CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Sixteenth meeting of the Conference of the Parties
Bangkok (Thailand), 3-14 March 2013

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Dalbergia stevensonii is proposed for listing in Appendix II of CITES in accordance with Article II, paragraph 2(a), of the Convention and Resolution Conf. 9.24 (Rev. CoP15) Annex 2 (a), Paragraph B.

B. Proponent

Belize*.

C. Supporting statement

1. Taxonomy

1.1 Class: Magnoliopsida

1.2 Order: Fabales

1.3 Family: Leguminosae (Fabaceae) Juss. 1789

1.4 Genus, species or subspecies, including author and year: *Dalbergia stevensonii* Standley 1927

Note: Taxonomic circumscription of the genus is subject to much debate. The current estimate for total number of species is 250 (Lewis, pers. comm., 2012)

1.5 Scientific synonyms: No synonyms

1.6 Common names: English: Honduras Rosewood, Rosewood, Nogaed, Nagaed
French: Palissandre du Honduras
Spanish: Palisandro de Honduras, Rosul

1.7 Code numbers: none

2. Overview

Dalbergia stevensonii is a species of rosewood restricted in distribution to broadleaf evergreen swamp forests of southern Belize and nearby regions of Guatemala and Mexico (Section 3.1; Section 3.2). The species is threatened by high levels of logging (legal and illegal) and increasing deforestation in the region (Section 4.1). It is of limited availability in trade, although it is very much sought after, particularly as a tonewood for musical instruments, and increasingly by the Asian market for furniture and cabinet-making. The species is not available from plantations, and therefore must be sourced from wild populations. In spite

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

of its rarity, there is a high level of wastage, up to 80% (Section 6.3), as only logs of the straightest grain are used to make marimba bars. Large volumes are also lost when the low value sapwood is removed. Increased accessibility to its habitat and declining stocks of other rosewoods has almost certainly led to growing pressure to turn to this species to meet demand.

Dalbergia stevensonii meets the criteria for inclusion on Appendix II of CITES in accordance with Article II, paragraph 2(a), of the Convention and Resolution Conf. 9.24 (Rev. CoP13) Annex 2 (a), Paragraph B: *It is known, or can be inferred or projected, that regulation of trade in the species is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.*

3. Species characteristics

3.1 Distribution

D. stevensonii occurs in broadleaf evergreen swamp forests of southern **Belize** and neighbouring regions of **Guatemala** and **Mexico**. From the limited data available, it is thought that the core populations are restricted to the Toledo district of southern Belize, between latitudes 16-17° N (WCMC, 1999). The type specimen was collected along the San Antonio Road near Westmoreland, Punta Gorda (Standley, 1927). It has been reported mostly between Sarstoon and Monkey Rivers, sometimes in fairly large patches (Chudnoff, 1984) along rivers but also on inter-riverine and drier areas (Cho & Quiroz, 2005). New York Botanic Garden (2006) records one specimen collected from **Belize** in 1994. MOBOT (2006) records the following specimens with coordinates from **Belize**:

– Cayo: New Maria Camp, 550 m, 16.49.38N 089.01W, 4 May 1995.

– Toledo: Columbia, 16.20N 088.59W, 13 Jun 1950.

– Toledo: Moho River, 16.07N 088.52W, 4 Jun 1949.

– Toledo: 16.20N 88.45W, 22 Sep 1944.

– Toledo: 16.20N 88.45W, 22 Sep 1944.

A wood sample in the Economic Botany collection at Kew (Royal Botanic Gardens Kew, 2006) is reported as coming from "**Honduras**". According to the Economic Botany collection manager it is possible that this may refer to **Belize** (previously British Honduras) (Steele, pers. comm. March 2006).

D. stevensonii is included on the list of principal forest species of **Guatemala** (INAB, 2006). MOBOT (2006) records the following specimens with coordinates from **Guatemala**:

– Izabal: Puerto Mendez, 15.30N 89.00W, 15 Jun 1970.

– Izabal: Puerto Mendez, 15.30N 89.00W, 15 Jun 1970.

– Peten: La Cumbre, 16.50N 90.00W, 15 Aug 1969.

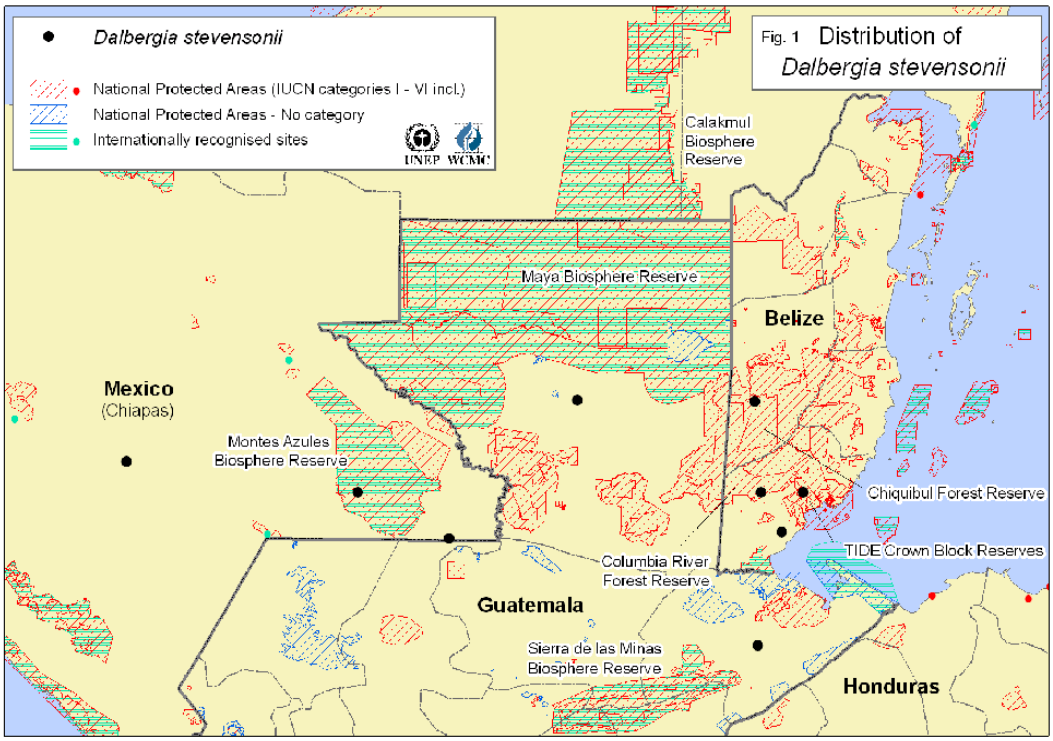
The species is reported to occur in **Mexico** (Dávila Aranda and Tejeda Godinez, 2005). MOBOT (2006) records the following specimens with coordinates from **Mexico**:

– Chiapas: 130 m, 16.04.48N 090.42.36W, 10 Jan 1986.

– Chiapas: 360 m, 16.20N 091.13W, 20 Aug 1993.

– Chiapas: 220 m, 16.30N 92.30W, 20 Apr 1986.

Figure 1. illustrates these specimens in the context of the legally gazetted protected areas of each country (protected area data taken from the World Database on Protected Areas managed by UNEP-WCMC).



3.2 Habitat

D. stevensonii is present in intermediate forests of **Belize** (Stevenson, 1928). It is found in seasonally and permanently waterlogged tropical evergreen broadleaf lowland swamp forest (Meerman *et al*., 2003). These habitats are scattered throughout the Toledo district of **Belize**. Specimens reported from **Guatemala** and **Mexico** come from a very small geographical range within the countries.

Due to habitat specificity and restricted distribution, habitat availability can be considered to be a limiting factor for the species.

In **Honduras** and **Guatemala** it is found in broad leaf forest; in **Mexico**, the species has been found in evergreen rainforest, oak forest and transformed areas (PC 20 Doc. 19.1 Annex 3).

3.3 Biological characteristics

Information on the breeding system of *D. stevensonii* is not available. However, some aspects of the reproductive biology of the congeneric species *D. miscolobium* (Gibbs & Sassaki, 1998), *D. nigra* (Ribiero *et al.,* 2005), *D. sissoo* (Mohana et al., 2001), *D. retusa* (Bawa, 1974; Bawa and Webb, 1984; Frankie *et al*., 2002; Marín & Flores, 2003) and *D. tucurensis* (Bawa *et al.,*1985) have been studied. These studies show some common features for the genus. Mass flowering but relatively few mature fruits have been observed in *D. miscolobium*, and high levels of seed abortion (the rejection of immature seeds between fertilization and seed maturation) have also been observed in *D. retusa* and *D. sissoo. D. retusa, D. sissoo* and *D. miscolobium* have been found to be outbreeding. Pollen is dispersed by bees in *D. tucurensis, D. retusa, D. sissoo* and *D. nigra* and seeds dispersed by wind in *D. nigra* and *D. sissoo*, by wind and water in *D. retusa*.

It is likely that the above characteristics are shared by *D. stevensonii*, on which yellow flowers appear in the first two weeks of July and the unripe fruits hang in thick clusters from August, probably ripening and falling in late September or November (Stevenson, 1927). The stumps sprout freely (Stevenson, 1927). Examination of a large number of unripe fruits revealed the presence of caterpillars or pupae in all cases, which may reduce regeneration (Stevenson, 1927). During

germination trials at a tree nursery in southern **Belize** in early 2012, tiny white caterpillars were found in the vast majority of seeds. Very few seeds germinated and seedlings did not survive beyond a few months (Stott, pers. comm. 2012). The caterpillars are thought to be the larval stage of a wood-boring beetle (Brewer, pers. comm., 2012). As is the case for many tropical tree species, regeneration of *D. stevensonii* may also be limited by infrequent 'pulse' recruitment and it is possible that mature seeds may have a limited viability, as is the case with *D. melanoxylon* (Gray, pers. comm., 2011).

3.4 Morphological characteristics

D. stevensonii is a medium sized tree, with a height of 15-30 m. The bole is often fluted and forks at about 6-8 m from the ground (Farmer, 1972). The bark is papery and disordered, with a scaly outer portion varying in colour from pale brownish-grey to a dingy yellow-brownish grey (Stevenson, 1927). Trees grow to around 3' (91 cm) in diameter (Forest Products Research Laboratory, 1955).

The wood is heavy and very durable, averaging 960 kg/m^3 when dry (Titmuss and Patterson, 1988). It has a medium to coarse texture and a straight or roe figure grain (Echenique-Marique and Plumptre, 1990). The sapwood and heartwood are sharply delimited: the sapwood is greyish (Titmuss and Patterson, 1988) and the heartwood is pinkish or purplish-brown with alternating dark and light zones (Echenique-Marique and Plumptre, 1990; Farmer, 1972; Titmuss and Patterson, 1988). The wood has no taste, but has a mild and distinctive smell (Titmuss and Patterson, 1988). The rose-like odour generally dissipates with age (Longwood, 1962).

3.5 Role of the species in its ecosystem

There is very limited information available about the role of *D. stevensonii* in the wider forest ecosystem. However it can be assumed that protection of the species from further unsustainable logging will allow remaining trees to continue their ecological functions.

In **Belize**, *D. stevensonii* is a dominant component of southern forest types (Cho & Quiroz, 2005). *Dalbergia* species form nitrogen-fixing nodules and therefore have an important role in enhancing soil fertility (Rasolomampianina *et al.*, 2005). Bees are the typical pollination mechanism for the genus (Section 3.3). Logging (especially when carried out during wet season) is likely to disturb the habitat, with the related consequences of road and trail building to transport the trees (Newman, 2004).

4. Status and trends

4.1 Habitat trends

Deforestation is occurring throughout the range of *D. stevensonii*. Major threats to the environment of **Belize** are deforestation, pollution from poor agricultural practices and a small but growing human population that is mainly poor (Beletsky, 1999). Southern **Belize** has escaped from major deforestation for a long time due to its inaccessibility and distance from population centres (Newman, 2004). However, the area is becoming inundated with colonists practising slash-and-burn agriculture. Road construction opening the area allowing access for logging and other purposes (Newman, 2004).

Belize currently has the highest population growth rate (annual percentage) in Central America (CIA, 2012 and World Bank, 2012). A recent land-use change study concluded that although parts of the Toledo District have remained as a highly forested area over the last 30 years, community lands have experienced extensive land use/land cover changes close to and within protected areas. In particular, Trio village farms are expanding at a very fast rate in the Maya Mountain North Forest Reserve and towards Bladen Nature Reserve (Ruscalleda, 2011), both areas known to contain *D. stevensonii*. Large volumes of lumber harvested between August 2011 and February 2012 have been extracted from so-called 'community lands' (see section 8.1) in the Toledo District (ie. outside of protected areas).

70,000 hectares of forest are disappearing each year in Chiapas, **Mexico** (Flakus, 2002). Izabal and Peten, **Guatemala**, have suffered from extensive deforestation (Section 5).

4.2 Population size

Information is lacking on the population size of *D. stevensonii*, though it is likely to be small. In 1979, *Dalbergia* was described as scarce, all accessible stands of the genus having long since been logged out (NAS).

Anecdotal evidence from suppliers suggests that it is rare: "this premier wood for orchestral marimbas is rare and expensive" (www.randbmarimbas.com); "Limited quantities … can, however, be obtained at high prices from importers" (http://www.exotichardwoods- southamerica.com); "generally believed to be fairly scarce" (http://www.woodwriteltd.com/); "difficult to obtain" (www.lmii.com).

Although confined to a small area, in **Belize** *D. stevensonii* had previously been reported to occur in fairly large patches within its habitat (Chudnoff, 1984). An assessment was recently carried out (Cho, 2012) in order to quantify *D. stevensonii* stocking past and present in the Toledo District, and to evaluate the magnitude of the immediate threat to the species posed by harvesting and trade, particularly resulting from the 'Rosewood Blitzkrieg' of 2010 to 2012. Since resources are not currently available for the Belize Forest Department to collect new data on rosewood populations in the Toledo district, data from 5 previous inventories (conducted in 2007 and 2011) were used.

The report concludes that current commercial stocking of *D. stevensonii* in Toledo is approximately 142 091 m^3, after a reduction of approximately 13 % over 3 years during the 'Rosewood Blitzkrieg'. A moratorium on harvesting and export was issued in March 2012 (MFFSD, 2012). If harvesting had continued at this rate (ie. if the moratorium had not been issued), *D. stevensonii* would have been wiped out (commercially) from Belize by 2033. **Assuming that demand for the species remains the same, if the moratorium is lifted and if stricter control measures on cutting and export are not put in place and properly enforced, Belize's commercial trade in *D. stevensonii* will be gone in two decades or less.**

Little is known of the genus in **Guatemala** (Sjezner, 2005). Neither **Guatemala** nor **Honduras** has data on status of populations (PC 20 Doc. 19.1 Annex 3). No information is available for the population size of the species in **Mexico**.

4.3 Population structure

No information is available on the population structure of *D. stevensonii.*

4.4 Population trends

Reports of timber extraction and habitat loss indicate that populations of *D. stevensonii* are declining. In the early 20th century, logging was the major economic activity in **Belize** (Beletsky,1999). For example, maximum timber extraction from the forests of Columbia River Forest Reserve occurred between 1925 and 1960 and most *D. stevensonii* had been extracted when inventories were undertaken in 1978 (Meerman and Matola, 2003). The species may once have been locally common, as it was described as "available only in British Honduras (now Belize), where large volumes await utilization" (Longwood, 1962).

Since 2007, harvesting of *D. stevensonii* from the Toledo district of **Belize** has been steadily increasing (section 6.2), reaching a peak in February 2012. Given the sheer volumes of timber that have been exported, it is highly likely that selective logging of *D. stevensonii* in the Toledo district will have contributed to a decrease in population size. A high number of large, mature, seed-bearing trees have been removed. Together with problems associated with regeneration from seed (section 3.3), over-harvesting may well have already seriously impeded regeneration of the species in the wild and this in turn will have an effect on genetic diversity.

Changes in population size can be inferred from changes in habitat availability. High rates of deforestation in the range States imply that the population is likely to be decreasing and selective logging will worsen the problem for valuable species such as *D. stevensonii*.

In 1927, Stevenson reported that the forests of **Belize** covered 87% of the total area.. More recent estimates of Belize's forest cover range from 79% (Fairweather & Gray 1994);

61.6% (Meerman et al 2010); 62.7% (Cherrington, 2010). The same 2010 study assesses Belize's deforestation rate between 1980 and 2010 to be under 25,000 acres / year (0.6%).

In 2000 in **Guatemala**, forest was reported to cover 26.3 % of the land area of the country. The annual rate of change of forest cover 1999-2000 was reported to be -1.7% (representing 54,000 ha; FAO, 2005).

Forests represented 28.9% of the land area in 2000 in **Mexico**. The annual rate of change of forest cover 1999-2000 was reported to be -1.1% (representing 631,000 ha; FAO, 2005).

4.5 Geographic trends

The historical situation is complex, as the ancient Maya were responsible for substantial deforestation in the region (Sever, 1998) and much of what is thought to be virgin forest today was farmed using the swidden method hundreds of years ago (Berkey, 1995).

D. stevensonii has a restricted distribution, mainly concentrated in the Toledo district of southern **Belize**. No information is available as to whether it was previously more or less widespread. It has been reported to be endemic in **Belize** (Standley and Steyermark, 1946), and although it has been found in other countries since, this suggests that it has never been common elsewhere. No information is available on trends for the species in **Guatemala** or **Mexico**.

In Honduras and Guatemala there is no data of potential area of distribution; in Mexico, based on data from the SNIB, REMIB and National Forestry Inventory of 2008 a map was created of potential distribution (PC 20 Doc. 19.1 Annex 3).

5. Threats

In the last 5 years, by far the greatest threat to the species in Belize has come from very high levels of selective logging. Throughout its range, deforestation due to a number of causes appears to be the next greatest threat to the survival of the species. High demand for the precious wood is already placing pressure on the remaining stocks. The success of national legislation to protect the species from logging has not been evaluated.

D. stevensonii is also threatened in **Belize** by genetic erosion and habitat loss (Cho and Quiroz, 2005). Toledo (the district of southern Belize where the core populations of *D. stevensonii* are found) is the poorest district in the country. The Government of **Belize** has very little money to manage the protected areas or enforce environmental regulations. As an example; currently there are only 3 forest officers stationed in the Toledo District who are expected to oversee approximately one million acres of forest. This lack of resources was undoubtedly one of many factors that contributed to the recent rampant harvesting of the species. Furthermore, there is a frequently ignored rule that new farms and orchards carved out of forests should leave standing a belt of 20 m of forest along all waterways (Beletsky, 1999). Given that *D. stevensonii* is mainly found alongside rivers (Stevenson, 1927) this is a particularly threatening activity. The extremely high rate of human population growth (see Section 4.1) and increased accessibility to southern areas is putting additional pressure on *Dalbergia* habitats in **Belize** (Newman, 2004). The forests of Toledo are no longer protected by their isolation. Paving of the Southern Highway (all the way to the southernmost town of Punta Gorda) was completed in 2009, and a new highway to Guatemala, extending from the border town of Jalacte to the existing Southern Highway, is due for completion in late 2014. It is now considerably easier to access the forests themselves, and to transport lumber from forest to point of export.

The tropical forest of Petén, **Guatemala**, is being destroyed at an alarming rate due to a combination of factors, including amongst others cattle ranching and slash-and-burn agriculture (Sever, 1998). Based on trends observed between 1986-1995 using remote sensing imagery, Sever (1998) predicted that only 2% of the Petén's forest would survive by 2010. Izabal has also suffered heavy deforestation (USAID, 2003).

Since 1960, the rate of deforestation in Chiapas has been higher than the rest of **Mexico**, and is among the highest in the world (González-Espinosa, 2005). For example, the Montes Azules Biosphere reserve in Chiapas is critically threatened by problems including forest fires, deforestation and land invasions (Parkswatch, 2004).

6. Utilization and trade

6.1 National utilization

D. stevensonii, in common with other rosewoods, is prized for its rich colouration; the heartwood is pinkish-brown to purple with irregular light and dark zones (NAS, 1979). It is present in international trade, although it is widely reported to be difficult to obtain.

D. stevensonii is the preferred species for the manufacture of bars for marimbas and xylophones (Kline, 1980; Farmer, 1972; and Rendle, 1969) It is superior to Brazilian Rosewood for this purpose due to greater density, toughness and resonance qualities (Kline,1980). Used for fingerboards for banjos, guitars and mandolins, percussion bars for xylophones, harp bodies, mouldings, picture frames, sculpture, furniture and decorative veneer. Widely used for turning (Friendly Forest, 2006). The main use (certainly by the Asian market) is for furniture and veneer. In **Belize**, it is used for making small items such as bowls and carvings (Cho and Quiroz, 2005, Echenique-Marique and Plumptre, 1990).

D. stevensonii is recommended as an acceptable, even superior substitute for Brazilian Rosewood (*D. nigra*) in the manufacture of guitars. Trade in *D. nigra* has declined since its listing in CITES Appendix I in 1992 (Affre *et al.,* 2004) and several guitar manufacturers (www.lmii.com; www.cbguitars.com, www.alliedlutherie.com; for example), even though commenting on its limited availability, recommend *D. stevensonii* as a substitute. This can only increase the pressure on the species.

A search on the Ebay website (www.ebay.com) for 'Honduras Rosewood' carried out in September 2012 lists 62 items. The majority are veneers, planks or blocks of wood (some treated, some raw lumber), with some small finished products such as pens and keyrings.

A search on Google for 'Honduras Rosewood' carried out in September 2012 shows a number of companies selling *D. stevensonii* lumber (see www.exotichardwood.com; www.export-to-china.com; http://www.worldtimbercorp.com; http://www.bellforestproducts.com).

The lengths to which enthusiasts are willing to go to obtain the wood are illustrated by a story given by the company Friendly Forest Products, who at great effort imported a giant burl of the species from **Belize** to Miami, **United States** (Friendly Forest, 2006).

During the recent spate of logging in **Belize**, wood was either removed from the forest in log form, or was converted on-site into squared, de-barked logs known as flitches. The unprocessed lumber is then exported. There has been a limited amount of replanting in **Belize** (Section 8.1).

6.2 Legal trade

There are no comprehensive reports of the levels of local or international trade in the species. However, the restricted growth area of the species limits the amount of trade (Flynn, 1994) and there is some difficulty in fulfilling demand (Titmuss, 1971).

The USA reports the following imports of D. stevensonii:

2008: 2 shipments of a total of 19 cubic meters of wild Guatemalan-origin *Dalbergia stevensonii* sawn wood imported into the United States from Guatemala. 009: 3 shipments of a total of 2 cubic meters of wild Guatemalan-origin *Dalbergia stevensonii* sawn wood imported into the United States from Guatemala. 2010: 2 shipments of a total of 21 cubic meters of wild Guatemalan-origin *Dalbergia stevensonii* sawn wood imported into the United States from Guatemala.

2010: shipment of 1,372 kilograms of wild Guatemalan-origin *Dalbergia stevensonii* logs imported into the United States from Germany. 2011: 5 shipments of a total of 25 cubic meters of wild Guatemalan-origin *Dalbergia stevensonii* sawn wood imported into the United States from Guatemala.

ITTO does not report any export or import trade in *D. stevensonii* from their member States (Guatemala and México) "We haven't seen any official export reports on these species from our

members in the region (Guatemala, Honduras, Mexico, Panama) for the past decade. This can mean zero or insignificant levels of exports are occurring (or that "unofficial" exports are occurring that aren't captured by official statistics." (Johnson, S. 2012 pers. comm.) Belize is not a member of the ITTO.

Systematic forestry began in **Belize** in 1922 with the formation of the Forest Department, although timber production had been ongoing for the previous 250 years (Standley and Record, 1936). Records of trade in the early 20th century indicate that in 1925, 248 tons and in 1926, 76 tons of *D. stevensonii* were exported from **Belize** (then British Honduras) to the United States. In 1933, 37 tons were exported, mainly to the United Kingdom of Great Britain and Northern Ireland and France (Standley and Record, 1936). There is a record of 118 pieces shipped in 1841 (Record and Hess, 1943). Between January 1999 and January 2012, a total of 10,892,972 board feet (25,705 cubic meters) of timber identified as 'rosewood' were exported from Belize. The majority of this is thought to be *D. stevensonii* with perhaps a small percentage being other *Dalbergia* species. A moratorium on cutting and export was issued in March 2012. Between February 2012 and July 2012, a total of 583,909 board feet (1,378 cubic meters) were exported from Belize (Belize Forest Department, 2012a). Exports were permitted for a limited time period after the moratorium was issued in order to move large quantities of raw lumber that would have otherwise gone to waste.

In 2004, 254.65 m^3 of timber from *D. stevensonii* valued at USD 381,390 extracted from regions outside protected areas were exported from **Guatemala**, principally to Japan, El Salvador, United States, Germany, Belize and the Netherlands (Szejner, 2005).

The shortage of trade information demonstrates the need for improved trade records.

6.3 Parts and derivatives in trade

For *Dalbergia* timber species, only the heartwood yields quality timber, whereas the sapwood is of little value. Heartwood from old trees is valued for having the richest colouration (Zadro,1975). The trees are slow in forming heartwood, so even large logs lose much of their volume when the sapwood is removed (NAS, 1979). This is not always the case, as sometimes the contrasting sapwood is retained for ornamental purposes (www.lmii.com, for example). Wastage may be as high as 70-80% as only the finest straight grain logs are used in making bars for marimbas and xylophones (Kline, 1980). The burls, highly figured cambium outgrowths, are particularly valued (Friendly Forest, 2006). Further indication of the increasing value of the species came in 2011, when the Belize Forest Department received a request for permission to uproot and export the stumps that remain after logging. Given the serious impact this would have had on the species (ie. potential local extinction), the request was declined.

6.4 Illegal trade

Little information is available on the level of illegal trade in *D. stevensonii*. There are, however, reports of illegal logging in the range States.

In the past illegal logging has been reported as a significant problem in **Belize** (Bird, 1998), even within protected areas (Section 8.5). A significant proportion of harvesting from the Toledo District of Belize in the last two years is thought to have been illegal. Anecdotal evidence suggests that even when permits and/or licenses were obtained, the volume of timber extracted under these permits/licenses was often greater than the permit allowed. Furthermore, lumber was often transported under cover of darkness and/or without an official Forest Department stamp (both illegal actions).

In **Guatemala**, population pressures around protected areas result in illegal timber harvesting and land clearing for agriculture in national parks (Mongabay, 2006). In 2001, an employee of the Guatemala National Forestry Institute was shot and killed, apparently in retaliation for efforts to control illegal logging and contraband trade in protected precious woods (Amnesty International, 2002).

In **Mexico**, illegal logging is also a serious problem. ITTO (2005) cites an estimate by PROFEPA that consumption of illegally harvested timber in the country is about 5-7 million m^3 of roundwood per year, which represents approximately 80% of legally harvested timber.

6.5 Actual or potential trade impacts

D. stevensonii is used to make luxury items from its beautiful high value wood. It is unclear how much of its use is local, but given the range States are developing countries, it seems likely that most timber or products made from timber of this species are traded internationally. International trade has therefore promoted cutting of *D. stevensonii*.

7. Legal instruments

7.1 National

In **Belize**, the export of raw *D. stevensonii* lumber was prohibited up until 1992. Only finished or semi-finished products could be exported. Legislation was changed in 1996 to allow the export of raw lumber. Since this time, there has been a steady rise in harvesting of the species (see section 6.2), fuelled primarily by demand from the Asian market. A moratorium on harvesting and export was issued by the Government of Belize in March 2012 (MFFSD, 2012).

Belize Forest Department then took steps to address the significant volumes of lumber on the ground that had been cut PRIOR to the moratorium. A public notice was issued on 3 April 2012 detailing procedures for this exercise (Forest Department, 2012b). Stockpiles of lumber were inspected by Forest Department officials and – in most cases – export was permitted. **Exports of raw *D. stevensonii* lumber from Belize ceased altogether in August 2012. The date of the last legally permitted export was 24 August 2012** (Alamilla, pers. comm., 2012).

Range states presented the following reports on national legislation to regulate conservation and trade in this species to the Mahogany and Tropical Timber Working Group: **Honduras** reported the Resolution GG-MP-104-2007, which establishes a ban for this species; **Nicaragua** has no specific measures for the species; **Guatemala** informed they have the Decree 4-89 "Law of Protected Areas", List of Threatened Species and Regulations specific for threatened species, there is no ban and management of the species is done through specific regulations if the populations are in or outside the Guatemalan System of Protected Areas**; Mexico** has the Agrarian Law, Federal Law of Administrative Procedure, General Law of Sustainable Forestry Development and its regulation, General Law of Ecological Equillibrium and the Protection of Environment and its regulations in the matter of environmental impact and Natural Protected Areas, General Wildlife Law, Federal Law of Rights, and finally the Official Mexican Norm NOM-059-SEMARNAT-2010 that lists species at risk. Neverthless in Mexico the species has no established measures of bans total or temporal or any similar measures (PC 20 Doc. 19.1 Annex 3).

7.2 International

D. stevensonii was listed on CITES Appendix III by **Guatemala** in 2008. The listing applies only to lumber coming from Guatemala.

Note: *Dalbergia nigra* was included in CITES Appendix I in 1992.

8. Species management

8.1 Management measures

The **Belize** Forest Department is responsible for management of forest reserves. A detailed inventory is a requirement for logging concessions in forest reserves. For private lands, an inventory is only required if the owner wishes to export mahogany (*Swietenia macrophylla*). Elsewhere, forest inventories are voluntary.

Management of the species on so-called 'community lands' in **Belize** is complicated by uncertainty over land tenure issues. Two rulings of the Belize Supreme Court (in 2007 & 2010) have granted customary land rights to all Maya communities (31 in total) in Toledo. The Government of Belize has appealed against this decision and the matter is still outstanding. Only two of these communities have forest management plans in place and as a result, in the last 12 months vast quantities of *D. stevensonii* were extracted from many of these areas with no consideration given to sustainable management. Disappearance of the species from community lands is putting increased pressure on populations in protected areas and on private land.

In response to the extensive damage caused in the Toledo District of **Belize** by Hurricane Iris in 2001, a tree planting scheme was established by the Ya'axche Conservation Trust. Activities focused on planting seedlings of those species historically felled for timber, including *D. stevensonii*. In the same year, a tree nursery was also developed at the Ya'axche field station near the village of Golden Stream. Whilst the nursery continues to provide saplings for local communities and farmers, Ya'axche has reported little success in raising *D. stevensonii* from seed (see section 3.3). Furthermore, for the last 12 months, Ya'axche have reported that it has become extremely difficult to acquire *D. stevensonii* seeds locally. Anecdotal evidence suggests that large seed trees are now very rare.

The National Forest Institute (INAB) is responsible for administering and managing most of the forests in **Guatemala**. The legal framework for forest activities includes the Forestry Law (Decree 101-96) and the Protected Areas Law (Decree 4-89 and its reforms: 18-89; 110-96; 117-97; Ferroukhi and Echeverría, 2003). Taxes on lumber are used to help finance forest management.

Mexico is a member of the Montréal Process for sustainable forest management (Montréal Process Working Group, 1998-2005). Honduras, Guatemala and Mexico, indicated that forestry regulations in their countries demand Forestry Management Plans (PC 20 Doc. 19.1 Annex 3)

Honduras, included it in the list of "Species of Special Concern in Honduras" in the category VU A1 cd+2cd (vulnerable) according to IUCN categories; In Guatemala, it was included in Category 2 of the List of Threatened Species of Guatemala, which refers to species with distribution range restricted to one type of hábitat (endemic) and in Appendix III of CITES, its state of conservation has yet to be determined (will have data on population studies shortly); **In** Mexico, a research project is being developed which will allow them to know the comercial and conservation status of the genus Dalbergia, complements its information saying there is no record of harvest inside Natural Protected Areas (PC 20 Doc. 19.1 Annex 3)

In Honduras, there is no zoning for the extraction of the species, in Guatemala, harvest and management are allowed outside the natural protected areas whose categories are type I, II and in core zones of protected areas whose category of management is type VI; in Mexico, there is no extraction zoning (PC 20 Doc. 19.1 Annex 3)

In El Salvador and Mexico there are no management plans and in Guatemala, there are management plans for commercial purposes, plans are for 30 or 40 years in natural protected areas where zoning allows it and minimum cutting diameters of 30 cm DAP (PC 20 Doc. 19.1 Annex 3).

8.2 Population monitoring

No population monitoring reports are available for the species.

In **Belize**, the Ya'axche Conservation Trust has secured funding to commence long-term population monitoring of *D. stevensonii* in the Golden Stream Corridor Preserve. Data collection is due to begin in November 2012.

Honduras and **Mexico**, have no forestry inventories of natural populations; **Guatemala** indicated that the first phase of the National Inventory of Mahogany, Cedar and Rosul has been completed (PC 20 Doc. 19.1 Annex 3).

8.3 Control measures

8.3.1 International

Guatemala listed *D. stevensonii* on CITES Appendix III in 2008.

8.3.2 Domestic

In **Belize**, a moratorium (see section 7.1) on cutting and export of the species is currently in place (issued in March 2012). Logging season re-opens on 15 October 2012. The Ministry of Forestry, Fisheries and Sustainable Development has confirmed that the moratorium will remain in place, and that no permits to cut *D. stevensonii* have been authorised by the Chief

Forest Officer. He is currently the only person authorized to sign such permits. Furthermore, the moratorium overrides any existing long-term forest licenses or concessions that previously included permission to cut *D. stevensonii* (Alamilla, pers. comm., 2012).

D. stevensonii is listed in the First Schedule of the **Belize** Forests Act 2003, which specifies that no person shall convert the wood without first having obtained a licence. Additionally, a licence is required to cut or otherwise injure any tree within forest reserves, national land and private land to which the Act has been applied.

D. stevensonii is listed in Category 3 of CONAP (*Consejo Nacional de Áreas Protegidas*) resolution No. ALC 028/2001 of **Guatemala** to prevent the species from becoming in danger of extinction. Commercial exploitation of the species is subject to strict regulation (Melgar, 2003).

Between 1970 and the mid-1980s, forestry practices in the Chiapas region of **Mexico** centred on unsustainable commercial and traditional logging by private and state groups. A ban on logging in 1989, which extended to rural uses such as fuel wood collection resulted in a number of clashes between the authorities and the indigenous communities in the Chiapas highlands and other areas (Castaňos, 1994).

8.4 Artificial propagation

D. stevensonii does not appear to be widely grown in plantations although it may be suitable for commercial growth. For example, Stevenson (1927) describes how the stumps of the trees sprout freely, quickly producing heartwood, and that with careful attention and selective thinning valuable timber should be obtainable in a fairly short time. There are no known plantations in Belize. Attempts to grow the species from seed have been unsuccessful (see section 3.3).

In **Guatemala**, there is no available data on area planted nor of volume harvested from plantations, these are of pure stands and mixed and in Mexico no plantations carry the species (PC 20 Doc. 19.1 Annex 3)

There are no suppliers of *D. stevensonii* with FSC certification listed on the Forest Stewardship Council database (FSC, 2006).

8.5 Habitat conservation

Belize has designated 36% of its terrestrial area for conservation or sustainable resource use (Walker & Walker, 2009). *Dalbergia stevensonii* has been recorded in the following protected areas; Bladen Nature Reserve (Brewer, 2011), Sarstoon Temash National Park (Meerman *et al.,* 2003), Cockscomb Basin Forest Reserve (WCMC, 1991), Golden Stream Corridor Preserve (Cho, 2011), Columbia River Forest Reserve (Cho, pers, comm., 2012), Deep River Forest Reserve and Maya Mountain North Forest Reserve. There is currently little or no population data for the species in these areas.

The eastern side of Bladen Nature Reserve, **Belize** has a high level of protection but there is increasing concern for illegal extraction on the western side of the reserve, due to cross border incursions from Guatemala. In Sarstoon Temash National Park, **Belize**, *D. stevensonii* has a high level of protection, although it is also a target for cross border illegal logging (IMCG, 2005). US Capital Energy recently completed seismic testing (oil exploration) in the area. The Cockscomb Basin Wildlife Sanctuary is a high-profile reserve (a jaguar sanctuary) and is well protected from deforestation, and although concerns about illegal logging have been raised, they have been addressed (Catzim, 2003). The Golden Stream Corridor Preserve (a private protected area) has a high level of protection. There is no management in place for Columbia River Forest Reserve and there are no active logging licenses (pers. comm. Sabido, 2012). Columbia River Forest Reserve is one of the only large, continuous tracts of relatively undisturbed land in Mesoamerica (Parker *et al*., 1993). Incursions from local villages are likely to be the greatest threat to *D. stevensonii* populations and habitats in this area. Maya Mountain North Forest Reserve was the subject of high levels of logging during the recent spike in harvesting. It is unclear as to whether this activity was technically legal, since the Forest Department reports an inactive long-term forest license for this area. Deep River Forest Reserve has an active long-term forest license. It should be noted that Forest Reserves in Belize were created specifically for timber production rather than habitat or biodiversity conservation. (Berkey, 1995).

In Belize, the Forest Planning and Management Project (FPMP) ran between 1992 and 1998 with the aim of utilising the national forest estate on a sustainable basis through forest management planning and research (Bird, 1998). In Belize, unprotected habitats adjacent to community lands are under threat. The Ya'axche Conservation Trust together with its partner Fauna and Flora International support a variety of ongoing projects designed to assist local Toledo communities with sustainable development – eg. shifting from traditional practices such as slash and burn to more sustainable, environmentally friendly practices such as agroforestry.

The northern forests of the Petén, **Guatemala**, have been protected by the Maya Biosphere reserve since 1995. The NGOs The Nature Conservancy, Conservation International and Wildlife Conservation society are active in Petén (USAID, 2003).

The species is found in the Montes Azules Biosphere Reserve in **Mexico**. This reserve of 331,200 ha of moist forest was created in 1978. Although the reserve offers some legal protection, and the Natural Protected Areas system is considered to be working in the region, it is critically threatened by a variety of problems (Parkswatch, 2004; Section 5).

Honduras has a Territorial Regulation Law (Decree 180-2003) an in some municipalities they have territorial regulation plans to contro land use; **in** Guatemala, the only territorial regulations are the master plans of natural protected areas; and in Mexico, there are some cases where there are regulation plans at the municipal level which determines land use. Forestry Law determines that land use changes are only issued by exception (PC 20 Doc. 19.1 Annex 3).

8.6 Safeguards

Not applicable.

9. Information on similar species

Brazilian Rosewood, *Dalbergia nigra* (Vell. Conc.) Benth., was included in CITES Appendix I in 1992. *D. tilarana* can be confused with *D. stevensonii* (Zamora, 2000).

10. Consultations

A consultation letter was sent to all range states. Comments from several Parties were added to the proposal.

11. Additional remarks

This proposal was developed as a consequence of a series of activities, dating back to 1998, to identify timber trees in international trade of conservation concern, and to recommend appropriate long-term strategies to ensure their sustainable use (see Decision 13.54). Initial activities are outlined in document PC13 Doc. 14.2 (Rev. 1), and later reported in the Summary Record (item 11.2) of the 14th meeting of the Plants Committee. The first workshop for Mesoamerica was subsequently held in 2005 and the outcome included the suggestion that *Dalbergia stevensonii* should be considered for inclusion in CITES Appendix II (UNEP-WCMC, 2005).

12. References

Anon 2000. Proceedings Of The Sub-Regional Workshop On Data Collection And Outlook Effort For Forestry In The Caribbean. Appendix V country contributions, Belize.

Affre, A., Kathe, W. and Raymakers, C. (2004). Looking under the veneer: implementation manual on EU timber trade control: focus on CITES-listed trees. Traffic Europe. Report to the European Commission, Brussels.

Amnesty International Report 2002. Guatemala. Accessed 07/03/2006. http://web.amnesty.org/web/ar2002.nsf/amr/guatemala?Open.

Bawa, K.S. 1974. Breeding systems of tree species of a tropical lowland community. Evolution 28: 85-92.

Bawa, K.S. and Webb, C.J. 1984. Flower, fruit and seed abortion in tropical forest trees: Implications for the Evolution of Paternal and Maternal Reproductive Patterns. American Journal of Botany. 71(5): 736-751.

Bawa, K.S., Bullock, S.H., Perry, D.R., Coville, R.E. and Grayum, M.H. 1985. Reproductive biology of tropical lowland rainforest trees II. Pollination systems. American Journal of Botany 72(3): 346-356.

Beletsky, L. 1999. *Belize and Northern Guatemala: Ecotraveller's wildlife guide*. Academic Press Inc., London, UK. 350pp.

Belize Forest Department, 2012a. Export data for *Dalbergia stevensonii*: 1999 – 2012

Belize Forest Department, 2012b; Public notice: rosewood moratorium and assessment.

Benitez Diaz, H. 2006. Email to Management Authorities of the Netherlands 6 Dec 2006, subject: Possible listing of three timber proposals.

Berkey, C. 1995. Mayas of Belize and Conservation: The Need to Protect Maya Lands in the Toledo District. Cultural Survival Quarterly. Issue 19.2.

Brewer, S. W. (2011), Vascular plants of the Bladen Nature Reserve: a preliminary list, Report prepared for the Belize Forest Department and the Ya'axche Conservation Trust.

Bird, N.M. 1998. *Sustaining the yield: Improved Timber Harvesting Practices in Belize 1992-1998*. Natural Resources Institute. pp. 188.

Castaños, L.J. The uprising in Chiapas, Mexico: the impact of structural adjustment and forestry reform. *Unasylva* 45(179): 51-55.

Catzim, N. 2003. The development of Cockscomb Basin Wildlife Sanctuary and Crooked Tree Wildlife Sanctuary as centers for co-management of protected areas. Third year intermediate technical report for the European Commission.

Central Intelligence Agency (2012), https://www.cia.gov/library/publications/the-world-factbook/geos/bh.html, Accessed 27 September 2012

Cherrington, E.A., Ek, E., Cho, P., Howell, B.F., Hernandez, B.E., Anderson, E.R., Flores, A.I., Garcia, B.C., Sempris, E., and D.E. Irwin. 2010. "Forest Cover and Deforestation in Belize: 1980-2010." Water Center for the Humid Tropics of Latin America and the Caribbean. Panama City, Panama. 42 pp. Available online: http://www.servir.net/servir_bz_forest_cover_1980- 2010.pdf

Cho, P. and Quiroz, L. 2005. Forest Department, Ministry of Natural Resources, Belmopan, Belize. [Presentation to Timber Tree workshop, Nicaragua February 2005], http://www.unep-wcmc.org/forest/timber/workshops/reports/MA2005.htm.

Cho, P., 2011. Carbon storage and timber stocks in the Golden Stream Corridor Preserve, Toledo District, Belize, Report prepared for the Ya'axche Conservation Trust

Cho, P., 2012. Assessment of *Dalbergia stevensonii* stocks in Toledo, Belize Report produced for the Belize Forest Department

Chudnoff, M. 1984. *Tropical timbers of the world*. USDA Forest Service Agriculture Handbook No. 607.

CIA World Factbook, Belize. Accessed 09/01/06. http://www.cia.gov/cia/publications/factbook/geos/bh.html

Dávila Aranda, P. and Tejeda Godinez, C. 2005. UNAM; SEMARNAT Presentation to Timber Tree workshop, Nicaragua February 2005. http://www.unep-wcmc.org/forest/timber/workshops/reports/MA2005.htm.

Echenique-Marique, R. and Plumptre, R.A. 1990. A guide to the use of Mexican and Belizean timbers. *Tropical Forestry Papers*, 20. Oxford Forestry Institute.

Fairweather, P.N. & D.A. Gray. 1994. "The Land Use of Belize: 1989/92." Land Information Centre, Ministry of Natural Resources. Belmopan, Belize. 15 pp.

Farmer, R.H. 1972. Handbook of hardwoods. 2nd edition. Her Majesty's Stationery Office, London. FAO, 2005. State of the World's forests. 6th edition. Food and Agriculture Organisation of the United Nations, Rome.

Ferroukhi, L. and Echeverría, R. 2003. Decentralized forest management policies in Guatemala. *In* Ferroukhi, L. 2004 (Ed.) Municipal forest management in Latin America. IFOR/IDRC. 236pp.

Flakus, G. 2002. Environmentalists Alarmed Over Mexico's Deforestation Rate. *Voice of America*, 07 June 2002.

Flynn, J.H. 1994. *A guide to useful woods of the world*. King Philip Publishing Co: Portland, Maine, US.

Forest Products Research Laboratory, 1955. Handbook of hardwoods. Her Majesty's Stationery Office, London. 269pp.

Frankie, G.W., Vinson, S.B., Thorp, R.W., Rizzardi, M.A., Tomkins, M. and Newstrom-Lloyed, L.E. 2002. Monitoring: an essential tool in bee ecology and conservation. *In:* Kevan, P and Imperatriz Fonseca, V.L. (Eds). Pollinating bees – the conservation link between agriculture and nature. Ministry of Environment. Brasília. pp. 187-198. http://www.webbee.org.br.

Friendly Forest, 2006. http://www.exotichardwood.com/sleeping_giant.html.

FSC, 2006. Forest Stewardship Council Database on Forest Management Certificate holders. Accessed 27/02/2006. http://www.fsc-info.org/english/dbfme.asp.

Gibbs, P. and Sassaki, R. 1998. Reproductive biology of *Dalbergia miscolobium* Benth (Leguminosae-Papilionoidae) in SE Brazil: the effects of pistillate sorting on fruit-set. Annals of Botany 81: 735-740.

González-Espinosa, M. 2005. Forest use and conservation implications of the *Zapatista* rebellion in Chiapas, Mexico. European Tropical Forest Research Network Newsletter (43-44): 74-76.

INAB, 2006. Instituto Nacional de Bosques. *Listado de las principales especies forestales de Guatemala*. Accessed on 27/01/2006. http://www.inab.gob.gt/espanol/documentos/codigoe.pdf.

IMCG, 2005. News from Belize: transboundary Ramsar Site. International Mire Conservation Group Newsletter December 2005, pp. 28.

ITTO, 2004. International Tropical Timber Organisation Annual Review 2004. http://www.itto.or.jp. ITTO, 2005. Achieving the ITTO objective 2000 and sustainable forest management in Mexico.

Executive summary. Report submitted to the International Tropical Timber Council by the Diagnostic Mission established pursuant to Decision 2(XXIX).

Kline M. 1980. *Dalbergia stevensonii* Honduras Rosewood. In Flynn, J.H. 1994. A guide to useful woods of the world. King Philip Publishing Co: Portland, Maine, US. pp.135-136.

Longwood, F.R. 1962. Present and potential commercial timbers of the Carribean, with special reference to the West Indies, the Guianas and British Honduras. Agriculture Handbook No. 207. Forest Service, U.S.Department of Agriculture. Washington, D.C.

Marín, W.A. and Flores, E.M. 2003. *Dalbergia retusa* Hemsl. *In:* Vozzo, J.A. 2003. Tropical Tree seeds Manual. Part II Species descriptions. United States Department of Agriculture Forest Service. pp. 429-431.

Melgar, W. 2003. Estado de la diversidad biológica de los árboles y bosques de Guatemala. Documentos de Trabajo: Recursos Genéticos Forestales. FGR/53S Servicio de Desarrollo de Rexursos Forestales, Dirección de Recursos Forestales, FAO, Roma. (Inédito).

Meerman, J.C., Epting, J. Steininger, M. and J. Hewson. 2010; *Forest Cover and Change in Belize circa 1990-2000-2004.* Preliminary draft. Belize Tropical Forest Studies / Conservation International. 12 pp.

Meerman, J.C., Herrera, P. and Howe, A. 2003. Rapid ecological assessment Sarstoon Temash National Park, Toledo District, Belize. Volume I. Report prepared for the Sarstoon Temash Institute for Indigenous Development. http://biological-diversity.info/Downloads/SarstoonTemash_REA_Report_s.pdf.

Meerman, J.C. and Matola, S. (Eds) 2003. The Columbia River Forest Reserve: Little Quartz Ridge expedition, a biological assessment. Columbia University printing services. pp 93. http://biological-diversity.info/publications.

Ministry of Forestry, Fisheries and Sustainable Development (MFFSD), 2012; *Public Notice: rosewood moratorium* (issued via the Belize Press Office).

MOBOT. 2006. TROPICOS: Mesoamerican Checklist. Accessed 08/03/2006 http://mobot.mobot.org/W3T/Search/meso.html.

Mohana, G.S., Shaanker, R.U., Ganeshaiah, K.N., and Dayanandan, S. 2001. Genetic relatedness among developing seeds and intra fruit seed acortion in *Dalbergia sissoo* (Fabaceae). American Journal of Botany 88(7): 1181-1188.

Mongabay, 2006. Guatemala: environmental profile. Accessed 07/03/2006. http://rainforests.mongabay.com/20guatemala.htm.

Newman, D.H. 2004. (Case Study). Evaluating the Opportunity Costs in Establishing a Nature Reserve. *In:* Groom, M.J., Meffe, G.K and Carroll, R.C. (Eds) Principles of conservation biology. Third edition. Sinauer Press. pp. 529-531.

New York Botanic Garden, 2006. Virtual Herbarium. Accessed 08/03/2006. http://sciweb.nybg.org/science2/VirtualHerbarium.asp.

Parker, T.A., Holst, B.K., Emmons, L.H. and Meyer, J.R. 1993. A Biological Assessment of the Columbia River Forest Reserve, Toledo District, Belize. RAP Working Papers 3: 86pp.

Parkswatch, 2004. Park Profile – Mexico Montes Azules Biosphere Reserve. http://www.parkswatch.org/.

Protected Areas Conservation Trust. Accessed 09/01/06. http://www.pactBelize.org/index.php.

Rasolomampianina, R., Bailly, X., Fetiarison, R., Rabevohitra, R., Béna, G, Ramaroson, L., Raherimandimby, M., Moulin, L., de Lajudie, P., Dreyfus, B. and Avarre, J-C. 2005. Nitrogen-fixing nodules from rose wood legume trees (*Dalbergia* spp.) endemic to Madagascar host seven different genera belonging to α- and β-Proteobacteria. Molecular Ecology (14)13: 4135.

Record, S.J. and Hess, R.W. 1943. Timbers of the New World. Yale University Press, New Haven; H. Milford, Oxford university press, London.

Rendle, B.J. 1969. World timbers. Volume 2, North and South America. University of Toronto Press. Ribiero, R.A, Simões Ramos, A.C., de Lemos Filho, J.P. and Lovato, M.B. 2005. Annals of Botany 95: 1171-1177.

Ricker, M. and Daly, D.C. 1997. Botánica económica en bosques tropicales. Editorial Diana, Mexico.

Richter, H.G. 2006. Pers. Comm. (email) 27 Nov 2006 from Dr. H.G. Richter, Departamento de Madera, Celulosa y Papel, Universidad de Guadalajara, Jalisco, Mexico, concerning possible inclusion of *Cedrela odorata*, *Dalbergia retusa* and *Dalbergia stevensonii* in CITES Appendix II.

Royal Botanic Gardens, Kew 2006. Electronic Plant Information Centre. Published on the Internet; http://www.kew.org/epic/ [accessed 8 February 2006].

Ruscalleda, J. (2011); *Land Use/Land Cover Change in the Maya Golden Landscape: 1980 – 2010.* Report produced for the Ya'axché Conservation Trust

Sever, T.L. 1998. Validating prehistoric and current social phenomena upon the landscape of the Peten, Guatemala. *In:* Liverman, D., Moran, E.F., Rindfuss, R.R. and Stern, P.C. (Eds), People and pixels: lining remote sensing ansd social science. National Academy Press, Washington, D.C. pp. 145-163.

Standley, P.C. 1927. Two new species of *Dalbergia* from British Honduras. Tropical Woods 12: 4-5.

Standley, P.C. and Record, S.J. 1936. The forests and flora of British Honduras. Field Museum of Natural History, Chicago. Publication 350, Botanical series Vol XII.

Standley P.C. and Steyermark J.A. 1946. Leguminosae. Flora of Guatemala. Fieldiana, Botany 24(5): 1-368.

Stevenson, D. 1927. The Honduras Rosewood. Tropical Woods 12: 1-3.

Stevenson, D. 1928. Types of forest growth in British Honduras. Tropical Woods 14: 20-25. Szejner, M. 2005. Herbario FAUSAC, Guatemala. Presentation to Timber Tree workshop, Nicaragua, February 2005. http://www.unep-wcmc.org/forest/timber/workshops/reports/MA2005.htm.

Titmuss, F.H. 1971. Commercial timbers of the world. The Technical Press Ltd., London. 351pp.

Titmuss, F.H. and Patterson, D. 1988. Commercial timbers of the world. Fifth Edition. Gower Technical, Aldershot. 339pp.

USAID, 2003. Guatemala biodiversity and tropical forest assessment. United States Agency for International Development.

Walker, P. and Walker, Z., 2009, *State of Belize's Protected Areas*, Report produced by Wildtracks.

The World Bank (2012); http://data.worldbank.org/indicator/SP.POP.GROW Accessed 27 September 2012

WCMC 1991. World Database on Protected Areas. WCMC Site sheet: Cockscombe Basin Wildlife Sanctuary. Accessed 10/01/2006. http://sea.unep-wcmc.org/sites/pa/0549q.htm.

WCMC 1999. Contribution to an evaluation of tree species using the new CITES criteria. Compiled by the World Conservation Monitoring Centre on behalf of the CITES Management Authority of the Netherlands. Unpublished. 440pp.

UNEP-WCMC. 2005. Timber trees in international trade: Strategies for sustainable use. Mesoamerica 2005 Workshop Report. http://www.unep-wcmc.org/forest/timber/index.htm.

Zadro, M.G. 1975. Woods used for woodwind since the 16th Century 2: a descriptive dictionary of the principal woods mentioned. Early Music 3(3): 249-251.

Zamora, N. 2000. Nuevas especies y combinaciones en Leguminosas de Mesoamérica. Novon 10: 175-180.

Zisman, S. 1996. The directory of Belizean protected areas and sites of nature conservation interest. Second Edition. N.

DALBERGIA TREE/SHRUB SPECIES OF MESOAMERICA

Species	Common names	Notes	Threat status	BZ	CR	SV	GT	HN	MX	NI	PA	Habit
D. brownei (Jacq.) Urb.	Coin vine; Brown's Indian rosewood (a confusing name - the species is confined to American continent).	Occurrence reported in the Caribbean, Meso-America, North America, South America and the United States [9] [13]. *D. brownii* and *D. brownei* (Jacq.) Schinz are synonyms of *D. brownei* [6]. **Possibly in international trade** [12].		x	x	x	x	x	x	x	x	Woody vine/shrub [13].
D. calderonii Standl.		Occurrence reported in Mesoamerica only [9]. Species with two varieties, var. *calderonii* and var. *molinae*. The var. *molinae* occur in Honduras and Nicaragua [10] [13]. **No evidence of international trade.**				x		x	x	x		Tree [13].
D. calycina Benth	Granadillo [9]; cahuirica (Mexico), calyxlike rosewood, palissandre à faux calice [15].	Occurrence reported in Mesoamerica only [9] [13]. **No evidence of international trade.**			x	x	x	x	x	x		Tree [13].
D. chontalensis Standl. & L.O. Williams		Occurrence reported in Mesoamerica only [9] [13].			x	x	x	x		x		Shrub [13].
D. congestiflora Pittier	Camatillo rosewood, campinchirán [17].	Occurrence reported in Mesomerica only [9] [13]. **In international trade** [11][12][1].	In danger of extinction [24]						x			Tree [13].
D. cubilquitzensis (Donn. Sm.) Pittier	Granadillo [9].	Occurrence reported in Mesoamerica only [9] [13]. **In international trade** [11].			x				x	x		Tree [13].
D. cuscatlanicum Standl.	Cuscatlán retuse rosewood, palissandre rétus de Cuscatlán [15].	Occurrence reported in Mesoamerica only [9]. Other author regard this as *D. retusa* var. *cuscatlanica* (Standley) Rudd [10].			x		x		x		x	Tree [9].
D. ecastaphyllum (L.) Taub.	Bejuco de peseta, bugi, clous , maraimaray, maray-maray, marmeleiro-da-praia, marmelo, palo de pollo [9]. For more common names refer to [15].	Widespread species that occur in Africa, Asia, Caribbean, North America, Mesoamerica, South America and India [9] [13]. **No evidence in international trade.**	Not threatened [9].	x	x		x	x	x	x	x	Woody vine/shrub [13].
D. frutescens (Vell.) Britton	Brazilian tulipwood, kingwood, tulip wood, bois de rose, bahia rozehout, violet wood, pinkwood, pau rosa [16].	Mainly S. America [14]. **In international trade** [1] [12].			x							Woody vine/shrub [13].

Species	Common names	Notes	Threat status	BZ	CR	SV	GT	HN	MX	NI	PA	Habit
D. funera Standl.	Funera rosewood, palissandre funera, ébano, funera (El Salvador) [15].	Occurrence reported in Mesoamerica only [9].The wood is of wide importance in carpentry and construction [4]. Threatened by agriculture, logging, land conversion and invasive species [4].	Endangered GT [2] and SV [3], DD [4].			x	x					Tree [9].
D. glabra (Mill.) Standl.	Logwoodbrush rosewood, logwood brush (Belize), palissandre glabre, mayagua (Guatemala), cibix (Maya, Belize and Guatemala), ixcipix, muc (Maya, Guatemala), muk (Maya, Belize) [15].	Occurrence reported in Mesoamerica only [9] [13]. **No evidence of international trade.**		x	x	x	x	x	x	x		Woody vine/shrub [13].
D. glomerata Hemsl.	Glomerate rosewood; palissandre à glomérules [15].	Occurrence reported in Mesoamerica only [9][13].	VU A1c [4].				x	x	x			Tree [13].
D. granadillo Pittier	Granadillo [5].	Occurrence reported in Mesoamerica only [9] [13]. **In international trade** [18][19][11].	Threatened [5]. Species in danger of extinction [24]			x			x			Tree [13].
D. intibucana Standl. & L.O. Williams		Occurrence reported in Mesoamerica only [9] [13].	CR C2a [4].					x				Tree [13].
D. melanocardium Pittier	Blackheart rosewood, palissandre à cœur noir; chapulaltapa; ebano [15].	Occurrence reported in Mesoamerica only [9] [13].			x	x	x	x	x			Tree [13].
D. monetaria L.f.	Bejuco de Peseta, clous, membrillo, money bush, palo de brasilete [13].	Occurrence reported in the Caribbean, Mesoamerica and South America [9] [13].		x	x		x	x	x	x	x	Woody vine/shrub [13].
D. palo-escrito Rzed.	Palo escrito [20].	Occurrence reported in Mesoamerica only [9] [13]. **In international trade** [20].							x			Tree [13].
D. retusa Hemsl.	See *D. retusa* proposal.	See *D. retusa* proposal.	VU A1acd [4].	x	x	x	x	x	x	x	x	Tree [13].
D. stevensonii Standl.	See *D. stevensonii* proposal.	See *D. stevensonii* proposal.		x			x		x			Tree [13].
D. tilarana N. Zamora	Tilarán rosewood, palissandre de Tilarán [15].	Occurrence reported in Mesoamerica only [12] [13].			x					x	x	Tree [13].
D. tucurensis Donn. Sm.	Granadillo [21] [22] [23].	Occurrence reported in Mesoamerica only [9] [13]. Certified wood available in Nicaragua [7]. **In international trade** [21] [22] [23].		x	x	x	x	x	x			Tree [13].

Annex 2

Manual práctico para la identificación de especies estrategicas protegidas CITES

Caoba, cedro y rosúl

Gobierno de Guatemala
Consejo Nacional de Áreas Protegidas
FONACON

Manual para la identificación de especies estratégicas CITES.

COORDINADOR DEL PROYECTO

Ing. Hedy Josue Godínez Pulido

REVISADO POR

Ing. Cesar Beltetón Chacón

Autoridad Científica CITES, Guatemala

Ing. Juan Jose Castillo Mont

Especialista en botánica

Lic. Abimael Reynoso.

Director Ejecutivo NPV

Lic. Héctor Monroy

Director Técnico NPV

Peciolo: Parte de la hoja que une el limbo con el tallo. Se inserta en el centro de la base del limbo. Normalmente, es cilíndrico y estrecho. Por el interior de éste trascurren los vasos conductores. La hoja que carece de éste se le domina **sésil**.

Estípula: Son apéndices que tienen una forma diversa, situados sobre la base foliar.

Vaina: Punto de unión del pecíolo con el tallo. Ésta puede rodear el tallo, muy claramente, o no existir. Ésta es más ancha que el pecíolo.

Ápice: Extremo superior de la hoja.

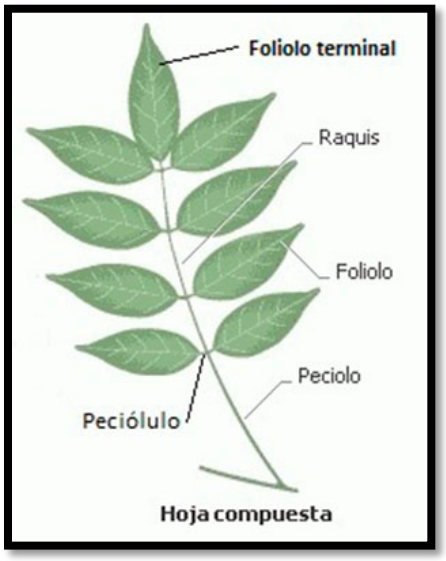
Base: Extremo inferior de la hoja, la cual ésta se une al pecíolo y de donde se extiende el nervio principal o nervios principales.

Folíolo: Cada una de las piezas separadas que forman parte del limbo en las hojas compuestas.

Folíolo terminal: Folíolo que se encuentra más al ápice en las hojas compuestas imparipinnadas (con un número de folíolos impar).

Peciólulo: Peciolo de cada folíolo en las hojas compuestas.

Raquis: Estructuras lineares que forman el nervio principal en las hojas compuestas o inflorescencias en forma de espiga. Ésta une los diferentes peciólulos con su folíolo, en este tipo de hojas.



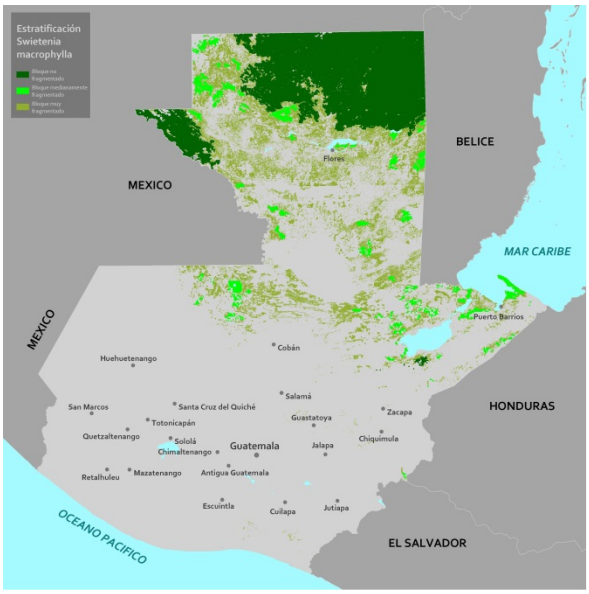
Fuente: http://bionaturalist.blogspot.com/2010_06_27_archive.html

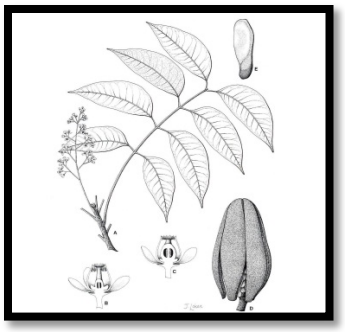
Los términos que se describen en la figuran anterior son muy importantes y básicos para diferenciar las 2 especies de caoba y las dos especies de rosúl.

***Swietenia macrophylla* King**

Caoba de hoja ancha

Estrato de la especie en el territorio nacional (Fuente: Inventario nacional Fase I)





Fuente: Pennington

Árbol que puede alcanzar hasta 35-40 m de altura

Tronco recto y cilíndrico, sin ramas hasta aproximadamente 25 m.

La corteza es reticulada, marrón grisáceo a menudo con marcas rojizas.

Foto: Hedy Godínez

Hojas compuestas, agrupadas en el extremo de las ramas, usualmente paripinnadas.

Raquis glabro. Foliolos opuestos a sub-opuestos

Con peciolulo de 0,5 hasta 1,2 cm de largo, 2 a 8 pares,

Ambas superficies de los foliolos (hojas) son glabras (sin vellosidad), de color verde oscuro brillante.

Fuente: Inventario Nacional/M.Manzanero

Flores unisexuales, inflorescencias axilares o subterminales, por lo general más cortas que las hojas, glabras.

Fruto en cápsula erecta, elongado a elongado.

Diferencias con la Caoba del Sur

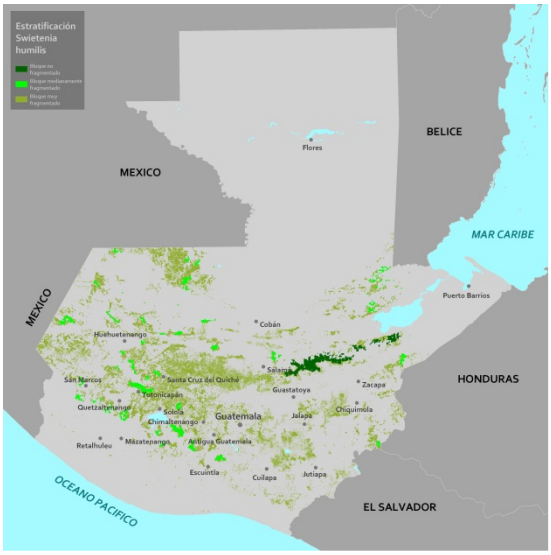
La caoba del norte tiene peciólulo y la del sur carece de estos, los foliolos (hojas) están unidos directamente al peciolo.

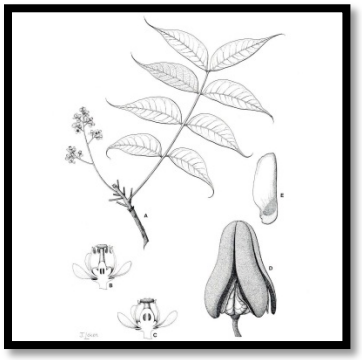
Los ápices de la caoba del norte son agudos o muy acuminados, bases irregulares y los foliolos (hojas) de la caoba del sur son caudados a largamente acuminado y la base redondeada a aguda, observar los dibujos de Pennington.

Swietenia humilis

Caoba del Sur

Estrato de la especie en el territorio nacional (Fuente: Inventario nacional Fase I)





Fuente: Pennington

Hojas agrupadas en las terminaciones de las ramas más finas, paripinnadas, de 12 a 30 cm de longitud,

El Raquis es glabro. Foliolos opuestos o subopuestos, de 2 hasta 7 pares.

No tiene peciólulo.

Flores unisexuales, inflorescencias axilares aunque a veces subterminales.

Fruto en cápsula erecta, ovoide algunas veces elongado ovoide de color marrón grisáceo.

Vive en bosques semideciduos secos y sabanas desde 0-1200 m s.n.m.

Diferencias con la Caoba del Norte

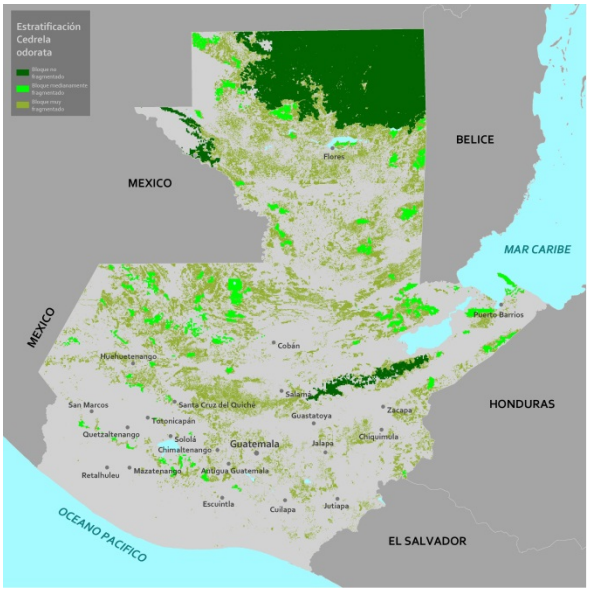
La caoba del sur no tiene peciólulo, lo contrario a la caboa del norte que si posee, los foliolos (hojas) están unidos al peciolo por el peciólulo

Los ápices de la caoba del norte son agudos o muy acuminados, mientras que los de la caoba del sur son largamente acuminados, observar los dibujos de Pennington.

Cedrela odorata

Cedro

Mapa del estrato de la especie en el territorio nacional (Fuente: Inventario Nacional Fase I)



Fuste: recto, bien formado,

Corteza: externa amarga y de color rojizo, profundamente fisurada Interna color rosada.

Posee olor a ajo y sabor amargo (Salas, 1993).

Hojas: compuestas, alternas paripinnadas y grandes, hasta de 1 m de largo (Salas, 1993).

Peciolos de 8 – 10 mm. de largo, delgados,

Foliolos 10-30 opuestos, oblicuamente lanceolados, comúnmente de 4.5 a 14 cm (Salas). de largo y 2.0 (Salas) a 4.5 cm. de ancho,

Glabros o más o menos glabros o puberulentos en las venas del envés (Aguilar, 1992).

Flores: Masculinas y femeninas en la misma inflorescencia.

Frutos: en cápsulas con dehiscencia longitudinal septicida en estado inmaduro, poseen un color verde y al madurar se tornan café oscuro (PROSEFOR, 1997).

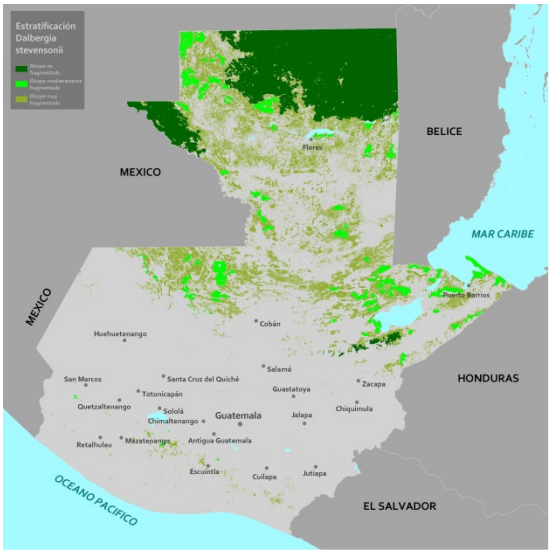
Fuente: Inventario Nacional/M.Manzanero

Fuente: Inventario Nacional/M.Manzanero

Dalvergia stevensoni

Rosúl

Mapa del estrato de la especie en el territorio nacional (Fuente: Inventario Nacional Fase I)



El envés de las hojas no tiene vellosidad

Un árbol grande o mediano tamaño 15-30 metros de altura.

Hojas 5-7, con peciólulos de 4-5 mm. largo, elípticas u oblongo-elípticas, 3.5-5.5 cm. largo, 2.5-3 cm.

Obtuso de ancho, o redondeadas en el ápice, a veces emarginado,

Color verde oscuro por encima, brillante, más pálido glabro (sin vellosidad),

El envés densamente pero minuciosamente leonado-seríceo (con pelos o vellos cortos que tienen un brillo como de seda).

Las ramas muy escasamente puberulentos (cubierto con pelos cortos); cáliz casi glabro (sin vellos); pétalos glabros (sin vellos)

Fuente: Inventario Nacional/J. Castillo

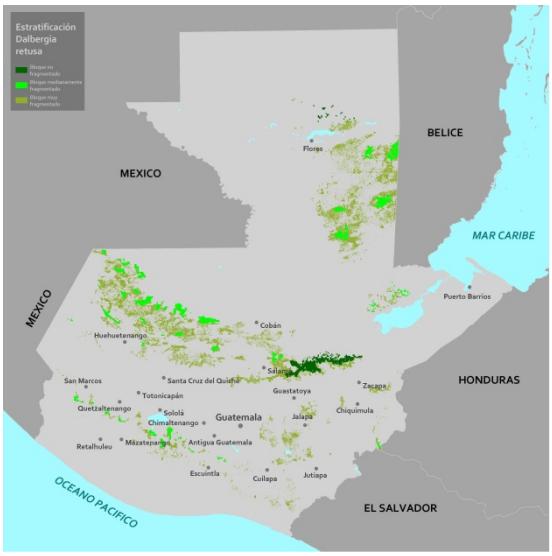
Fuente: Inventario Nacional

Fuente: Inventario Nacional

Dalvergia retusa

Rosúl

Mapa de distribución de la especie en el territorio nacional (Fuente: Inventario Nacional Fase I)



Conocido también como granadillo y cocobolo.

El fuste rugoso, color pardo, cascarudo.

El envés de las hojas presenta vellosidad o casi limpio (pubescente)

La hoja es imparipinada de 7 a 15 hojitas, de 4 a 7 cms de largo cada una.

Su floración es en los meses de febrero y marzo.

Las flores son de color blanco de 1,5 cm de largo.

El fruto es una vaina de 7 a 15 cm de largo.

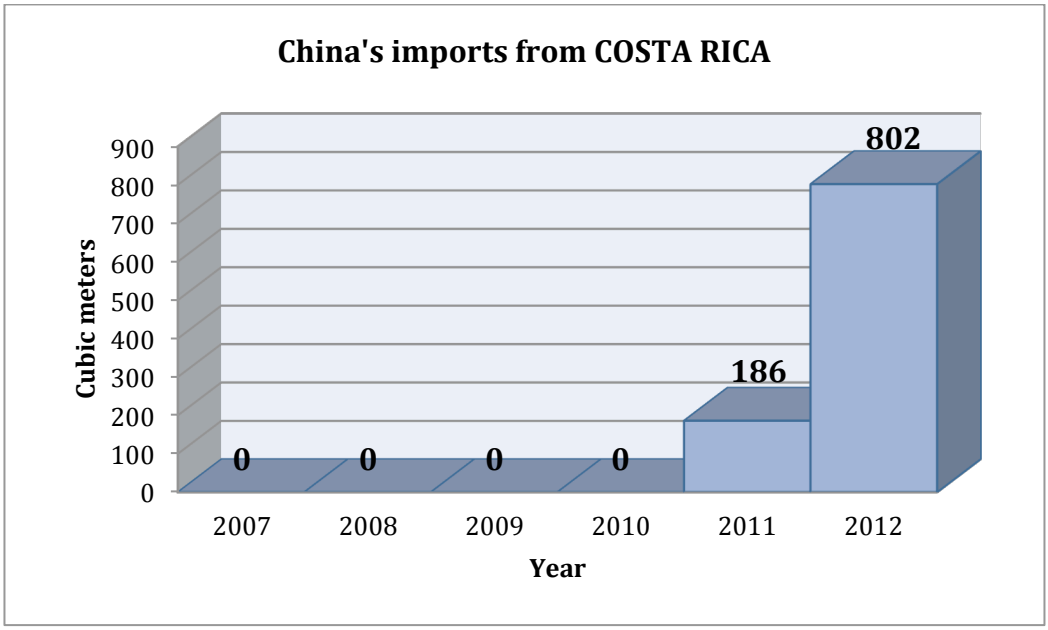
http://fm2.fieldmuseum.org/plantguides/view.asp?chkbox=3363

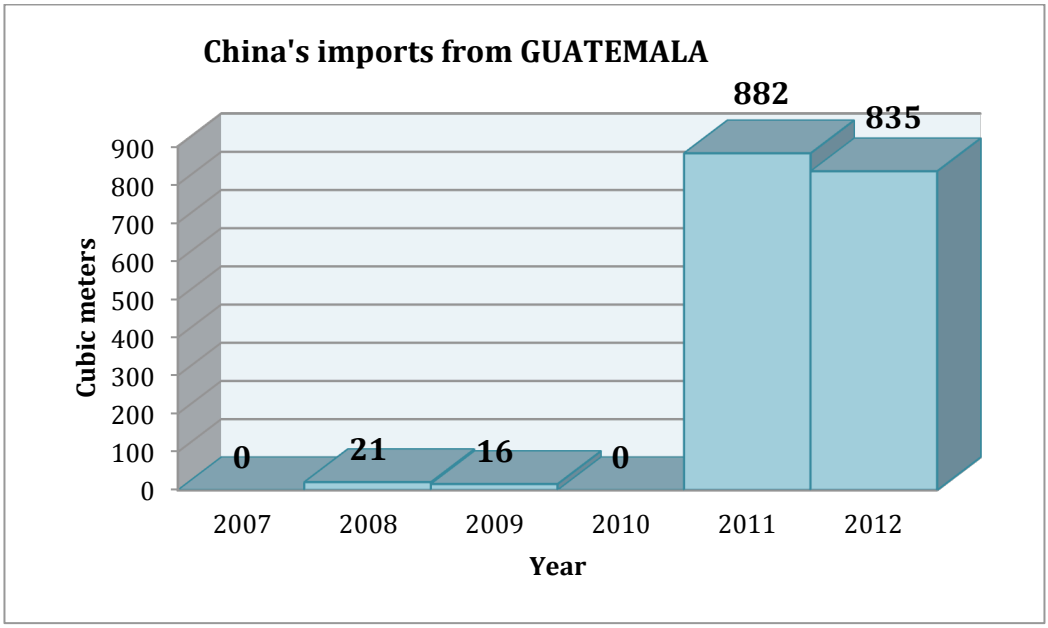
Guatemala 2012

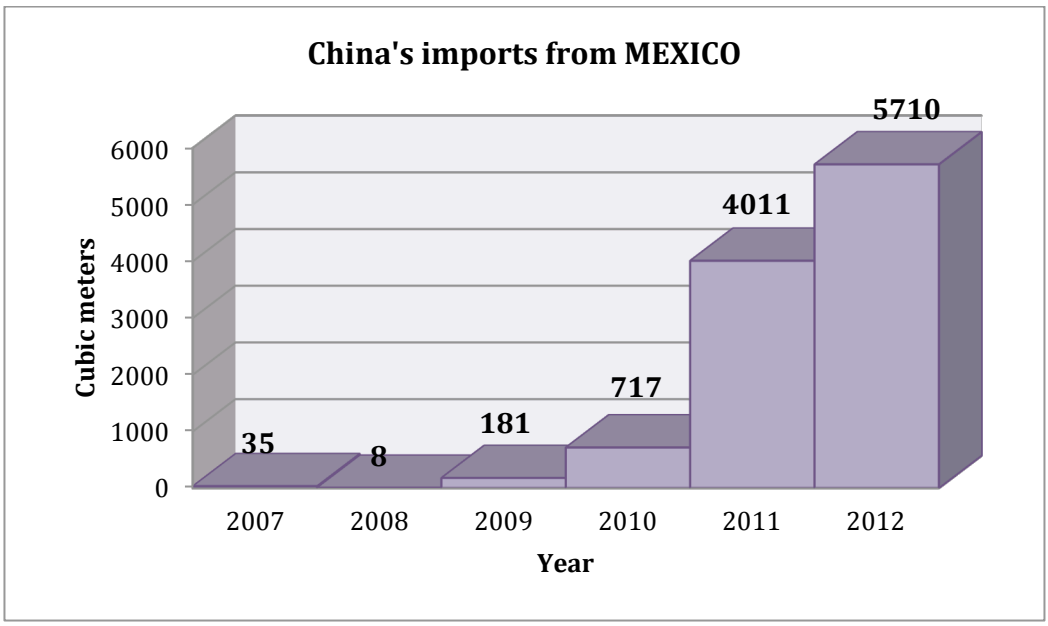
http://fm1.fieldmuseum.org/vrrc/?language=esp&page=results&genus=Dalbergia&PHPSESSID=8cad2d5de1ba1c5e69b28ea190d02471&rpno=3&PHPSESSID=8cad2d5de1ba1c5e69b28ea190d02471

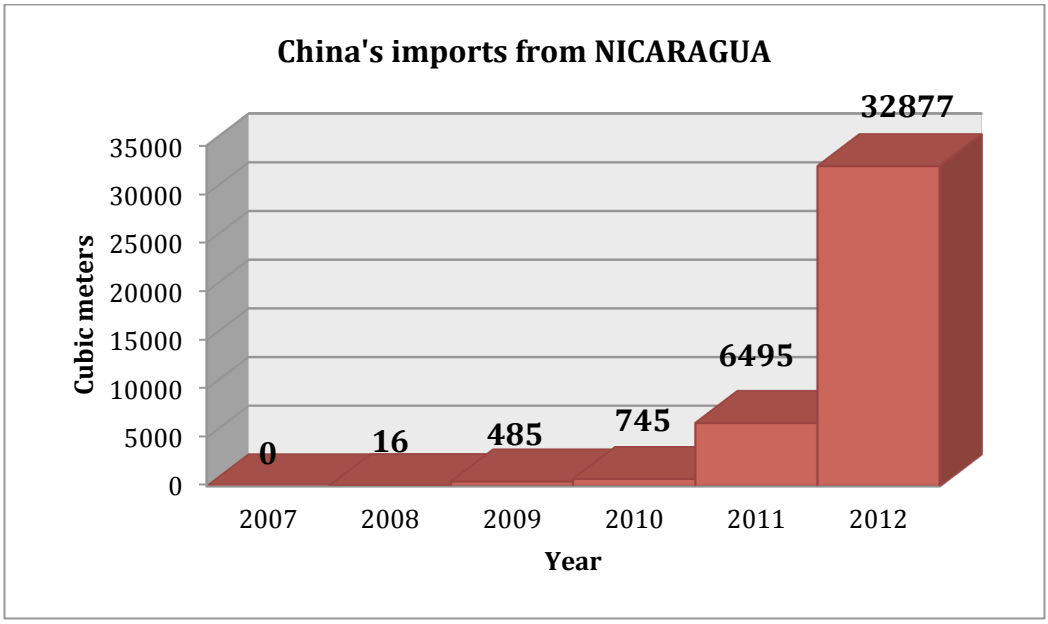
China's data on imports of logs from Central American countries

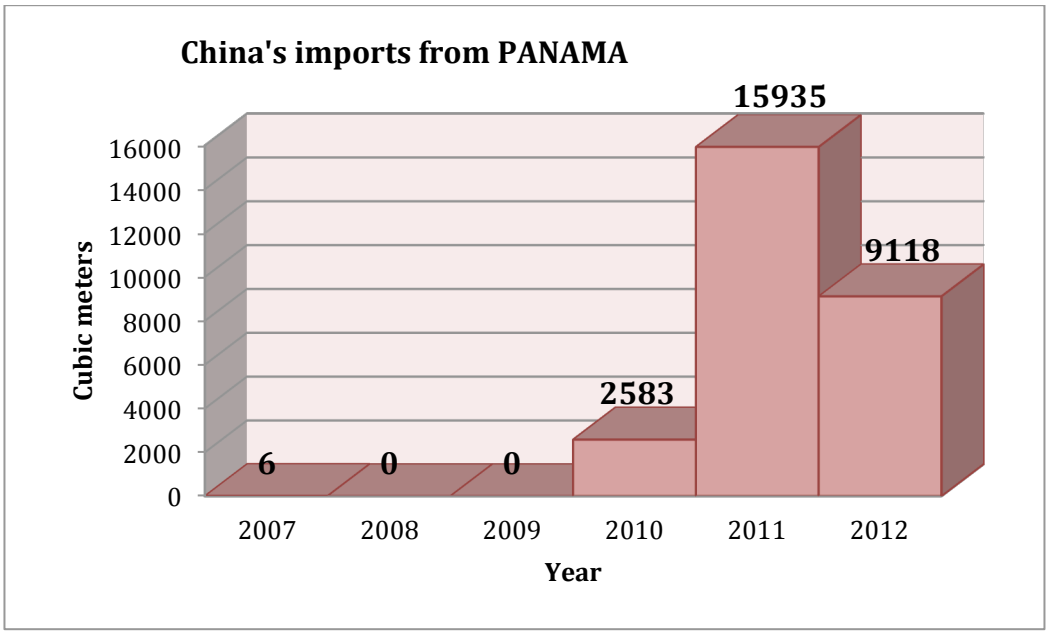
Source: based on 'China Customs' (General Administration of Customs of the People's Republic of China).
Data should not be cited to more than two significant figures.
Data is for logs reported as 'rosewood'/ 'padauk' code number 44039930




China's imports from GUATEMALA
Cubic meters
900
800
700
600
500
400
300
200
100
0
0
21
16
0
882
835
2007
2008
2009
2010
2011
2012
Year


China's imports from MEXICO
Cubic meters
6000
5000
4000
3000
2000
1000
0
35
8
181
717
4011
5710
2007
2008
2009
2010
2011
2012
Year





Negligible quantities recorded for El Salvador and Honduras.

BELIZE PRESS OFFICE

•Phone: 501-822-0094 or 822-0092 •Fax: 501-822-2671 • website: www.belize.gov.bz

Rosewood Moratorium

Belmopan, 16th March, 2012. The Ministry of Forestry, Fisheries and Sustainable Development hereby informs the public that a moratorium on the harvesting and exportation of rosewood (*Dalbergia stevensonii*) is being declared with immediate effect until further notice.

Rosewood harvesting in southern Belize has increased exponentially over the past two years in direct response to a growing demand for raw rosewood timber from the Asian markets. The increased rosewood logging has led to a near depletion of the specie in national lands. Private lands and protected areas are now being targeted to meet this insatiable demand.

The moratorium is a necessary measure 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 and to institute a rigorous regulatory framework throughout the country.

The Ministry of Forestry, Fisheries and Sustainable Development is committed to advancing fair trade, equitable benefit sharing and the principles of sustainable and wise use of resources. In this regard, the Ministry assures the public that it will do due diligence to ensure that we honor the laws of the country and that those who have abided by the laws do not suffer undue losses.

For further information please contact the Chief Forest Officer, Ministry of Forestry, Fisheries and Sustainable Development at 501-802-1524 or 501-802-2079. e-mail: cfo@mnrei.gov.bz

---

FOREST DEPARTMENT
Ministry of Forestry, Fisheries and Sustainable Development
Forest Drive, Belmopan, Belize
Tel: (501) 802-1524 ● Fax: (501) 802-1523
Email: fdsecretary@mnrei.gov.bz

Annex 5

Belmopan, September 25, 2012

Rosewood exports 1999 to 2012

Year	Total board feet exported	Total cubic meters exported[1]
1999 to Jan 2012 (Before the rosewood moratorium)	10,892,972.00	25,704.55

Year	Total board feet exported[2]	Total cubic meters exported
February to July 2012 (After the rosewood moratorium)	583,908.75	1,377.87

WCMC Data on *Dalbergia stevensonii*

Year	Appendix	Taxon	Importer	Exporter	Origin	Imp Quantity	Imp Unit	Imp Term	Imp Purpose	Imp Source	(Re)Exp Quantity	(Re) Exp Unit	(Re) Exp Term	(Re) Exp Purpose	(Re) Exp Source
2008	3	Dalbergia stevensonii	CN	BZ		13.59	CUM	sawn wood	T	W					
2008	3	Dalbergia stevensonii	DE	BZ		6'929	CUM	sawn wood	T	W					
2008	3	Dalbergia stevensonii	JP	DE	GT	36'723	CUM	sawn wood	T	W	37.27	CUM	sawn wood	T	W
2008	3	Dalbergia stevensonii	KR	DE	GT						0.12	CUM	sawn wood	T	W
2008	3	Dalbergia stevensonii	US	DE	GT						0.053	CUM	sawn wood	T	W
2008	3	Dalbergia stevensonii	US	DE	GT						63	KIL	sawn wood	T	W
2008	3	Dalbergia stevensonii	DE	GT		57.55	CUM	sawn wood	T	W					
2008	3	Dalbergia stevensonii	ES	GT		5	CUM	sawn wood	T	W					
2008	3	Dalbergia stevensonii	JP	GT		8	CUM	sawn wood		W					
2008	3	Dalbergia stevensonii	US	GT		19	CUM	sawn wood	T	W					
2008	3	Dalbergia stevensonii	FR	US	GT						3	CUM	sawn wood	T	W
2008	3	Dalbergia stevensonii	TW	US	GT						2	CUM	sawn wood	T	W
2009	3	Dalbergia stevensonii	JP	DE	GT	250'721	CUM	sawn wood	T	W	250'721	CUM	sawn wood	T	W
2009	3	Dalbergia stevensonii	JP	DE	GT	20205	KIL	sawn wood	T	W	25180	KIL	sawn wood	T	W

Year	Appendix	Taxon	Importer	Exporter	Origin	Imp Quantity	Imp Unit	Imp Term	Imp Purpose	Imp Source	(Re)Exp Quantity	(Re) Exp Unit	(Re) Exp Term	(Re) Exp Purpose	(Re) Exp Source
2009	3	Dalbergia stevensonii	US	DE	GT						0.07067	CUM	sawn wood	T	W
2009	3	Dalbergia stevensonii	US	DE	GT						12	KIL	sawn wood	T	W
2009	3	Dalbergia stevensonii	JP	ES	GT	0.15	CUM	sawn wood	T	O					
2009	3	Dalbergia stevensonii	DE	GT		41.8	CUM	sawn wood	T	W					
2009	3	Dalbergia stevensonii	ES	GT		2.27	CUM	sawn wood	T	W					
2009	3	Dalbergia stevensonii	US	GT		200'409	CUM	sawn wood	T	W					
2009	3	Dalbergia stevensonii	AR	US	GT	0.47	CUM	sawn wood	T	W	470000	CUM	sawn wood	T	W
2009	3	Dalbergia stevensonii	ES	US	GT	0.74	CUM	logs	T	O					
2009	3	Dalbergia stevensonii	ES	US	GT						1	CUM	sawn wood	T	O
2009	3	Dalbergia stevensonii	PL	US	GT						1	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	JP	DE	GT	15275	KIL	sawn wood	T	W	10.3	KIL	sawn wood	T	W
2010	3	Dalbergia stevensonii	JP	DE	GT						3'417	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	TR	DE	GT						237	KIL	sawn wood	T	W
2010	3	Dalbergia stevensonii	US	DE	GT	1372	KIL	logs	T	W					
2010	3	Dalbergia stevensonii	US	DE	GT						10	KIL	sawn wood	T	W
2010	3	Dalbergia stevensonii	CN	GT							40.5	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	DE	GT		165'099	CUM	sawn wood	T	W	16.51	CUM	sawn wood	T	W

Year	Appendix	Taxon	Importer	Exporter	Origin	Imp Quantity	Imp Unit	Imp Term	Imp Purpose	Imp Source	(Re)Exp Quantity	(Re) Exp Unit	(Re) Exp Term	(Re) Exp Purpose	(Re) Exp Source
2010	3	Dalbergia stevensonii	ES	GT		9	CUM	sawn wood	T	W	9	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	FR	GT							6	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	US	GT		21	CUM	sawn wood	T	W	14.97	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	FR	US	GT						4	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	PL	US	GT						1	CUM	sawn wood	T	W
2010	3	Dalbergia stevensonii	SK	US	BZ	26.1	KIL	sawn wood							
2011	3	Dalbergia stevensonii	CN	DE (GERMANY)	GT						117	KIL	sawn wood	T	W
2011	3	Dalbergia stevensonii	JP	DE	GT						0.4032	CUM	sawn wood	T	W
2011	3	Dalbergia stevensonii	JP	DE	GT						3187	KIL	sawn wood	T	W
2011	3	Dalbergia stevensonii	US	DE	GT						1816	KIL	sawn wood	T	W