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



Fourteenth meeting of the Conference of the Parties The Hague (Netherlands), 3-15 June 2007

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. CoP13) Annex 2 (a), Paragraph B.

B. Proponent

Germany, on behalf of the European Community Member States acting in the interest of the European Community. (This proposal has been prepared by The Netherlands.)

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

Taxonomic categorisation of the genus is difficult and estimates of the total number of species vary between 100 and 200 (CITES, 1992).

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: ---

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 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. As it is not available from plantations, it follows that timber must be sourced from wild populations. In spite of its rarity, there are reports of high levels 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 may lead to growing pressure to turn to this species to meet demand.

This document suggests that *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. It is restricted to the southern part of 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 is 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).

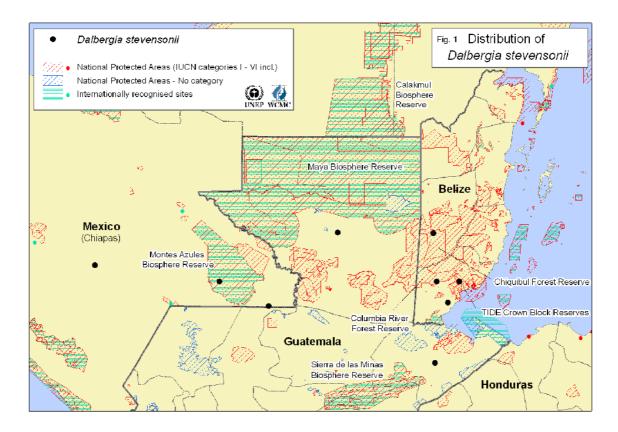
D. stevensonii is included on the list of principal forest species of **Guatemala** (INAB, 2006). MOBOT (2006) records the following specimens with coordinates from **Guatemala**:

- 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.

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 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).

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/m³ 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

Protection of the species from unsustainable logging will allow the 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 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 and is vulnerable to road construction opening the area to allow access for logging and other purposes (Newman, 2004). 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" (www.woodwriteltd.com); "difficult to obtain" (www.lmii.com).

Although confined to a small area, in **Belize** *D. stevensonii* has been reported to occur in fairly large patches within its habitat (Chudnoff, 1984). Little is known of the population size of this species, or the genus, in **Guatemala** (Sjezner, 2005). 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 Honduras¹, where large volumes await utilization" (Longwood, 1962).

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. In 2000, forest was reported to cover only 59.1% of the land area of the country. Deforestation is continuing, with the annual rate of change of forest cover 1999-2000 reported to be -2.3% (representing 36,000 ha; FAO, 2005).

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 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.

5. Threats

Throughout its range, deforestation due to a number of causes appears to be the greatest threat to the survival of the species. Demand for the precious wood will place pressure on the remaining stocks. The success of national legislation to protect the species from logging has not been evaluated.

D. stevensonii is threatened in Belize by genetic erosion and habitat loss (Cho and Quiroz, 2005). Southern Belize is a relatively under-developed region that is being inundated with colonists practising slash-and-burn agriculture (Newman, 2004). The Government of Belize has very little money to manage the protected areas or enforce environmental regulations. One important example 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 (2.33% 2005 estimate, CIA World Factbook) and increased accessibility to southern areas is putting additional pressure on *Dalbergia* habitats in Belize (Newman, 2004).

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Now Belize.

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.

The main use is for the manufacture of bars for marimbas and xylophones (Kline, 1980), for which it is a preferred species (Farmer, 1972; 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).

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.cbguitars.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.

It is also used for making novelty and craft items (Cho and Quiroz, 2005, Echenique-Marique and Plumptre, 1990) and speciality items including knife handles and veneers for fine furniture (Farmer, 1972; Ricker and Daly, 1997).

A search on eBay (United States of America) for "Honduras Rosewood" (http://search.ebay.com, 13 February 2006) listed 25 small, high-quality wood items, including: pen blanks; crochet hooks; and small (c. 1 m) pieces of timber. All finished items were reported by the four vendors to have been manufactured in the United States, thus the international trade appears to be in timber.

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).

In Belize, wood is removed from the forest in log form and transported to sawmill sites in long lengths where it is processed (Anon, 2000). 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).

ITTO (2004) does not report any export or import trade in *D. stevensonii*. Patchy, *ad hoc* records of trade in the species have been reported. Systematic forestry began in **Belize** (British Honduras) 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 (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).

In 2004, 254.65 m³ 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).

Suppliers on the internet include: www.southernlumber.com; www.eisenbran.com; www.eisenbran.com; https://www.eisenbran.com; www.eisenbran.com; https://www.eisenbran.com; <a href="https

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).

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.

Illegal logging was reported to be a significant problem in Belize (Bird, 1998), even within protected areas (Section 8.5).

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 m³ 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 and that in **Belize** dimensional lumber products are no longer available locally (Cho and Quiroz, 2005), 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*.

In spite of felling restrictions in the country (Section 7.1), several international suppliers give the source of the wood as originating from Belize (for example www.gilmerwood.com, www.gilmerwood.com, www.gilmerwood.com, www.gilmerwood.com, gule the www.gilmerwood.com, www.gilmerwood.com, <a href="www.gilmer

7. Legal instruments

No information.

7.1 National

In Belize, there is local trade only in finished products and dimensional lumber is rare. Only finished products and squared stumps may be exported (Cho and Quiroz, 2005).

7.2 International

Dalbergia stevensonii is not protected under any international legal instruments. (NB Dalbergia nigra was included in CITES Appendix I in 1992.)

8. Species management

8.1 Management measures

A tree planting scheme following the damage caused by Hurricane Iris in the Golden Stream Corridor Preserve, Belize, has focussed on planting saplings of species historically felled for timber, including *D. stevensonii* (Global Trees Campaign, no date). A tree nursery including *D. stevensonii* is being developed in Belize (Cho and Quiroz, 2005).

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).

8.2 Population monitoring

No population monitoring reports have been published for the species.

8.3 Control measures

8.3.1 International

There are no international measures in place to control movement of specimens of the species across international borders.

8.3.2 Domestic

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. Felling restrictions were placed on this species and felling of live, natural trees is now prohibited in Belize (Cho and Quiroz, 2005). 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. It is included in a tree nursery being developed in Belize (Section 8.1).

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 a high proportion of protected land area, with 42% of its land under some form of legal protected status (Protected Areas Conservation Trust, Anon, 2000). *D. stevensonii* is found in some nature reserves in Belize. An area of the Bladen branch has been an official Nature Reserve since 1990, open only to scientists and other researchers (Zisman, 1996). The species is found in Sarstoon Temash National Park (Meerman *et al.*, 2003) and Cockscomb Basin Forest Reserve (WCMC, 1991). In Sarstoon Temash National Park, Belize, *D. stevensonii* has a high level of protection, although it is a target for crossborder illegal logging (IMCG, 2005). The Cockscomb Basin Wildlife Sanctuary, Belize, has populations of *D. stevensonii* and this high-profile reserve (a jaguar sanctuary) is well protected from deforestation, and although concerns about illegal logging have been raised, they have been addressed (Catzim, 2003). *D. stevensonii* is still found in broadleaf hill forest on limestone in rolling or flat terrain within the Columbia River Forest Reserve (Meerman and Matola, 2003), which is one of the only large, continuous tracts of relatively undisturbed land in Mesoamerica (Parker *et al.*, 1993). Forest reserves in Belize are, however, created for wood exploitation rather than habitat 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).

Belize FFI is supporting sustainable forest management and income generation in areas adjacent to the Golden Stream Corridor Preserve, in Toledo District, as part of the overall biodiversity strategy for the area. A training programme is being provided for indigenous communities to develop sustainable forestry management (Cho and Quiroz, 2005).

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).

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

The document was discussed at the 16th meeting of the CITES Plants Committee. The Netherlands sent a draft proposal to all Parties within the range of this species. Mexico responded noting their forest authorities are compiling information on the species and that this will be sent once it is integrated (Benitez Diaz, 2006). Richter (2006) supports inclusion of the species in Appendix II.

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). This suggestion was reported to the 15th meeting of the Plants Committee (Summary record item 22), which agreed to consider reviewing the listing of the species at its next meeting, based on a document to be provided by the Netherlands. The draft proposal was subsequently presented at the 16th meeting of the Plants Committee which encouraged the Netherlands to continue collecting information on these species and urged the range States to collaborate with the Netherlands in this matter. As a result the Netherlands wrote to all range States in 2006, including a copy of the proposal and requesting feedback.

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

- 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.
- 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.
- 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.
- Global Trees Campaign, no date. Belize conservation project, Toledo Forest Management. Accessed 27/02/2006. http://www.tree2mydoor.com/dedicate a tree/belize project.asp.
- 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., 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.
- 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.
- NAS 1979. Tropical legumes: resources for the future. National Academy of Sciences. Washington, D.C.
- 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].

- 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.
- 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. NARMAP.