola
Diospyros gracilipes (includes *vars lecomtei, parvifolia, velutipes* and *subenervis)*
Diospyros greveana (includes *var. boinensis)*
Diospyros haplostylis (includes *var. hildebrandtii)*
Diospyros hazomainty
Diospyros hemiteles / (Bois d'ébène feuilles) IUCN Status: Critically Endangered NB: Commercially extinct[62]
Diospyros heterosepala
Diospyros humbertiana
Diospyros humbertii
Diospyros implexicalyx
Diospyros ketsensis
Diospyros laevis
Diospyros lamiana

[62] Oldfield, S. (1988) Op. cit. P 7.

Diospyros lanceolata
Diospyros latispathulata
Diospyros lenticellata
Diospyros leucomelas
Diospyros leucocalyx
Diospyros lokohensis
Diospyros louveli
Diospyros madagascariensis
Diospyros madecassa
Diospyros magnifolia
Diospyros manampetsae
Diospyros mangabensis
Diospyros mangorensis
Diospyros mapingo
Diospyros masoalensis
Diospyros mcphersonii
Diospyros meeusiana
Diospyros microrhombus
Diospyros montigena
Diospyros myriophylla
Diospyros myrtifolia
Diospyros myrtilloides
Diospyros natalensis
Diospyros neraudii / (Bois d'ébène feuilles) – IUCN Status: Vulnerable
Diospyros nigricans
Diospyros nodosa / (Bois d'ébène feuilles) - IUCN Status: Critically Endangered
Diospyros obducta
Diospyros occlusa / IUCN Status: Data Deficient
Diospyros olacinoides
Diospyros onivensis
Diospyros parifolia
Diospyros parvifolia
Diospyros perreticulata
Diospyros perrieri
Diospyros pervillei
Diospyros platycalyx
Diospyros pruinosa
Diospyros quartzitarium
Diospyros quercina
Diospyros revaughanii / (Bois D'ébène Feuilles) - IUCN Status: Vulnerable
Diospyros rubrolanata
Diospyros sakalavarum (includes *var. mollifolia)*
Diospyros sclerophylla
Diospyros seychellarum / IUCN Status: Near Threatened
Diospyros sphaerosepala (includes *var. calyculata)*
Diospyros stenocarpa
Diospyros striicalyx
Diospyros subacuta
Diospyros subenervis
Diospyros subfalciformis
Diospyros subsessifolia
Diospyros subtrinervis
Diospyros tampinensis
Diospyros tetraceros
Diospyros tetrapoda
Diospyros torquata (includes *var. mabaoides)*
Diospyros toxicaria
Diospyros tropophylla
Diospyros urschii
Diospyros velutipes
Diospyros vera
Diospyros vescoi (includes *var. mandrarensis)*
Diospyros viguieriana

Table 6 *Diospyros* species – listed by IUCN – requiring further research to establish uses and values and whether precious woods

Species	IUCN Classification
Diospyros acuminata	Status: Vulnerable
Diospyros acuta	Status: Endangered
Diospyros adenophora	Status: Lower Risk/least concern
Diospyros albiflora	Status: Vulnerable

Diospyros amaniensis	Status: Vulnerable
Diospyros angulata (Bois D'ébène Feuilles)	Status: Critically Endangered
Diospyros apiculata	Status: Lower Risk/least concern
Diospyros areolata	Status: Lower Risk/least concern
Diospyros argentea	Status: Lower Risk/least concern
Diospyros atrata	Status: Vulnerable
Diospyros attenuata	Status: Endangered
Diospyros barberi	Status: Vulnerable
Diospyros barteri	Status: Vulnerable
Diospyros benstonei	Status: Critically Endangered
Diospyros bibracteata	Status: Lower Risk/least concern
Diospyros blumutensis	Status: Vulnerable
Diospyros boutoniana (Bois d'ébène marbre à grosses feuilles)	Status: Vulnerable
Diospyros capricornuta	Status: Data Deficient
Diospyros chaetocarpa	Status: Vulnerable
Diospyros cherrieri	Status: Vulnerable
Diospyros chrysophyllos (Bois d'ébène blanc)	Status: Critically Endangered
Diospyros conformis	Status: Vulnerable
Diospyros crumenata	Status: Endangered
Diospyros daemona	Status: Vulnerable
Diospyros ebenoides	Status: Endangered
Diospyros egrettarum (Bois d'ébène d'ile aux aigrettes feuilles)	Status: Critically Endangered
Diospyros ekodul	Status: Least Concern
Diospyros esmereg	Status: Endangered
Diospyros fastidiosa	Status: Vulnerable
Diospyros feliciana	Status: Vulnerable
Diospyros foxworthyi	Status: Lower Risk/least concern
Diospyros gambleana	Status: Vulnerable
Diospyros gillisonii	Status: Endangered
Diospyros greenwayi	Status: Vulnerable
Diospyros hirsuta	Status: Vulnerable
Diospyros impolita	Status: Vulnerable
Diospyros insidiosa	Status: Vulnerable
Diospyros insularis	Status: Endangered
Diospyros ismailii	Status: Lower Risk/least concern
Diospyros johorensis	Status: Lower Risk/conservation dependent
Diospyros katendei	Status: Critically Endangered
Diospyros kingii	Status: Vulnerable
Diospyros kotoensis	Status: Endangered
Diospyros kupensis	Status: Vulnerable
Diospyros latisepala	Status: Lower Risk/least concern
Diospyros leucomelas (Bois d'ébène marbre feuilles)	Status: Vulnerable
Diospyros lolinopsis	Status: Critically Endangered
Diospyros lotus	Status: Least Concern
Diospyros macrocarpa	Status: Lower Risk/conservation dependent
Diospyros magogoana	Status: Endangered
Diospyros margaretae	Status: Vulnerable
Diospyros melanida (Bois d'ébène blanc feuilles)	Status: Vulnerable
Diospyros minimifolia	Status: Near Threatened
Diospyros molissima	Status: Critically Endangered
Diospyros moonii	Status: Critically Endangered
Diospyros mun (Ebony)	Status: Critically Endangered
Diospyros nebulosa	Status: Vulnerable
Diospyros nutans	Status: Lower Risk/least concern
Diospyros oblongifolia	Status: Vulnerable
Diospyros oppositifolia	Status: Endangered
Diospyros penangiana	Status: Lower Risk/least concern
Diospyros perplexa	Status: Vulnerable
Diospyros philippinensis	Status: Endangered
Diospyros pterocalyx (Bois d'ébène à calice ailé feuilles)	Status: Vulnerable
Diospyros pustulata	Status: Vulnerable
Diospyros quaesita	Status: Vulnerable
Diospyros rheophytica	Status: Critically Endangered
Diospyros ridleyi	Status: Lower Risk/least concern
Diospyros rufa	Status: Lower Risk/least concern
Diospyros rumphii	Status: Data Deficient
Diospyros scortechinii	Status: Lower Risk/least concern
Diospyros selangorensis	Status: Vulnerable
Diospyros shimbaensis	Status: Endangered

Diospyros singaporensis	Status: Lower Risk/least concern
Diospyros tero	Status: Vulnerable
Diospyros tessellaria (Black Ebony)	Status: Vulnerable
Diospyros thwaitesii	Status: Vulnerable
Diospyros transitoria	Status: Lower Risk/least concern
Diospyros trengganuensis	Status: Lower Risk/least concern
Diospyros trichophylla	Status: Vulnerable
Diospyros tristis	Status: Lower Risk/least concern
Diospyros trisulca	Status: Vulnerable
Diospyros vaccinioides	Status: Critically Endangered
Diospyros veillonii	Status: Critically Endangered
Diospyros wajirensis	Status: Lower Risk/near threatened
Diospyros walkeri	Status: Vulnerable

Table 7 *Diospyros* species – not listed by IUCN – require further research to establish if any are precious woods

Diospyros abyssinica / Black bark
Diospyros australis / Black Plum
Diospyros blancoi / Macassar Ebony
Diospyros burmanica / Burmese ebony
Diospyros chinensis / Chinese Persimmon
Diospyros crassinervis / Ebano carbonero
Diospyros cuneata / Silil Persimmon
Diospyros dendo / African Ebony
Diospyros dichroa / Persimmon
Diospyros diepenho / Kayu Malam
Diospyros discocalyx / Kayu Malam Ebony
Diospyros dignya / Black Sapote Persimmon
Diospyros ehretioides / Aukchinsa
Diospyros gabonensis / Gabon Ebony
Diospyros guianensis / Swamp Barabara
Diospyros inclusa / East Indian ebony
Diospyros inturensis / Persimmon
Diospyros kaki / Chinese persimmon
Diospyros kamerunensis / African ebony
Diospyros mannii / Demi
Diospyros maritima / Philippine Ebony
Diospyros marmorata / Andaman ebony
Diospyros melanoxylon / East Indian ebony
Diospyros mespiliformis / African ebony
Diospyros mindanaensis / East Indian ebony
Diospyros molis / Maklua
Diospyros morenoi / Matchwood
Diospyros pentamera / Black Myrtle Ebony
Diospyros sabiensis / Jackal's Bessie
Diospyros sanza / Minika
Diospyros senegalensis / Senegal Ebony
Diospyros sumatrana / Malan Ebony
Diospyros texana / Texas Ebony
Diospyros verae / Crucis
Diospyros virginiana / Persimmon
Diospyros whyteana / Bladder

Table 8 Other IUCN listed species that may qualify as precious woods

Afzelia africana - unknown - Status: Vulnerable
Afzelia bipindensis - unknown - Status: Vulnerable
Afzelia pachyloba - White Afzelia - Status: Vulnerable
Afzelia rhomboidea - unknown - Status: Vulnerable
Afzelia xylocarpa - unknown - Status: Endangered
Bobgunnia fistuloides - unknown - Status: Endangered
Intsia bijuga - Moluccan Ironwood - Status: Vulnerable
Millettia aurea - unknown - Status: Endangered
Millettia bussei - unknown - Status: Vulnerable
Millettia capuronii - unknown - Status: Vulnerable
Millettia conraui - unknown - Status: Vulnerable
Millettia decipiens - unknown - Status: Vulnerable
Millettia elongistyla - unknown - Status: Vulnerable
Millettia eriocarpa - unknown - Status: Vulnerable

Millettia galliflagrans - unknown - Status: Vulnerable
Millettia hitsika - unknown - Status: Endangered
Millettia lacus-alberti - unknown - Status: Vulnerable
Millettia laurentii - unknown - Status: Endangered
Millettia macrophylla - unknown - Status: Vulnerable
Millettia micans - unknown - Status: Vulnerable
Millettia mossambicensis - unknown - Status: Data Deficient
Millettia nathaliae - unknown - Status: Endangered
Millettia orientalis - unknown - Status: Endangered
Millettia psilopetela - unknown - Status: Lower Risk/least concern
Millettia pterocarpa - unknown - Status: Vulnerable
Millettia richardiana - unknown - Status: Lower Risk/least concern
Millettia sacleuxii - unknown - Status: Vulnerable
Millettia schliebenii - unknown - Status: Vulnerable
Millettia semseii - unknown - Status: Vulnerable
Millettia sericantha - unknown - Status: Vulnerable
Millettia taolanaroensis - unknown - Status: Endangered
Millettia unifoliata - unknown - Status: Vulnerable
Millettia warneckei - unknown - Status: Vulnerable
Pterocarpus angolensis - Bleedwood Tree - Status: Lower Risk/near threatened
Pterocarpus brenanii - Unknown - Status: Lower Risk/least concern
Pterocarpus dalbergioides - East Indian Mahogany - Status: Data Deficient
Pterocarpus indicus - Burmese Rosewood - Status: Vulnerable
Pterocarpus marsupium - East Indian/malabar Kino - Status: Vulnerable
Swartzia aureosericea - unknown - Status: Endangered
Swartzia bombycina - unknown - Status: Least Concern
Swartzia haughtii - unknown - Status: Vulnerable
Swartzia littlei - unknown - Status: Endangered
Swartzia macrophylla - unknown - Status: Data Deficient
Swartzia nuda - unknown - Status: Endangered
Swartzia oraria - unknown - Status: Critically Endangered
Swartzia rediviva - unknown - Status: Vulnerable
Swartzia robiniifolia - unknown - Status: Endangered
Swartzia santanderensis - unknown - Status: Vulnerable
Terminalia acuminata - unknown - Status: Extinct in the Wild
Terminalia arbuscula - White Olive - Status: Endangered
Terminalia archipelagi - unknown - Status: Endangered
Terminalia bucidoides - unknown - Status: Endangered
Terminalia cherrieri - unknown - Status: Endangered
Terminalia eddowesii - unknown - Status: Vulnerable
Terminalia eriostachya - unknown - Status: Endangered
Terminalia hararensis - unknown - Status: Data Deficient
Terminalia hecistocarpa - unknown - Status: Vulnerable
Terminalia intermedia - unknown - Status: Endangered
Terminalia ivorensis - Black Afara - Status: Vulnerable
Terminalia januariensis - unknown - Status: Vulnerable
Terminalia kangeanensis - unknown - Status: Vulnerable
Terminalia kuhlmannii - unknown - Status: Vulnerable
Terminalia latifolia - unknown - Status: Lower Risk/near threatened
Terminalia nitens - unknown - Status: Vulnerable
Terminalia novocaledonica - unknown - Status: Vulnerable
Terminalia parviflora - unknown - Status: Vulnerable
Terminalia pellucida - unknown - Status: Vulnerable
Terminalia reitzii - unknown - Status: Vulnerable
Terminalia rerei - unknown - Status: Vulnerable

Appendix 3

Central American Dalbergias Case Study

Table 9 Summary Central American Dalbergia spp. their common names, regions of origin, uses and conservation statuses

Botanical name	Common names	Region or country of origin	Qualities	Uses	Conservation status (IUCN)[63] & CITES listing
***Dalbergia* spp.**	Rosul wood	Central America	See individual species below	See individual species below	See individual species below
D. darienensis	Panamanian rosewood, Black rosewood	Panama.[64]	No references found.	No references to a use of this wood were found and indeed it may not be a PW.	IUCN – not evaluated CITES App. III in Panama
D. granadillo	Tigerwood rosewood Granadillo	Southern Mexico.[65],[66]	Less sought-after and cheaper than *D. retusa*	Guitars; other musical instruments; Chinese furniture (widely used).[67]	IUCN – not evaluated. Not listed on CITES (proposed as indistinguishable from *D. retusa*)[68]
D. retusa	Cocobolo, Nicaraguan rosewood	Mexico to Panama, mainly in dry tropical forest.[69]	Hard, beautiful, very stable, exceptionally good for marine use[70], resonant when struck[71], secretes compounds toxic to bacteria, fungi, algae, termites, mosquito larvae, confused flour beetles and marine borers.[72]	Marine use gun grips; butts of billiard cues; chess pieces; jewellery boxes; inlay; veneer; bowling balls; fine furniture; brush backs; cutlery handles; pen blanks; carvings; marimbas, clarinets, xylophones[73] and guitars.[74]	IUCN - vulnerable
D. stevensonii	Honduras rosewood	Only grows in the swamp forests of southern Belize and nearby regions of Guatemala and Mexico.[75]	A renowned tonewood, suggested substitute in guitars for Brazilian rosewood D. *nigra*[76]. Hard and durable.[77]	Marimba keys; high quality xylophones; claves; and castanets.[78] Luxury furniture in China (widely used);[79] fingerboards for the violin family; veneers for fine furniture and cabinets, the backs of brushes, knife	IUCN – not evaluated. (Said to be likely to qualify)[81]. CITES App. III in Guatemala.

[63] IUCN Red List. Op. cit.
[64] http://www.cites.org/eng/resources/species.html Accessed 14 March – 1 April 2012
[65] Mexico is not strictly part of Central America. Central America is made up of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. Central America is bordered by Mexico to the north and Colombia to the south. Mexico is sometimes discussed along with Central America because it shares a common language and history.
[66] Anon (2010) Germplasm Resources Information Network (GRIN) website. http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?411822 Accessed 27th March 2012
[67] Anon. (2011) *Madagascar, Panama ask UN-backed body to regulate trade in hardwood species* UN News Centre. Website: http://www.un.org/apps/news/story.asp?NewsID=39873&Cr=endangered+species&Cr1 28th September 2011. Accessed 27th March 2012
[68] "The timber of Dalbergia granadillo (range States El Salvador and Mexico) is not distinguishable from that of D. retusa. Although it has the common name "granadillo", it is often traded under the name "cocobolo". Inclusion of this species in CITES Appendix II is therefore proposed for look-alike reasons". In: CITES (2007) *Consideration of proposals for amendment of appendices I and II.* Fourteenth meeting of the Conference of the Parties. The Hague (Netherlands), 3-15 June 2007. P9
http://www.cites.org/common/cop/14/raw_props/E-DE02-Dalbergia%20retusa%20&%20Dal%20granadillo.pdf
[69] Anon. (2011). *CITES extends trade controls to 111 precious hardwood species from Madagascar and Panama.* CITES website http://www.cites.org/eng/news/pr/2011/20110928_timber_appendixIII.php Accessed 27th March 2012
[70] CITES (2007) *Consideration of proposals for amendment of appendices I and II.* Fourteenth meeting of the Conference of the Parties. The Hague (Netherlands), 3-15 June 2007. P6
[71] Anon. (2011). *CITES extends trade controls…* Op. cit.
[72] CITES (2007) Op. cit. P6
[73] Anon. (2011). *CITES extends trade controls…* Op. cit.
[74] Anon. (2007). *Summaries of the IUCN/TRAFFIC Analyses of the Proposals to Amend the CITES Appendices at the 14th Meeting of the Conference of the Parties*. IUCN Species Programme and Species Survival Commission and TRAFFIC. The Hague, Netherlands. 3-15 June 2007. P 35
[75] Anon. (2012). *Assessing Honduras Rosewood Populations in Belize.* Botanic Gardens Conservation International Website: http://www.bgci.org/worldwide/Dalbergia/ Accessed 14 March 2012
[76] Ibid.
[77] Anon. (2012) *Honduras Rosewood*. Global Trees Website. http://www.globaltrees.org/tp_honduras_rosewood.htm Accessed 14 March 2012
[78] Read. M. (1993). Op. cit. P5
[79] Anon. (2012) *Assessing Honduras Rosewood…* Op. cit.

Botanical name	Common names	Region or country of origin	Qualities	Uses	Conservation status (IUCN)[63] & CITES listing
				handles and for fine turnery [80]	
D. tucurensis	Columbian/Guatemalan rosewood, Cocobolo, Granadillo rojo	'Granadillo rojo' from Nicaragua, Colombia and Guatamala	Tonewood.	Tonewood[82]	IUCN – not evaluated. CITES – not listed.

Extraction, trade and illegal logging

- Illegal logging is a prevalent problem in Central America. For instance in 2003 it was been estimated that up to 85% of the total harvest in broadleaf forests in Honduras is illegal.[83] There is very little information on the volume of international trade, although cocobolo wood is available from numerous sources online. Locally in the Darién region of Panama the wood is used to produce carvings. There is no information on volumes used.[84]
- The source of timber for international trade at present is unclear: some suppliers state that timber comes from private lands, others that timber is salvaged from dam sites and trees felled during hurricanes.[85] (see also *Plantations* Section below)
- A websearch for traders wanting to buy *Dalbergia* spp. resulted in 19 importers looking for rosewood/cocobolo including *D.* retusa and D*. stevensonii*, over half of which are in China.[86]
- *Dalbergia* spp. are highly demanded in China, which fuels the smuggling trade.[87]
- There is relatively little recent information on the extent of international trade. Guatemala reported the export of just over 250 m^3 of *D. stevensonii* in 2004, valued at US$380,000, to a range of countries including Japan, USA, Germany and the Netherlands. Overall, *D. stevensonii* timber does not appear to be readily available internationally. Several companies that do offer the species on the international market report its origin as Belize, where logging of the species is illegal [NB see below as the Government of Belize has only very recently banned the harvesting and export of this species]. There is reportedly some local use in Belize.[88]
- Recent (February 2012) seizures of illegally trafficked timber in Guatemala suggest that there is an organized smuggling ring sophisticated enough to transport the wood (Dalbergia) in large quantities. According to the newspaper, Prensa Libre, Guatemalan authorities seized three shipping containers between November and December last year, each containing 58.28 cubic metres of *Dalbergia* spp. or "rosul" wood. The shipments were set to depart from the port of Santo Tomas de Castilla. A further 3.5 cubic metres of the illegally logged wood was seized in national parks across the country. There are allegations that members of the law enforcement agencies are involved in the trafficking ring.[89]
- In July 2011, Belize's Maya Leaders Alliance (MLA) expressed concern about illegal logging in the Toledo region of Belize. An MLA representative stated that:
    - Three active rosewood collection/buying sites have been established in Toledo.

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[81] "Felling for timber has depleted stocks of the species *Dalbergia stevensonii* and it is likely that this species would qualify for the *IUCN Red List* " Stated in: Anon. (2012) *Honduras Rosewood*. Op. cit.
[80] Anon. (2012) *Honduras Rosewood.* Op. cit.
[82] For example: https://www.gilmerwood.com/items.php?CID=45 Accessed 24 March
[83] Richards M., A. Wells, F. Del Gatto, A. Contreras-Hermosilla and D. Pommier (2003) *Impacts of illegality and barriers to legality: a diagnostic analysis of illegal logging in Honduras and Nicaragua*. International Forestry Review Vol.5(3), September 2003, Oxford, UK. Quoted in: Anon (2011). *Central America's first VPA? Perspectives on FLEGT in Honduras. LoggingOff Briefing Note.* July 2011. AFE-COHDEFOR et al. See http://loggingoff.info/
[84] Anon. (2007). *Summaries of the IUCN/TRAFFIC Analyses of the Proposals to Amend the CITES Appendices at the 14th Meeting of the Conference of the Parties*. *Inclusion of the rosewoods D. retusa and D. granadillo in Appendix II*. IUCN Species Programme and Species Survival Commission and TRAFFIC. The Hague, Netherlands. 3-15 June 2007. P 35
[85] Ibid
[86] http://importer.tradekey.com/dalbergia-importer.html Accessed 14 March 2012
[87] Fox. E. (2012). *Seizures Point to Timber Trafficking Ring in Guatemala*. Website http://insightcrime.org/insight-latest-news/item/2242-seizures-point-to-timber-trafficking-ring-in-guatemala Accessed 26th March 2012
[88] Anon. (undated). *Inclusion of Honduras Rosewood (D. stevesonii) in Appendix II.* COP 14 Prop. 32 IUCN/TRAFFIC. Website http://intranet.iucn.org/webfiles/doc/SSC/CoP14/AnalysesEN/cites_prop_32.pdf Accessed 14 March 2012
[89] Fox. E. (2012). Op. cit.

    - Rosewood is rare in Belize and exists only in small pockets in Toledo. Indications are that the yields from the illegal harvesting may be heading to China.
    - Corruption is involved in the illegal harvesting of rosewood. MLA claims that officials from the Machaca Forest Department stamp the blocks of woods, making them legal and ready for further transport and export (denied by a Forest Department spokemen).[90]
- According to a paper for the Inclusion of *D. stevensonii* in Appendix II of CITES, felling of live, naturally occurring trees of *D. stevensonii* is prohibited in Belize, and commercial exploitation of the species in Guatemala is subject to strict regulation. Much of the range of the species in Belize is within protected areas, but illegal felling and cross-border trade in this species are reportedly a problem in some areas. Illegal logging in general is reported from Guatemala and Mexico although no information is available on the impact of such logging on *D. stevensonii*.[91]

Conservation concerns

- Despite its significance as a high-value timber species, relatively little is known about the biology, population and status of *D. stevensonii*. The species is threatened by increasing deforestation in the region. Easier access to its habitat and declining stocks of other rosewoods may also boost trade levels. The largest area in which it occurs in southern Belize is an area that is reportedly inundated with colonists practising slash-and-burn agriculture.[92]
- Representatives of Darien Verde have expressed "great concern" with colleagues over "the looting and vandalism that is happening to *D. retusa* in the Darien region, [a Province in Panama]. The thirst for *D. retusa* has got out of control and this goes against our efforts to promote sustainable forest management of forest resources at the community level… It is actually causing genetic erosion of the species of the highest commercial value in the forest of Darien and rows and rows of trailers and dozens of agricultural tractors and hundreds of settlers can loot the forest with a thirst for exploitation and marketing of this species to China."[93]
- What little is known about the biology and ecology of the species suggests that *D. stevensonii* is slow-growing, occurs only in patches and – in common with other *Dalbergia* species - has high levels of seed abortion. Therefore, the continued survival of Rosewood stocks is highly dependent on the availability of mature trees that produce ample seeds. From a conservation point of view, the situation, as it stands, is reportedly a potential disaster.[94]

Community and social impacts

- Many citizens of Belize are concerned at the current levels of extraction of *D. stevensonii* from the forests of Toledo. There is a very real possibility that the species will completely disappear from community lands in the near future.[95] Belize's indigenous MLA has taken an active role in speaking out, but faced repressions (see *Current levels of extraction* section above).
- According to a Mongabay website story, "The extraction of rosewood [*D. stevensonii*] has been particularly controversial when carried out on land that the country's Supreme Court has ruled belongs in common to Maya villages, a legal judgment that the government is appealing and has refused to enforce. This uncertainty has seen Forest Department personnel declining to enter Maya land to monitor logging, and village leaders lacking the communal legal title to their land with which to establish community boundaries."[96]

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[90] Coc. C. (2011) *China demand seems to be driving illegal harvesting of rosewood.* http://www.amandala.com.bz/index.php?id=11545 Accessed 14 March

[91] Anon. (undated). *Inclusion of Honduras Rosewood…* Op. cit.

[92] Anon. (2012) *Assessing Honduras Rosewood…* Op. cit.

[93] Salazar. M. (2012) Pers. comm. to Ulrich Malessa (TRAFFIC, WWF US). Email 7 March 2012. DarienVerde.org. (translation from Spanish to English).

[94] Anon. (2011). Ya'axché Conservation Trust. *The Future of Rosewood in Belize.* Website: http://www.amandala.com.bz/index.php?id=11590 19th August 2011.

[95] Ibid

[96] Llewellyn. R. O. (2012) *Belize enacts moratorium on rosewood.* Mongabay website. http://news.mongabay.com/2012/0319-llewellyn_moratorium_rosewood.html Accessed 26th March 2012

Action being taken

- On 20 March 2012, the Belizean Government banned the harvesting and export of rosewood with immediate effect, in response to the widespread clearing of the hardwood species for the Asian market. A government statement released on Friday, 16 March 2012 claimed that the moratorium was necessary "to carry out an orderly assessment of the situation on the ground and as a first response to regulate the timber trade occurring in southern Belize." The government would subsequently institute "a rigorous regulatory framework throughout the country." Southern Belize had been the remaining stronghold of Honduran Rosewood (*D. stevensonii*) until it became subject to widespread felling for the Chinese market.[97]
- Nicaragua recently created the world's first "eco-battalion," a military unit that will focus solely on protecting the country's natural resources.[98]
- Last year (2011) Guatemala announced a crackdown on eco-trafficking, stating they would enforce stricter security measures at airports. But the initiative left the country's seaports off the list of priorities, arguably a serious omission.[99]
- In Darien, Panama, in May 2011, the Government of Panama's Environmental Authority (ANAM) commissioned inspections of different sites where wood is gathered for local use or export. The group investigated illegal rosewood logging and selling methods, and collaborated on a "combative response". Subsequently, custom officials prevented the shipment of two teak containers en route to China, which were filled with illegally harvested rosewood.[100]
- The Global Trees Campaign - a partnership between Fauna & Flora International (FFI) and Botanic Gardens Conservation International (BGCI) - is working through the Ya'axché Conservation Trust (YCT) and in collaboration with the Belizean Forest Department to support surveys of forests in southern Belize to establish the status of Honduran Rosewood for improved management.[101]

Plantations and other cultivation

- *Dalbergia stevensonii* is not believed to be grown commercially in plantations, although it has been used in at least one tree-planting scheme in Belize.[102]
- The CITES 2007 proposal to list *D. retusa* and *D. granadillo* (as a look-alike) stated that a significant volume already comes from plantations, sometimes planted 80-100 years ago. However in some areas such as Darién, Panama, 50% of cocobolo extraction for commercial carving is via destructive harvest.[103] However the same documents slightly contradicts itself in saying "The species has been the subject of plantation trials in Costa Rica and Nicaragua but there are not known to be any commercial plantations."[104] A reviewer of a draft of this document has corroborated the latter point.[105]

Certification

- The Forest Stewardship Council listed two organisations that maintain plantations including D. retusa holding their certificate in forest management, in Costa Rica and Nicaragua, in 2007.[106] However this is no longer the case. There are currently no known internationally certified sources of supply of D. stevensonii.[107]

Trade and conservation outlook

No further information to add.

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[97] Ibid
[98] Fox. E. (2012). Op. cit.
[99] Fox. E. (2012). Op. cit.
[100] Anon (2011) *USAID/PANAMA News 2011*. USAID website http://www.usaid.gov/pa/Information/2011_News_Jan-Jun_FINAL_22Jul11.pdf Accessed 27th March 2012
[101] Anon. (2012) *Assessing Honduras Rosewood…* Op. cit.
[102] Anon. (undated) *Inclusion of Honduras Rosewood...* Op. cit.
[103] CITES (2007) Op. cit. P6 -8
[104] Anon. (2007). *Summaries of the IUCN/TRAFFIC…* Op. cit. P 35
[105] Hudson, J. (2012) Pers. comm. when reviewing a draft of this paper.
[106] CITES (2007) Op. cit. P6 -8
[107] Anon. (undated) *Inclusion of Honduras Rosewood…* Op. cit.

Appendix 4

African Blackwood Case Study[108]

Names

Botanical: *Dalbergia melanoxylon*
Common: African blackwood, Grenadilla, Mpingo (Kiswahili), East African blackwood, Mozambique ebony.
NB: from here the species is referred to as blackwood

Uses

Locally: Carvings
Internationally: Blackwood for export is primarily processed into blanks for woodwind instrument manufacturing, most significantly clarinets, but also oboes, bagpipes, recorders and flutes. Smaller quantities of blackwood are processed into other specialist tonewood pieces such as guitar fingerboards, bridges, headplates and backs/sides. Following initial processing for high-value tonewoods, secondary processing produces smaller blanks for consumer items such as knives, pens and jewellery. Other smaller markets exist for blackwood including the manufacturing of luxury furniture in China.

Ecological status

IUCN: lower risk/least concern. (Reviewed in 1998 and noted on the Red List website as being in need of updating; the principal author of this case study considers the status to have declined).

CITES listing

None

Natural range and ecology

- A relatively small species, rarely exceeding 10m height and 100cm diameter, which, due to its preference for dry, miombo forests, often with poor, rocky soils, is slow-growing, taking 70-100 years to reach commercial harvesting volume. The species does not require re-planting and naturally regenerates from root-stock given time. Formerly common across Southern, Eastern, Central and Western Africa, today blackwood is only viable for commercial timber extraction in Tanzania and Mozambique and the range is limited even within these countries, with the main stands occurring in South-east Tanzania and Northern Mozambique. Outside of these two countries only remnant trees remain. For example in Kenya, a former stronghold for commercial blackwood harvesting, the species is now restricted to protected forests only (Wikipedia entry on *Dalbergia melanoxylon*).

Extraction, trade and illegal logging

- Until the 1990s, the majority of commercially exported blackwood originated from Tanzania. However, since the end of its 30-year civil war, Mozambique has developed into a major exporter and both countries export roughly equal amounts. Sound & Fair (unpublished research in 2012) have shown that over the past 10 years, official blackwood exports from Tanzania and Mozambique have averaged $100m^3$ per annum respectively, with $200m^3$ entering international timber markets on an annual basis.
- Research on illegal logging in the region is limited, but the work that has been done in both countries highlighted high levels of illegal logging (as high as 96% in Tanzania) and actual timber exports far exceeding official exports (for example, total timber imports into China from Tanzania exceeding total Tanzanian timber exports by a factor of five).[109]

[108] This case study is based on unpublished research carried out by Sound & Fair (http://soundandfair.org/) except where other references are given. It was authored by Neil Bridgland of Sound & Fair.
[109] Milledge, S, Gelvas, K and Ahrends, A. (2007) *Forestry, Governance And National Development: Lessons Learned From A Logging Boom In Southern Tanzania*. TRAFFIC South/Eastern Africa; and
Mackenzie, C. (2006) Forest Governance In Zambézia, Mozambique: Chinese Takeaway! FONGZA, Mozambique.

- The nature of illegal logging in the region seems to follow a regular pattern: harvesters obtain an official timber extraction license; harvesting takes place but actual quantities of timber extracted far exceed the official license total; the lack of forestry control capacity means that harvesters are rarely checked, and if they are, there are means to ensure that the timber finds its way to market regardless.
- Sound & Fair (unpublished research in 2012) suggest that the blackwood usage by the music industry is stable and averages 255m^3 per annum. Hence, the music industry alone uses more blackwood than is officially exported before other uses are taken into consideration.
- Little is known about the volumes of blackwood used in China for making furniture. However, it seems that this market is supplied primarily from Mozambique where raw logs are routinely exported. Raw log export is banned in Tanzania and this law seems to be successfully implemented.
- Yields of commercially exportable timber from blackwood raw log processing typically average 10%. Extrapolating this figure suggests that the official total annual volume of blackwood extracted in Tanzania and Mozambique for export purposes each year was around 2,000m^3. However, known usage by the tonewood industry alone suggests that the actual extraction figure is significantly higher.
- Extraction for local uses, primarily carvings, is hard to estimate given the unofficial nature of much of the business. However, unpublished research carried out for Sound & Fair in 2012 estimates that in Tanzania there were 1,500 carvers each using around 1m^3 per annum, giving a total volume for this sector in Tanzania of 1500m^3 per annum.
- The Sound & Fair study estimates the total annual harvesting rate of blackwood in Tanzania at 4,500m^3 . Of this, 100m^3 (2%) was exported as sawn timber, 150m^3 (3%) was used locally for carvings, 750m^3 (17%) was used for domestic purposes by households, for example for buildings and firewood, and the remainder, 3,500m^3 (78%) was wasted.
- In the absence of official forest inventories in Tanzania and Mozambique it is difficult to estimate remaining timber stocks accurately and assess the impact of current extraction rates. However, unpublished research carried out for Sound & Fair in 2012 suggests that the standing stock of blackwood in Lindi, one of the two remaining Tanzanian regions with significant blackwood stock, was in the region of 100,000m^3.
- Assuming that Mtwara, the only other remaining Tanzanian region with significant blackwood stock, holds a similar amount, the remaining standing stock of blackwood in Tanzania would be in the region of 200,000m^3, representing 40-45 years of supply at current extraction rates. However, there is a great deal of uncertainty about the accuracy of these figures – what is urgently required is a national inventory of standing forest stocks. Given the uncertainty of current timber stocks and the 70-100 years required for a blackwood tree to reach minimum maturity, current extraction rates are a major concern and are very likely to be unsustainable. The species requires close and careful management to ensure stocks remain in perpetuity.
- Comparable figures are not available for Mozambique, apart from the very similar official export volume of 100m^3.
- Currently there are seven FSC certified forest areas in Tanzania that are listed as having the potential to supply FSC (or controlled wood) blackwood. There is a single FSC chain of custody in Mozambique that is certified to handle FSC (or controlled wood) blackwood.[110]

Conservation concerns

- The primary concern is unsustainable harvesting rates often associated with illegal logging in the form of license holders exceeding quotas. Secondary concerns include: the 'cherry picking' of the most valuable species in forest areas which devalues the forest and increases pressure for land conversion to agriculture; acquisition of large tracts of land for forest clearance and conversion to industrial mono-cultures, often by foreign corporations for export; forest fires and climate change.

[110] http://info.fsc.org/ Using the search term 'melanoxylon' in the species field of the database. Accessed 10 April 2012.

Community and social impacts

- According to the CIA Factfile, Tanzania is one of the poorest countries on earth. Average rural household incomes are less than $200 per annum and a significant proportion of the population is entirely dependent on the forest for their livelihoods.

Action being taken

- The Tanzanian government has implemented a policy of Participatory Forest Management (PFM) that enables forest-dependent people to establish Village Land Forest Reserves (VLFRs) with clearly defined boundaries and representative committees. VLFRs are entitled to retain all proceeds from the sale of forest resources, the most significant of these being timber, especially in areas where the forest hasn't already been stripped of the most valuable tree species such as blackwood.
- Sound & Fair represents the FSC chain of custody for timber originating from FSC-certified VLFRs in Tanzania. Local NGO partner, Mpingo Conservation and Development Initiative (MCDI), facilitates PFM and FSC-certification with VLFRs. Sound & Fair liaises with sawmills and distributors, and works to generate demand for certified timber amongst musical instrument manufacturers and musicians, as well as other marginal/recovery markets.

Plantations and other cultivation

- There are several NGO campaigns to plant blackwood. Many trees have been planted, and as such it is highly unlikely that the species would ever become biological extinct. However, tonewood quality blackwood originates from slow-growing natural forests. Plantation trees, which are usually artificially watered, are not considered to be of sufficiently high quality.

Certification

- FSC 100% African blackwood is available, and the volume is expanding.

Trade and conservation outlook

- Trade is currently stable, but new tonewood markets are emerging for blackwood which may increase demand in near future. For example, guitar-makers are increasingly interested in using blackwood as a certified substitute for ebony and other similar species.
- Sound & Fair's objective is to establish sufficient VLFR area to supply the tonewood industry on a sustainable basis and through FSC+ (FSC-certification and fair trade pricing) deliver social/livelihood impacts for forest-dependent people.
- Early VLFR harvests have generated income increases of up to 40,000% over what communities would have previously received from the harvesting of timber in their forests. Prior to PFM /FSC, VLFR residents' potential incomes from timber extraction were limited to tiny, piecemeal rates helping outside agents extract timber from the forest – literally pennies.
- Post-PFM/FSC, VLFRs are free to sell the timber to the highest bidder and retain 100% of the proceeds.

Appendix 5

Madagascar Case Study

- The Environmental Investigation Agency (EIA) and Global Witness (GW) 2010 *Investigation Into the Global Trade in Malagasy Precious Woods* report details 43 species of Rosewood (Dalbergia) in Madagascar, all but one of which are endemic to this island. Several are particularly valued for the export trade, including *Dalbergia baronii*, *D. louvelii*, *D. maritime*, *D. madagascariensis*[111] and *D. greveana.*
- There are over 100 species of ebony *Diospyros* spp. in Madagascar.
- The *IUCN Red List*[112] lists 44 species of the genus *Dalbergia* native to Madagascar, amongst which there are believed to be 10 species of 'real' rosewood[113] most of which are vulnerable or endangered. Other sources detail 47 *Dalbergia* spp.[114] A summary of the main species are listed in the table below:

Table 10 Summary Madagascan Dalbergia spp. and Diospyros spp. their common names, qualities, uses and conservation statuses

Common names	Botanical name	Known Qualities	Precious Wood or Not & known particular uses	Conservation status (IUCN)[115] & CITES listing
Rosewood, Bois de rose, Madagascar rosewood, Malagasy rosewood, occasionally: Pallisander, Palisander	*Dalbergia* spp.			
	D. baronii	Lustrous deep red wood,[116] Tonewood	*PW in this study.* Guitars (favoured Madagascan rosewood), luxury Chinese furniture.	IUCN – vulnerable CITES – not listed
	D. greveana	Lustrous deep red wood[117], Tonewood	*PW in this study.* Tonewood, luxury Chinese furniture	IUCN – near threatened CITES – not listed
Violet rosewood, Rosewood, Bois de rose, Madagascar rosewood, Malagasy rosewood, occasionally: Pallisander, Palisander	*D. louvelii*	Lustrous deep red wood[118]	*PW in this study* Chinese furniture	IUCN – endangered CITES - App. III
Most commonly Pallisander, Pallisandre,[119] Madagascar rosewood.	*D. madagascariensis*	(Lacks red lustre)	*Potential PW in this study*	IUCN – vulnerable CITES – not listed
Rosewood, Bois de rose, Madagascar rosewood, Malagasy rosewood, occasionally: Pallisander,	*D. maritima*		*PW in this study* Tonewood	IUCN – endangered CITES – not listed
	D. monticola		*Potential PW in this study*	IUCN – vulnerable CITES - App. III
	D. neoperrieri		*Potential PW in this study*	IUCN – vulnerable CITES – not listed

[111] Anon. (2010) *Investigation Into the Global Trade in Malagasy Precious Woods.* Global Witness and the Environmental Investigation Agency (EIA). October 2010. P 6
[112] IUCN Red List. Op. cit.
[113] Patel, E. (2010) *Madagascar's logging crisis: Separating myth from fact.* National Geographic website http://newswatch.nationalgeographic.com/2010/05/20/madagascar_logging_crisis/ Accessed 21 March 2012
[114] Pimm, S. (2009) *The call to boycott Madagascar's rosewood and ebony explained*. National Geographic website. http://newswatch.nationalgeographic.com/2009/10/06/madagascar_forest_crisis/ Accessed 21st March 2001.
[115] IUCN Red List. Op. cit.
[116] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit. P 6
[117] Ibid
[118] Ibid
[119] Ibid

Palisander	*D. normandii*		*Potential PW in this study*	IUCN – endangered CITES - App. III
	D. obtusa		*Potential PW in this study*	IUCN – not evaluated CITES – not listed
	D. purpurascens		*Potential PW in this study*	IUCN - vulnerable CITES - App. III
	D. xerophila		*Potential PW in this study*	IUCN – endangered CITES - App. III
Ebony	*Diospyros* spp.	Tonewood, decorative use.	*Potential PW in this study* Inlays, cabinetwork, parts of musical instruments (fingerboards on violins and keys on pianos), cutlery handles	IUCN - No species evaluated[120] CITES – 85 species listed on App. III

CITES listing

- Following the recommendations in a 2009 GW/EIA report *Investigation into the illegal felling, transport and export of precious wood in SAVA region Madagascar* [121], in June 2010 the Madagascan Minister for Environment and Forests submitted a request to the Secretariat of CITES to list all Malagasy *Dalbergia* and *Diospyros* species on Appendix III of the CITES convention. It is also reported that that the Malagasy delegation planned to submit a bid for inclusion in Appendix II by 2013.[122]
- In September 2011, Madagascar requested the inclusion in CITES of five species of rosewood (genus *Dalbergia*) and 104 species of ebony wood (genus *Diospyros*) after illegal trade increased 25% in 2009 and approximately 25,000 m^3 of rosewood were exported.[123]
- Currently CITES lists 85 Madagascan ebony *Diospyros* spp. and five rosewood species *Dalbergia* spp. in Appendix III [124]

Extraction, trade and illegal logging

- A coup d'état in March 2009 by pro-opposition troops ousted the democratically elected government, and led to a rise in both illegal and sanctioned logging, undermining decades of conservation work.[125]
- A joint NGO statement in 2009 stated: "No forest that contains precious woods is safe, and the country's most prestigious nature reserves and favoured tourist destinations, such as the Marojejy and Masoala World Heritage Sites and the Mananara Biosphere Reserve, have been the focus of intensive exploitation."[126]
- The primary harvest areas are the two national parks in the SAVA Region and the forests bordering these areas. The Mananara North area is the third hotspot of illegal logging of PW.[127]
- A wide range of timber sizes has been found by EIA investigations, suggesting indiscriminate felling of rosewood trees of any age and size.[128]
- A vast amount of published evidence clearly shows that very little, if any, of the rosewood logging in Madagascar is legal.[129]

[120] Nghia, N.H. 1998. *Diospyros mun*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. www.iucnredlist.org. Accessed 21 March 2012.
[121] Anon. (2009) *Investigation into the illegal felling, transport and export of precious wood in SAVA region Madagascar.* Global Witness and the Environmental Investigation Agency (EIA). August 2009.
[122] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit. P 8
[123] Anon. (2011) *CITES extends trade controls to 111 precious hardwood species from Madagascar and Panama.* 28th September 2011 CITES website: http://cites.org/eng/news/press/2011/20110928_timber_appendixIII.php Accessed March 21 2012
[124] http://www.unep-wcmc-apps.org/isdb/CITES/Taxonomy/country_list.cfm?displaylanguage=eng&Country=MG Accessed March 21 2012
[125] Anon (2009). *Political unrest portends ecological ruin in Madagascar. http://www.illegal-logging.info/item_single.php?it_id=3780&it=news* Accessed 30th March 2012.
[126] Pimm, S. (2009) *The call to boycott Madagascar's rosewood and ebony explained*. National Geographic website. http://newswatch.nationalgeographic.com/2009/10/06/madagascar_forest_crisis/ Accessed 21st March 2001.
[127] Anon. (2009) *Investigation into the illegal felling…* Op. cit. P 16
[128] Ibid P 17
[129] Patel, E. (2010) Madagascar's logging crisis: Separating myth from fact National Geographic website

- The 2009 GW/EIA report stated that from the field observations in the Masoala National Park and reliable information about similar illegal activities in the Mananara Biosphere Reserve, the investigation team estimates that between 100 – 200 rosewood trees (as a conservative estimation) are felled and transported per day.[130] This amounts to an average of about 30 – 115m^3 of illegally harvested rosewood per day which, given the current price of rosewood in China of about US$3,000 – 4,000 per m^3, is worth between US$88,000 and US$460,000 per day.
- The same report stated that in 2009, eight container ships left Vohémar carrying a total of 19,730 logs and 50,584 planks in 324 containers authorised by Ministry of Environment and Forests (MEF). This amounted to about 9,700 tonnes of rosewood.[131]
- Several hundred million dollars of these precious hardwoods were cut in 2009 within protected areas. A "rosewood mafia" of a few dozen organizing individuals, many of whose identities are well known, takes the overwhelming majority of these profits. Few others benefit.[132]
- Informal details of illegal rosewood trade from 2009 until August 2011 (when illegal logging was still being recorded) can be found in *The Rosewood Chronicles*.[133]
- After peaking in 2009 and 2010, rosewood logging slowed due to an export ban enacted by Madagascar's transition authority in response to international outcry over the destruction of the country's forests. Most of the rosewood was destined for China where it was turned into luxury furniture.[134]

Conservation concerns

- Illegal logging of rosewood and ebony has emerged as the most severe threat to Madagascar's dwindling northeastern rain forests.[135] Madagascar has 47 species of *Dalbergia* spp. and over 100 *Diospyros* spp. that occur nowhere else, and their exploitation is pushing some to the brink of extinction.[136]
- The UNESCO World Heritage Committee noted in 2010 "that despite a decree outlawing the exploitation and export of rosewood and ebony, Madagascar continues to provide export permits for illegally logged timber." It therefore added the Madagascan World Heritage Site Rainforests to its "List of World Heritage in Danger."[137]
- Those exploiting the trees are also trapping endangered lemurs for food, and the forests themselves are being degraded as trees are felled, processed and dragged to adjacent rivers or roads for transport to the coast.[138]
- The hunting has also supplied restaurants catering to Chinese exporters and the relatively large population of Chinese extraction.[139]
- Although selective logging results in less absolute forest loss than clear-cutting, it is often accompanied by substantial peripheral damage such as decreases in genetic diversity and increases in the susceptibility of the impacted areas to burning and bush meat hunting. Documented long-term ecological consequences of selective logging in Madagascar include invasion of persistent, dominant non-native plant species, impaired habitat for animals, and a diminution of endemic mammalian species richness.[140]

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http://newswatch.nationalgeographic.com/2010/05/20/madagascar_logging_crisis/ Accessed 21 March 2012

[130] Anon. (2009) *Investigation into the illegal felling…* Op. cit. P 31

[131] Ibid P 17

[132] Patel, E. (2010) Op. cit.

[133] Randriamalala, H. (2009 – 2011) *The Rosewood Chronicles*. Available at: http://www.illegal-logging.info/item_single.php?it_id=1161&it=document Accessed 30th March 2012.

[134] Anon (2011) Madagascar may authorize exports of illegally-logged rosewood. http://news.mongabay.com/2011/0822-madagascar_rosewood_meeting.html Accessed 30th March 2011

[135] Patel, E. (2010) Op. cit.

[136] Pimm, S. (2009) Op. cit.

[137] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit. P 9

[138] Pimm, S. (2009) Op. cit.

[139] Anon. (2011). *China and Madagascar.* WWF MWIOPO. P3

[140] Patel, E. (2010) Op. cit.

Community and social impacts

- Illegal logging of PW continues to be a persistent source of habitat disturbance within Madagascar's northeastern rainforests. Unlike fuel-wood logging or slash-and- burn agriculture, the logging of PW is not primarily motivated by the subsistence requirements of local people. It is considered an organized criminal activity in which participating local residents receive only a tiny fraction of the profit made by the exporters, intermediaries and corrupt officials that initiate this entire process. "...The local people who are employed earn little money. 90% of the revenue doesn't stay in the community". When local residents were asked about the causes of rosewood logging within Marojejy, they primarily offered economic explanations such as the high value of rosewood and local poverty. In a nation where per capita annual income averages only 255 US dollars, even a very small wage, e.g. 1,000 AR per log, can be significant, particularly during a time of low vanilla prices.[141]
- Precious wood logging has angered local communities by trampling on the beliefs and taboos of local people. In traditional Sakalava culture, ebony is a sacred wood only cut by priests who conduct traditional ceremonies with ebony staffs.[142]
- In addition to depriving the government of Madagascar of millions of dollars of taxable revenue, illegal logging of precious wood is said to have decimated tourism in northeastern Madagascar, which had become a growing source of local income.[143]

Local action being taken

- Illegal activities in Marojejy National Park were halted through a joint "cleaning" exercise staged by law-enforcement agencies and the army in March and April 2009.[144]
- A 2009 investigation into the trafficking of rosewood, palissander and ebony, commissioned by the Madagascar National Parks in August, uncovered unprecedented levels of illegal activity in the country's northeast, following the political crisis earlier in the year. Investigators captured video evidence of the logging and collected testimony from local communities, revealing both the scale and brazenness of the illegal trade.[145]
- According to the EIA/GW 2010 report, several organs of the Malagasy government were engaged in issuing a series of decrees attempting to further the "assainissement" (cleaning up) of the PW sector. Unfortunately, these decrees confirm the illegal nature of the merchandise awaiting export, and authorise the export of an established quantity of timber from particular traders, typically upon payment of some sort of penalty. Much like previous decrees, they continue to facilitate the extraction and commercialisation of timber from vulnerable and protected areas. Despite firm deadlines in the legislation mandating an end to exports after a given date, timber traders inevitably claim that they have been unable to use their full quota and demand extensions, which are provided in the form of new decrees. These extensions enable the export of yet more illegal timber, which is continuously replaced by freshly cut stock from the forest.[146]
- On 24 March 2010, the government issued Decree 2010-141, which unconditionally banned all harvest, transport or export of rosewood or ebony in all of Madagascar.[147]
- On 11 May 2010, the Prime Minister issued a service note permitting the export of 79 containers approved for export under Inter-ministerial Order 38409/2009 which had been impounded.[148]
- According to Erik Patel (a PhD candidate at Cornell University), the decree did not include pallisandre, a precious hardwood in the same genus (*Dalbergia*) as rosewood. Illegal logging of pallisandre has heavily impacted some reserves such as Betampona Natural Reserve (This likely refers to *D. madagascariensis*).[149]

[141] Patel, E. (2007) Logging of Rare Rosewood and Palisandre (Dalbergia spp.) within Marojejy National Park, Madagascar. Cornell University, New York. December 2007. P 15
[142] Patel, E. (2007) Ibid
[143] Patel, E. (2010) Op. cit.
[144] Anon. (2009) *Investigation into the illegal felling…* Op. cit. P 16
[145] Ibid P 31
[146] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit. P 8
[147] Ibid
[148] Ibid
[149] Patel, E. (2010) Op. cit.

- In June 2010, the Minister in charge of the Environment and Forests submitted a request to the Secretariat of CITES to list all *Dalbergia* and *Diospyros* subspecies on Appendix III of CITES (see CITES section above).[150]
- Enforcement actions in 2010 by the new Minister of the Environment, Water and Forests, Gen. Herilanto Raveloharison, suggest that his Ministry was taking a more aggressive stance towards the export of Malagasy illegally harvested timber.[151]
- In August 2011 Madagascar's ruling High Transitional Authority introduced heavier penalties in a bid to crack down on illegal rosewood and ebony exports.[152]
- On 18 January 2012, the Madagascar's Minister of the Environment and Forests re-authorized the export of "all categories of natural forest-sourced primary products" provided a trader can prove the legal origin of the product. But given the ease of acquiring proof-of-origin documents in Madagascar, the order potentially opens the door for large-scale exports of wood that were banned in an order published last August. That order prohibited the felling, transport, exploitation, and export of rosewood and ebony, and also cancelled all existing export agreements.[153]
- However, according to local sources, the new order is now under review due to concerns about foreign dominance of the trade. Madagascar's rosewood trade is dominated by foreign traders and a small group of local barons popularly dubbed the "timber mafia". There is also considerable pressure from conservationists and the tourism industry, which fear that a resumption in logging will further damage the environment and undermine the country's nature-based tour industry. There is concern that a loosening of restrictions on old-growth timber could ignite another logging frenzy in the country's rainforest parks, which are renowned for their biodiversity.[154]
- A report in the *L'Express de Madagascar* of the 15 March 2012 states that the Madagascan Council of Ministers has annulled the January 'arret' that allowed the export of a large number of containers of rosewood. This leaves the provisions of the decree 2010-141 in place, bannings the harvest, transport or export of rosewood and ebony.[155]

International action being taken

- In 2009 the NGOs GW and EIA undertook an *Investigation into the illegal felling, transport and export of precious wood in SAVA region Madagascar*.[156] In 2010, the same NGOs undertook further investigation and published *Investigation Into the Global Trade in Malagasy Precious Woods.*[157]
- In October 2009, a statement was released by 15 organisations from around the world including NGOs, Universities and Conservation Trusts titled *Malagasy government's decree for precious wood export will unleash further environmental pillaging*.[158] The statement said: "Recently Madagascar's transitional government issued two contradictory decrees: first, the exploitation of all precious woods was made illegal, but then a second allowed the export of hundreds of shipping containers packed with this illegally harvested wood… Malagasy civil society, conservation and development organisations and the international community are united in lamenting the issue of the most recent decree, in fearing its consequences and in questioning its legitimacy. Consumers of rosewood and ebony products are asked to check their origin, and boycott those made of Malagasy wood.[159]

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[150] Anon. (2010) *Investigation Into the Global Trade in Malagasy...* Op. cit. P 16
[151] Ibid P 8
[152] Anon (2011) *Madagascar toughens wood export rules*. http://www.illegal-logging.info/item_single.php?it_id=5772&it=news Accessed 30th March 2012
[153] Anon. (2012). *Madagascar lifts rosewood ban. Or does it?* Mongabay.com website. http://news.mongabay.com/2012/0229-rosewood_ban_lifted.html Accessed 21st March 2012
[154] Ibid
[155] Alain, I. (2012) *Bois de rose. Le ministre de l'Environnement sur la sellette.* In: *L'Express de Madagascar*. 15 March 2012. http://lexpressmada.com/bois-de-rose-madagascar/32858-le-ministre-de-l-environnement-sur-la-sellette.html Accessed 11 April 2012.
[156] Anon. (2009) *Investigation into the illegal felling…* Op. cit. August 2009.
[157] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit.
[158] *CAS California Academy of Science; CI Conservation International; DWCT Durrell Wildlife Conservation Trust; EAZA European Association of Zoos and Aquaria; ICTE Institute for the Conservation of Tropical Environments; MBG Missouri Botanical Garden; MFG Madagascar Fauna Group; The Field Museum, Chicago; Dr Claire Kremen, University of California, Berkeley; Dean Keith Gilless, University of California, Berkeley; Robert Douglas Stone, University of KwaZulu-Natal, South Africa; WASA World Association of Zoos and Aquariums; WCS Wildlife Conservation Society; WWF World Wide Fund for Nature; Zoo Zürich.*
[159] Pimm, S. (2009) Op. cit.

- In November 2009, US enforcement agencies used the newly amended 2008 Lacey Act to raid the offices of iconic Nashville-based guitar manufacturer Gibson, on the back of the GW/EIA findings. Gibson is suspected of importing illegal Malagasy ebony via its European trading partner. The trading partner sourced its timber from a trader based in Antalaha, northern Madagascar. It is difficult to assess the precise impact of this case, but its profile generated significant media interest in the United States and Europe. GW/EIA data analysis has shown that those who had imported Malagasy timber in the US and Europe prior to this raid have since stopped.[160] The Gibson case has yet to be heard in court (A second raid on Gibson in 2011 was not related to Madagascan PW).
- Following publication of the EIA report and extensive input from EIA, in November 2009 the United States House of Representatives passed Bill H.R. 839, which strongly condemns "the illegal extraction of Madagascar's natural resources and its impact on biodiversity and livelihoods of rural communities". The bill called upon importing countries to "ensure that they do not contribute to the demand for illegally sourced precious woods from Madagascar" and upon "consumers of rosewood and ebony products to check their origin, and boycott those made of Malagasy wood".[161]
- Furthermore, in July 2010 the European Parliament passed the EU Timber Regulation 995/2010 (EUTR), prohibiting the import of illegal timber and timber products into the European Union market. Like the US Lacey Act, this is a critical first step in stopping the trade in illegal timber destined for US and European markets.[162] The EUTR will not be implemented until 3 March 2013.
- Global Witness and 6 other NGOs wrote to the Minister of Environment and Forests of Madagascar on 3 February 2012 regarding the sale of confiscated PW in Madagascar.[163] It recommend that he take careful steps to ensure that all options for disposal, destruction, or sale of existing and future PW stocks be evaluated carefully before any action is taken, and that all such actions be conducted in a transparent manner that deters future illegal activity, does not benefit criminal actors in Madagascar or elsewhere, and does not generate renewed demand for the same product on international markets, with the consequence of continuing illegal trade in Malagasy PW.[164]

Plantations and other cultivation

No information could be found of Madagascan ebonies or rosewoods being grown in plantations either on Madagascar or elsewhere.

Certification

According to the FSC database, there are no certified sources of Madagascan rosewood or ebony.

Trade and conservation outlook

- Madagascar is one of 14 countries that will receive funds under the Forest Carbon Partnership Facility, which will reward countries for preserving their forest cover. The countries will receive grants to build their capacity for REDD (Reducing Emissions from Deforestation and Degradation), including establishing emissions reference levels, adopting strategies to reduce deforestation, and designing monitoring systems.[165]
- The EIA's investigations found that Chinese buyers are well aware of pressure from the international community to end the trade in Malagasy PW, though most buyers with whom EIA spoke feel that the pressure is a pretence used by the West to address China's growing trade surplus. They also believe that even if the Malagasy government implements a strict ban on export in the near future, it will be

[160] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit. P 4
[161] Ibid
[162] Ibid
[163] Environmental Investigation Agency;
Zoo Zurich;
Missouri Botanical Garden;
St. Louis Zoo;
Field Museum;
Madagascar Fauna Group.
[164] Anon. (2012) International NGO letter regarding the sale of confiscated precious wood in Madagascar. Global Witness website. http://www.globalwitness.org/library/international-ngo-letter-regarding-sale-confiscated-precious-wood-madagascar Accessed 26th March 2012
[165] Anon. (Undated). *Madagascar.* Illegal Logging info website. http://www.illegal-logging.info/approach.php?a_id=73 Accessed 21st March 2012

temporary, as with previous bans.[166]

- Buyers attracted by the highly lucrative nature of the rosewood import business quoted the proverb, "He who stays till the end laughs at the end." The common understanding among traders is that they will keep importing rosewood, regardless of the legal circumstances on the ground in Madagascar.[167]
- Since the 2009 GW/EIA Madagascar investigation and subsequent raid - under the US Lacey Act - of Gibson Guitars Corp. for possession of alleged illegally felled Madagascar ebony, it has been reported that the "export of rosewood and ebony from Madagascar is almost at a standstill and the big logging camps in the national parks are a thing of the past."[168] GW/EIA stated in their 2010 report that "Analysis of trade data and interviews with those who had imported Malagasy timber prior to the raid indicate that this activity has now ceased entirely in the US and Europe."[169]
- Research for this project however found instrument blanks made of *Diospyros perrieri* ('Malagasy Ebony'), the rosewoods *Dalbergia maritima*, *D. baronii*, *D. greveana* and 'Malagasy Rosewood - *Dalbergia* spp.' for sale on the internet by US-based timber traders.[170]

[166] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit. P 15
[167] Ibid
[168] BBC Natural World (2011) *Madagascar, Lemurs and Spies*. TV Programme. Quote taken at 56 minutes duration. http://www.bbc.co.uk/programmes/b01dlcgk Accessed 31 March 2012
[169] Anon. (2010) *Investigation Into the Global Trade in Malagasy…* Op. cit. P 9
[170] See https://www.gilmerwood.com/items.php?page=&CID=36&keywords=Search&size=100 and http://www.alliedlutherie.com/madagascarrw.htm Accessed 1 April 2012

Appendix 6

Red Sanders

Names

Botanical: *Pterocarpus santalinus*
Common: Red Sanders (often mistakenly referred to as red sandalwood).[171]

Uses

Locally: Medicinal qualities, red dye, pharmaceutical preparation, agricultural implements, hut material, carving for idol making and toys. [172]
Internationally: Red Sanders is reported to be in high demand in China for furniture and in Japan for making musical instruments, furniture and toys. It is also used as a food dye and in incense.

Ecological status

IUCN: Endangered.
CITES listing: Red Sanders has been listed on CITES Appendix II (Logs, wood-chips, powder and extracts) since 1995.

Natural range and ecology

- Red Sanders is an endemic species in India, found primarily in the southern parts of the Eastern Ghats region in the State of Andhra Pradesh. The extent of occurrence is estimated to be less than 5000km^2 but also estimated as extending over an area of 9600km^2. In the Rayalseema Region, three specific districts have a geographical range of distribution and occupation of Red Sanders: Kadapa forests has 97% area under Red Sanders, Chittor 45%, and Nellore 40%. In these three districts, Red Sanders comprises 16% of the total growing stock.[173]

Extraction, trade and illegal logging

- Formulating consumption patterns for Red Sanders is an arduous task because data is incomplete. Further, examination of the available data reveals inconsistencies between the sources, thereby creating a hazy picture of the trends experienced and the actual extent of damage occurring to the resource.[174] Much of the available data on timber trade relates to seizures within India or in transit and/or importing countries.
- In December 2009, a series of seizures of Red Sanders took place with indications that smugglers are growing increasingly sophisticated in transporting the valuable timber out of India. According to media reports, more than 50 tonnes of Red Sanders logs were seized Leh, in the far northern State of Jammu and Kashmir, where it was en route to China. Further reports state that in the Punjab, almost 11 tonnes of red sanders was seized, with follow-up action netting a further 26 tonnes of Red Sanders from Delhi. In the far north-eastern State of Nagaland, close to the borders with Myanmar and China, Forest Department staff seized a truckload of the valuable timber.[175]
- "It is evident from the spate of seizures taking place that smugglers of Red Sanders are operating on a massive scale and are running highly organized international smuggling rackets," commented Samir Sinha, Head of TRAFFIC India. For example, logs are being transported via different routes overland and are being shipped to the Middle East, although whether this is to markets in that region or it is just being used as a transit point, remains to be seen. "The Directorate of Revenue Intelligence are to be congratulated for their diligence in uncovering these smuggling routes and techniques, but as well as

[171] Srikhanta, A. (2008) *An Overview of Trade in Red Sanders. A Background Research Paper.* TRAFFIC India. 15th February 2008. P 3
[172] Anon (2011). Traffic bulletin Seizures and Prosecutions March 1997 – October 2011. TRAFFIC. P 205
[173] Ibid P 4
[174] Srikhanta, A. (2008) *An Overview of Trade in Red Sanders. A Background Research Paper.* Unpublished. 15th February 2008. P 8
[175] Anon. (2009). *Red Sanders Red Alert.* TRAFFIC website http://www.traffic.org/home/2009/12/23/red-sanders-red-alert.html Accessed 1st April 2012

stopping the smuggling in India, we urgently need to find out more about what can be done to control the drivers of the Red Sanders demand in China, Japan and elsewhere."[176]

- According to the Government of India's Ministry of Environment & Forests, Wildlife Crime Control Bureau, Red sanders has "virtually no domestic demand for constructional or furniture use. Almost all the seizures indicate the movement of logs towards the exit points or the seizures themselves are at the exit points during attempted smuggling. An analysis of the seizures occurred during last 5 years indicates that about 90% of the logs seized confirming [sic] to 50 to 90 Cms g.u.b while remaining 10% were between 100 to 120 Cms g.u.b."[177] (note to reader: 'Cms g.u.b.' is not a term the authors of this report have been able to define).

Conservation concerns

As noted above, the species has been classified as Endangered, and continues to be subject to widespread illegal trade within and from India.

Community and social impacts

No references found.

Local action being taken

- At the State level, Andhra Pradesh forestry departments strive to conserve the species, but cannot be responsible for thwarting the international demand for this timber which triggers and establishes the illegal market of Red Sanders wood. Though seizures and confiscations are successful, the tree is still lost from the native forest, threatening conservation. The policy conundrum arises because stockpiles can no longer be sold and exported unless Central provisions implore exemptions.[178]
- In February 2012, an article in the Business Standard (India) *Sandalwood trade in the dock*[179], stated "in order to protect sandalwood and its rare varieties found only in south India, the 'green bench' of the Supreme Court last week passed several directions to the central government. According to one of them, the government shall take steps to include Red Sanders, which has medicinal properties and is in high demand abroad, in Schedule VI of the Wild Life Protection Act. This will make it an endangered species. It also asked the government to consult the wild life board and take a decision within six months whether sandalwood could be notified as a protected species."
- The Wildlife Crime Control Bureau has a section in the *Red Sander's Enforcement Manual* entitled "Criminality" which explains the process of illegal logging. See Box 1 below.

Box 1: India's Wildlife Crime Control Bureau's *Red Sander's Enforcement Manual* "Criminality" section[180]

Domestic

Smuggling by hierarchical criminal groups through the following stages:
Stage 1: Certain Traders / Middlemen on behalf of the Traders stationed elsewhere (Chennai etc) contact middlemen in medium towns near the forest areas and pay them advances to organize cutting of wood.
Stage 2: The Middlemen contact the locals and pay them advances for going to the Forests, cutting Red Sanders trees and bringing the timber logs from the Forests. The locals are paid by weight and the rate varies any where from Rs.20/- to Rs.40/- per Kg based on the market demand.
Stage 3: Several cycles of transportation and laundering often changing ownership, locations, conveyance and drivers through middlemen.
Stage 4: Final transport of Red Sanders logs normally concealed under some agricultural produce or under animal dung or rotten onions and transport to Chennai or other places by road.

[176] Ibid
[177] Anon. (2008). *Red Sanders – An Enforcer's Manual.* Government of India Ministry of Environment & Forests Wildlife Crime Control Bureau, New Delhi. Website http://www.wccb.gov.in/rsmanual/main.html Accessed 1st April 2012
[178] Ibid P 3
[179] Antony, M.J. (2012). Sandalwood trade in the dock. Business Standard website. http://www.business-standard.com/india/news/sandalwood-trade-indock/465134/ Accessed 26th March 2012
[180] Ibid

Stage 5: The material either in log form or in converted form is transported to various destinations with in the country or outside the country.

International
Exit Point Vulnerability Analysis
Borders with Nepal and Myanmar appear to be currently active with reference to smuggling of Red Sanders. Amongst the exit points the forms vary as below:
Land Frontiers – Logs
Air – Purportedly Value added forms
Sea – Logs, Purportedly valued added forms
ICD – A New front, Logs

Plantations and other cultivation

- The species can be artificially propagated via both seeds and cuttings. Plantations of *P. santalinus* were established as early as 1964 by the Andhra Pradesh Forest Department, with research into vegetative propagation reported in the 1990s with encouraging results. Plantations were also established in Kerala in 1983, with three different sites planted that were said to show promise. It was estimated that the trees would take 18-20 years to produce heartwood, but was not known if that heartwood would possess the high value wavy grain. Cultivation trials were said to be aimed primarily at producing this higher value wood.[181]
- A red sanders plantation in Kodur established in 1865, last recorded felling in 1957 and shows a picture of the difference between "native" and "plantation wood", the plantation wood showing less sapwood.[182]

Certification

- According to the FSC website, there are no certified supplies of Red Sanders.

Trade and conservation outlook

Available information indicates that this species has been significantly reduced in the wild, to the point that it has been classified as Endangered. With no signs that demand has declined or that cultivation or enforcement have reached sufficient levels to undercut the incentives for illegal felling, the conservation status of this species remains of concern.

[181] Mulliken, T & Crofton, P. (2008) *Review of the Status, Harvest, Trade and Management of Seven Asian CITES-listed Medicinal and Aromatic Plant Species*. Bonn, Germany. P 79
[182] Srikhanta, A. (2008). Op. cit. Slide 14