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

Eighteenth meeting of the Plants Committee
Buenos Aires (Argentina), 17-21 March 2009

Proposals for possible consideration at CoP15

Proposals to amend the Appendices

CEDRELA SPP., *DALBERGIA RETUSA, D. GRANADILLO* AND *D. STEVENSONII*

1. This document has been submitted by the Chair of the Plants Committee[*].

2. At its 14th meeting (CoP14, The Hague, 2007), the Conference of the Parties adopted Decision 14.146 on *Cedrela odorata, Dalbergia retusa, Dalbergia granadillo* and *Dalbergia stevensonii* as follows:

   The Conference of the Parties adopted the Action Plan attached as Annex 4 to these Decisions, to complete knowledge on the status of conservation of, trade in and sustainable use of Cedrela odorata, Dalbergia retusa, Dalbergia granadillo *and* Dalbergia stevensonii*.*

3. Annex 4 to the Decisions states the following:

   The Plants Committee shall:

   a) establish the relevant methodology and necessary formats for the presentation of the information requested for the implementation of this Decision;

   b) receive, analyse and follow up the Action Plan at its 17th and 18th meetings; and

   c) propose the relevant recommendations for Cedrela odorata, Dalbergia retusa, Dalbergia granadillo *and* Dalbergia stevensonii *at the 15th meeting of the Conference of the Parties.*

4. The Plants Committee established the relevant methodology and necessary formats for the presentation of the information and communicated them to the Secretariat. The latter forwarded them to the Parties concerned within the agreed time-frame and compiled the information that was submitted to the Committee at its 17th and 18th meetings (see documents PC17 Doc. 16.3 and PC18 Doc. 13.3).

5. The Committee is invited to consider documents PC17 Doc. 16.3, PC18 Doc. 13.3 and the data contained in proposals CoP14 Prop. 31, Prop. 32 and Prop. 33 submitted at CoP14 (Annexes 1, 2 and 3 respectively).

[*] *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.*

6. After analysing all this information, the Committee should assess whether the criteria for inclusion in the CITES Appendices (see Annex 4) have been met and should propose the relevant recommendations for submission at the 15th meeting of the Conference of the Parties.

CoP14 Prop. 31

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 retusa 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.

Dalbergia granadillo is proposed for listing in Appendix II of CITES for look-alike reasons in accordance with Article II, paragraph 2(b), of the Convention and Resolution Conf. 9.24 (Rev. CoP13) Annex 2 (b), Paragraph A.

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 retusa* Hemsley and *Dalbergia granadillo* Pittier

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: Synonyms of *Dalbergia retusa:*

Amerimnon lineatum (Pittier) Standl.
Dalbergia hypoleuca Pittier
Dalbergia lineata Pittier
Amerimnon retusum (Hemsl.) Standl.

Note: *Dalbergia retusa* Baill. is a synonym of *Dalbergia obtusa* Lecomte; Rudd (1995) combined *D. hypoleuca*, *D. lineata*, *D. pacifica* and *Amerimnon cuscatlanicum* as varieties of *D. retusa.*

1.6 Common names: English: Black rosewood, Nicaraguan rosewood, Red foxwood, Rosewood, Yellow rosewood
French: palissandre cocobolo

Spanish: cocobola, cocobolo, cocobolo ňambar, cocobolo negro, cocobolo prieto, funera, franadillo, granadillo, granadillo de Chontales, manarizoby, namba, nambar, nambar de Agui, nambar legitimo, nambaro, palisandro, palo negro, palo de rosa, prieto

German: Cocoboloholz, Foseholz

In trade, *Dalbergia retusa* has the same common names as *D. granadillo*, and other *Dalbergia* spp. (Schmidt, 2006).

1.7 Code numbers: ---

2. Overview

Dalbergia retusa is a hardwood leguminous tree, principally occurring in tropical dry forests (Section 3.2). This endangered ecosystem has been heavily exploited, with most of the land having been converted to other uses (Section 4.1). In addition to this pressure, *D. retusa* has been extensively felled, like many of the other tree species in the genus, to harvest the beautiful, dense and durable wood, which is prized for a wide range of uses (Section 6.1). There appears to be a high wastage of wood as the sapwood is of low value and there is a premium on the most highly patterned heartwood pieces (Section 6.3). The wood is used for carvings and presumably exported as personal items in the tourist trade (Section 6.1). The wood is also reported in trade outside the range States, particularly in the United States of America, where it appears to be imported as timber and then sold on as timber or small, high value products such as pen-blanks and gun handles (Section 6.1). Some plantations of the species exist at various stages of maturity, and more are planned to attempt to fulfil demand for the timber (Section 8.4) although destructive harvest from the wild continues (Section 6.1). Little information is available on current abundance, but there are reports of heavy exploitation in the past, particularly in **Costa Rica** and **Panama** (Section 4.2). Reported difficulties in sourcing the wood (Section 4.2) suggest that it may already be commercially extinct in some wild areas.

Given the increasing importance of tourism in the region, the prominence of carvings in the tourist trade, the continuing demand for the wood for a range of uses internationally and the high level of wastage, the total trade may represent utilisation of a great many trees.

This document suggests that *Dalbergia retusa* 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. Dalbergia granadillo* is also proposed for inclusion for look-alike reasons as the timber is also traded as "cocobolo" and the timber of the two species cannot be distinguished.

3. Species characteristics

3.1 Distribution

Dalbergia retusa occurs from **Mexico** to **Panama** (INBio, 2006) mainly in dry tropical forest. The distribution is likely to be highly fragmented due to the massive loss of this ecosystem (Section 4.1). The type location is Paraíso in **Panama** (INBio, 2006).

D. retusa has been reported from north-western **Colombia** (Record, 1942; TROPICOS, 2006). In **Costa Rica**, it occurs throughout the Nicoya Peninsula, and in the vicinity of Pozón-Orotina, San Pablo and San Pedroe de Turrabares and the city of Colón, but is very scarce in the northern zone of Los Chiles (INBio, 2006; ITCR/EIF, 2006). In **Costa Rica**, *D. retusa* occupies 13,697.7km^2. Its available habitat has been reduced by 61.5%, indicating the species is exploited and rare. 6.2% of its habitat occurs within State protected areas. Occurs from 50-300m, in dry, warm to very warm areas, with less than 2,000mm annual precipitation. It occurs principally within the dry forests of Guanacaste province and in the driest areas of the Nicoya Peninsula within the province of Puntarenas. It generally grows in flat to moderately flat areas with slopes less than 15% and occasionally in rocky areas (ITCR/EIF, 2006). Representative specimens have been reported from **El Salvador** (MOBOT, 2006). Included in a list of principal forest species of **Guatemala** (INAB, 2006). Reported from western **Honduras** (Record, 1942). Grows in south-western (Record, 1942) and south-eastern (ILDIS, 2005) **Mexico.** It is frequent in **Nicaragua** from the Pacific to the Atlantic coasts (Stevens *et al*., 2001). In **Panama**, it is only found in the drier, southern parts of the isthmus, but is never common

(Condit and Pérez, 2002). *Dalbergia granadillo* occurs in **El Salvador** and **Mexico** (Secretaría de Desarrollo Social, 1994).

3.2 Habitat

D. retusa is a species of dry forest, woodland and scrub along central American Pacific coastal lowlands and slopes, occurring in wooded areas as well as rocky ground and pastureland (Jiménez Madrigal, 1993). In **Nicaragua**, the species is found in a range of habitats, including dry forests, humid forests, gallery forests and savannas (Stevens *et al.,* 2001).

D. retusa is found on flatlands or moderate slopes in tropical dry forests with an annual rainfall under 2000 mm and a temperature range of 24 - 30ºC (Marín and Flores, 2003). It grows in soils of varying pH, texture, drainage and fertility, with a typical elevation range of 50 - 300 m (INBio, 1999; Marín and Flores, 2003) and up to 800 m in **Nicaragua** (Stevens *et al*., 2001).

The species responds well to fire (Section 3.3). It is slow-growing (Americas Regional Workshop, 1998) but has shown a high rate of survival, for example in **Costa Rica**, in a tropical dry site (Piotto *et al.*, 2004) and on acid soils in a tropical humid site (Tilki & Fisher, 1998).

3.3 Biological characteristics

The trees flower between January and May after 4 to 5 years, with a second flush in August and September (INBio, 1999; Marín and Flores, 2003 and references therein). Flowers are insect-pollinated and seeds with intact fruits are wind-dispersed (Bawa and Webb, 1984). Flowers are arranged in racemes, clustered towards branching tips, appearing as terminal or axillary panicles; the pod is an indehiscent, one-seeded samara.

D. retusa appears to be self-incompatible and shows high levels of seed abortion. In a pollination study by Bawa and Webb (1984), only 8% of 560 open-pollinated flowers developed mature fruits, none of the 184 self-pollinated flowers set fruits and 64% of the 137 cross-pollinated flowers set fruits. Pollen is dispersed by bees (Frankie *et al.*, 2002) and seeds are dispersed by wind and water (Marín & Flores, 2003). Seeds are orthodox and remain viable for up to 5 years with 60% germination if stored at 6 - 8% moisture at 5º C (Marín & Flores, 2003). Up to 80% germination has been observed in nurseries (INBio, 1999).

Natural regeneration of the species is scarce, however saplings and juveniles are numerous in areas periodically exposed to fire (Jiménez Madrigal, 1993; Marín & Flores, 2003).

3.4 Morphological characteristics

The species grows to about 20 m (Ricker & Daly, 1997) with a diameter of 40 cm (INBio, 1999). The heartwood is surrounded by white sapwood. The sapwood, which is as dense as the heartwood, will vary in amount depending on the age of the tree and the conditions of its habitat. The poorly formed stems yield the most uniquely figured and highly prized wood (Cocobolo, 2006).

The wood is hard, heavy and lustrous in colour (Condit & Pérez, 2002). It has a basic specific gravity (oven dry weight/green volume) from 0.80 to 0.98 and the air-dry density is between 750-1000 kg/m^3 (Marín & Flores, 2003). The heartwood varies from yellow to dark reddish-brown in colour, with a figuring of darker irregular markings. It is faintly fragrant (Titmuss and Patterson, 1988) with no distinctive taste (SCMRE, 2002). The amount of figure and contrasting colour varies widely from tree to tree. (Cocobolo, 2006). It has a fine to medium texture and a straight to irregular grain (Echenique-Marique & Plumptre, 1990). The wood has a natural cold feel like marble (Titmuss & Patterson, 1988), with a high oil content and a high natural polish (Marín and Flores, 2003). Because of the oil content, it is easy to work and polish and is highly durable (Record, 1942). The oils offer a waterproofing property, which give it an esteemed position in the cutlery trade (SCMRE, 2002). Dust from working the material may produce a rash or dermatitis resembling ivy poisoning (Record & Hess, 1943).

Numerous photographs of the wood are available on the web (Hobbithouseinc, 2006).

3.5 Role of the species in its ecosystem

The species is associated with *Tabebuia ochracea*, *Astronium graveolens*, *Tabebuia impetiginosa*, *Sideroxylon capiri* and *Swietenia macrophylla* (Jiménez Madrigal, 1993).

D. retusa is a highly attractive bee plant in **Costa Rica**, where up to 60 species of bees visit the flowers (Frankie *et al*., 2002). *Dalbergia* species form nitrogen-fixing nodules and therefore have an important role in enhancing soil fertility (Rasolomampianina *et al.,* 2005). Cutting of *D. retusa* trees for timber could mean that they will no longer provide these ecosystem functions.

4. Status and trends

IUCN Global threat status: VU A1acd (assessed by Americas Regional Workshop, Conservation and sustainable management of trees project in 1998). For threat category definitions, see http://www.iucnredlist.org/info/categories_criteria1994.

4.1 Habitat trends

The tropical dry forests of Central America, the main habitat for *D. retusa*, have been subject to human influences such as hunting and modification of the vegetation cover for a long as 11,000 years (Murphy and Lugo, 1995). Relatively high population densities have subjected dry forest ecosystems to massive disturbances, such that most, if not all, of the surviving forest has least been affected by the harvesting of trees, as well as by grazing in the understory (Murphy and Lugo, 1995).

Conversion of tropical dry forest to agriculture and pasture is occurring at alarming rates (Manuel Maass, 1995) and it is considered to be the most endangered major tropical ecosystem, with less that 2% remaining intact (Janzen, 1988). Less than 0.1% of the original dry forest has conservation status in Pacific Mesoamerica (Manuel Maass, 1995).

In general, the rate and extent of deforestation in the range States is very high. FAO report that the annual rates of forest cover change between -0.4% (**Colombia**) and -4.6% (**El Salvador**) for the range States between 1990 and 2000 (Table 1; FAO 2005).

Large-scale dry forest restoration studies have been undertaken in Guanacaste, **Costa Rica**, with the goal of re-establishing 70,000 ha of dry forest and associated habitats (Murphy & Lugo, 1995).

Table 1. Forest cover change in *D. retusa* range States, according to FAO (2005)

Country	Forest cover change 1990-2000	
	Annual ('000 ha)	Annual rate (%)
Colombia	-190	-0.4
Costa Rica	-16	-0.8
El Salvador	-7	-4.6
Guatemala	-54	-1.7
Mexico	-631	-1.1
Honduras	-59	-1.0
Nicaragua	-117	-3.0
Panama	-52	-1.6
Belize[1]	*-36*	*-2.3*

[1] Information is needed to confirm if Belize is a range State.

4.2 Population size

In 1979, *Dalbergia* was described as scarce, all accessible stands of the genus having long since been logged out (NAS). Much of the habitat that should be available to *D. retusa* has been destroyed or heavily exploited (Section 4.1). Some areas where the species was formerly widespread now hold populations which are almost completely exhausted (Americas Regional Workshop, 1998). This is most notable in **Costa Rica** (Americas Regional Workshop, 1998; Jiménez Madrigal, 1993).

Continuing habitat destruction, the growth of cattle ranching and increasing fires have all contributed to the decline in the species (Americas Regional Workshop, 1998).

Cocobolo is so rare that very little of it reaches the world market; it has been heavily exploited and is now mainly harvested from private fincas (farms) where 80 to 100 year old trees have been able to mature (Cocobolo, 2006).

4.3 Population structure

Little information is available on the current status of population structure for the species. However, it is likely that many populations are of lower density than in the absence of logging and that mature trees will have been preferentially felled for their greater amount of heartwood. The flowers of *D. retusa* are self-incompatible and dependent on pollination by bees (Section 3.3). It is therefore likely that a minimum population density is required for regeneration of the species and that this is at risk from excessive logging.

4.4 Population trends

The combination of habitat loss (Section 4.1) and cutting (Section 4.2) has resulted in a decline in the populations of the species. Exploitation as a timber is intense and areas where the species was formerly widespread are almost completely exhausted; this is most notable in **Costa Rica**. Continuing reductions are caused through cattle ranching and burning (Americas Regional Workshop, 1998). Intensive commercial harvest of the timber for at least 100 years, combined with artisanal harvest and its distribution is thought to have made it a scarce resource in **Panama** (Velásquez Runk *et al.,* 2004).

4.5 Geographic trends

The species is threatened in **Costa Rica** and has a high risk of becoming endangered due to the drastic decrease in its populations (INBio, 2006). Prohibition of cutting standing trees of this species has been proposed (Varela Jiménez and Rodríguez Coffre, 2005). Populations of a reasonable size remain in **Mexico** (Americas Regional Workshop, 1998). In **Nicaragua**, it was recently described as 'frequent' (Stevens *et al.,* 2001) and is considered a low priority species in the Forestry Action Plan of Nicaragua (Ampié and Ravensbeck, 1994). Once considered plentiful in some parts of **Panama** (Standley, 1928), it is now endangered in the country (Melgarejo, 2005).

5. Threats

Felling of mature, reproducing individuals and the corresponding reduction in population size and population density threatens the capacity of *D. retusa* populations to regenerate (Section 4.3). Additionally, the habitat is under continuing pressure, particularly from increasing agriculture, cattle ranching and burning (Americas Regional Workshop, 1998; Section 4.1).

6. Utilization and trade

6.1 National utilization

Only the heartwood of *Dalbergia* timber species yields quality timber; the sapwood is of little value. The trees are slow in forming heartwood, so even large logs lose much of their volume when the sapwood is removed (NAS, 1979). Because of its scarcity and high value, *D. retusa* is used for its rare beauty rather than for its extreme strength or durability (Cocobolo, 2006). Most internationally traded timber now comes from plantations (Section 8.4), although historically large volumes of the wood were extracted from the wild. Standing trees are felled for artisanal use, with at least 50% of cocobolo extraction for commercial carving being via destructive harvest in Darién, **Panama** (Velásquez Runk *et al.,* 2004).

D. retusa is exceptionally good for marine use. The timber secretes compounds toxic to bacteria, fungi, algae, termites, mosquito larvae, confused flour beetles and marine borers (NAS, 1979).

The wood is used for inlay work, musical and scientific instruments, tool and cutlery handles and other crafts (Americas Regional Workshop, 1998; Echenique-Marique and Plumptre, 1990; Flynn, 1994; Ricker and Daly, 1997; SCMRE, 2002). For brush backs, butts of billiard cues (SCMRE, 2002), decorative and figured veneers, parquet floors, hunting bows, automobile dashboards (Cocobolo, 2006), jewellery boxes, canes, buttons and chessmen (Kline, 1978). In **Costa Rica** the species is

considered a precious wood with a high commercial value. Previously it was used to make furniture, floors, tiles and visible beams, but because of its progressive disappearance its use has been reduced to handicrafts such as statues, picture frames, jewellery etc. Trade is very small and it is not exported (ITCR/EIF, 2006).

D. retusa is used for making woodwind instruments such as professional quality clarinets. Although most professional quality clarinets are made of African Blackwood (*D. melanoxylon*), *D. retusa* is said to produce a softer tone. Due to the stresses placed on woodwind instruments, a professional instrument has a lifespan of approximately six years. This means that even with a consistent number of players, there is a steady demand for the wood (Jenkins *et al.,* 2002). Guitar suppliers recommending cocobolo as a substitute for Brazilian Rosewood include:

www.cbguitars.com
www.benjaminguitars.co.uk
www.alliedlutherie.com

The Wounaan and Emberá indigenous peoples of Darién, **Panama**, have carved cocobolo commercially for about 30 years, although they have a longer tradition of carving the wood for personal household items (Velásquez Runk *et al.,* 2004). The shavings and sawdust create colour ranging from light brown to black (Velásquez Runk *et al.,* 2004), and the wood is used to produce a dye for local use in Ipeti and Nurna, **Panama** (Dalle & Potvin, 2004) and in Darién province, **Panama** (Velásquez Runk *et al.,* 2004).

6.2 Legal trade

Only small quantities of timber reach the world markets (Titmuss & Patterson, 1988). This limit to supplies has led to high prices in the international market (Flynn, 1994). Cocobolo is so precious that it is often sold by the pound (TATF, no date).

A search on eBay (United States of America) for "cocobolo" (http://search.ebay.com, 13 February 2006) listed 944 relatively small, high quality wood items and small quantities of sawn timber suitable for the production of high quality items (pens, gun handles etc.). Many of these items were being sold within the United States, demonstrating that international trade of the species into the United States occurs. It is a popular material for pens. A manufacturer in the United States of America of wooden handgun grips states that most of the cocobolo wood they use comes from **Nicaragua**.

Suppliers on the Internet (January to February 2006), trading variously in lumber and finished products, include:

http://www.amazonexotichardwoods.com
www.anexotichardwood.com
www.cocobolo.net
www.cocoboloinc.com
www.cocoboloking.com
www.cookwoods.com
www.gilmerwood.com
http://www.jeswoodcrafting.com
www.maderasbarber.com
http://jdominik.rearviewmirror.org/wood/cocobolo.html
www.southernlumber.com
www.woodgrips.com
www.woodshopcala.com
www.yukonlumber.com

Internet suppliers of seeds and seedlings include:

www.sunshine-seeds.de and www.agroforester.com

ITTO (2004) does not report any export trade in *Dalbergia retusa*, although five of the range States (Colombia, Guatemala, Honduras, Mexico, Panama) are ITTO members. Similarly, ITTO does not report any import trade despite the evidence (see 6.1) of trade in the species in the United States, which is an ITTO member, but not a range State.

6.3 Parts and derivatives in trade

The heartwood is traded, but the sapwood is of little value (NAS, 1979). The species is traded as sawn wood and as finished items manufactured from timber in the range States. Usage is highly selective for the best-patterned pieces, with reports of only 2% being used (http://www.esmeralda.cc).

6.4 Illegal trade

D. retusa is poorly protected, with few of the range States including special legislation on the species (Section 7). It follows that trade in the species is neither monitored nor regulated.

6.5 Actual or potential trade impacts

Dalbergia retusa is used for its beautiful high value wood to make luxury items. There is some local use, but given the range States are all developing countries it seems likely that most timber or products made from timber of this species are traded internationally. International trade is therefore likely to be promoting exploitation of the species for timber.

7. Legal instruments

7.1 National

Populations are contained within protected areas in **Costa Rica**, **El Salvador**, **Guatemala**, **Honduras** and **Nicaragua** (Section 8.5). *D. retusa* is included (without category) in the national red list of threatened plants of **Guatemala** (Szejner, 2005) and has been protected in **Costa Rica** since 2001 (Exp. No. 14.356). It is included on the list of species for which felling should be prohibited **Costa Rica** (Varela Jiménez & Rodríguez Coffre, 2005).

7.2 International

Dalbergia retusa 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

Extraction in **Guatemala** is regulated through management plans that comply with technical requirements and national legislation that guarantee the survival of the species (Szejner, 2005). The species has been investigated for reforestation in **Panama** (Wishnie *et al*., 2002). It was included in a 10-year reforestation programme, commencing in 2003, for 4,000 ha of former pastures in **Nicaragua** (Anon, 2005).

8.2 Population monitoring

There are no population monitoring reports published for this species in any of the range States.

8.3 Control measures

8.3.1 International

8.3.2 Domestic

8.4 Artificial propagation

Dalbergia trees are slow growing, but due to the value of their timber, NAS (1979) recommend that efforts be made to extend their cultivation. During trials in a dry tropical region in **Costa Rica**, they exhibited good growth in height and good productivity when compared to six other native slow growth

species that were also planted in pure and mixed plantations (Piotto *et al.*, 2004). The good form of this species and its high timber value could compensate for the relatively low annual increments in volume, especially if grown in mixed plantations (Piotto *et al.*, 2004). However, in Central America the overwhelming majority of plantations are of teak, with only 10% of plantations in **Costa Rica** consisting of native species (Schmincke, 2000).

The Forest Stewardship Council lists two organisations that maintain plantations including *D. retusa* holding their certificate in forest management, in **Costa Rica** and **Nicaragua** (FSC, 2006).

Most of the cocobolo available today is not cut from the natural rainforest, but from privately owned fincas with trees planted 80 to 100 years ago (Cocolobo, 2006). Tropical American Tree Farms offers to grow precious hardwoods, including *D. retusa* trees in **Costa Rica** for its customers. Due to the exceptionally high value of the timber they claim this will serve as a high-yielding long-term investment (TATF, no date).

One supplier claims that most of their cocobolo is salvaged from trees which fell during Hurricane Mitch, and that they have planted 50,000 trees on former cattle farms to ensure a future supply (www.cocoboloking.com). Another supplier (www.cocoboloinc.com) claims to source their wood from hydroelectric dam sites and government-controlled reforestation schemes.

The Wounaan Indians now living at Gamboa in the **Panama** Canal Zone, who produce wooden carvings from Cocobolo harvested in the Darien are planting *D. retusa* seedlings locally on their reserve at Gamboa for future use (Gillett, H.J. Pers. Comm. 2006). It has been planted for lumber around Hacienda Barú, **Costa Rica** (Costa Rica Link, no date).

Dalbergia retusa was included in plantation trials of native precious wood species in **Costa Rica**, which started in 1992 (Fonseca & Chinchilla, 2002; Fonseca *et al*., 2002), and is noted as a second choice native species choice for reforestation in the central Pacific zone of **Costa Rica** (Gustavo Torres & Ricardo Luján 2002). In managed plantations, trees may reach 13 cm diameter breast height and 8 m in height after 17 years (Marín and Flores, 2003 and references therein). They have been found to grow at a rate of 1.1 m/year (Knowles and Leopold, 1997).

Seeds of *D. retusa* are available from the CATIE forest seed bank (CATIE, 2006) and commercial suppliers (Section 6.2).

Guatemala reports the plantation of 58ha of *D. retusa* between 1998-2004 (INAB, 2004).

8.5 Habitat conservation

Less than 0.1% of dry tropical forest of Pacific Mesoamerica, the most important ecosystem for *D. retusa*, has conservation status (Section 4.1). However, the species does occur in some protected areas. The size of the protected areas is greater than the habitat available to the species, as they often cover a range of habitat types.

D. retusa occurs in several conservation areas of **Costa Rica**: Huetar Norte, Guanacaste (including Santa Rosa (49,515 ha) and Guanacaste (84,000 ha) National Parks), Pacífico Central (including Vida Silvestre Curú Refuge), and Tempisque (including Palo Verde National Park (13,058 ha), Lomas Barbudal Biological Reserve (2,279 ha)) (INBio, 1999). It is present in the Parque Nacional Marino Las Baulas (445 ha, mainly of mangroves and coastline; Guía Costa Rica, no date).

It is frequent in the Domitila Private Wildlife Reserve in **Nicaragua** (Lezama-Lopez and Grijalva, 1999), which is composed of 230 ha of dry forest, the last patch of dry tropical forest at the shores of Great Nicaragua Lake (Mejía, pers. comm. 2006).

Found in the tri-national protected area of Montecristo (1,973 ha), which spans **Honduras**, **Guatemala** and **El Salvador** (Komar *et al.*, 2005).

8.6 Safeguards

No information.

9. Information on similar species

A table listing other *Dalbergia* tree species of Central America is included in Annex 1.

The timber of *Dalbergia granadillo* (range States El Salvador and Mexico) is not distinguishable from that of *D. retusa* (Record and Hess, 1943; Richter, 2006). Although it has the common name "granadillo", it is often traded under the name "cocobolo" (Richter, 2006). Inclusion of this species in CITES Appendix II is therefore proposed for look-alike reasons.

D. retusa wood is denser and stronger than Brazilian rosewood *Dalbergia nigra* (SCMRE, 2002).

10. Consultations

The document was discussed at the 16th meeting of the CITES Plants Committee. The Netherlands sent a draft proposal to include *Dalbergia retusa* in Appendix II, to all Parties within the range of this species. Comments received by 15 December 2006 are incorporated in the document. This comprises a response from Costa Rica (ITCR/EIF, 2006). 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).

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 retusa* 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.

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DALBERGIA TREE/SHRUB SPECIES OF MESOAMERICA

Species	Common names	Notes	Threat status	BZ	C R	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	C R	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].

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CoP14 Prop. 32

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).

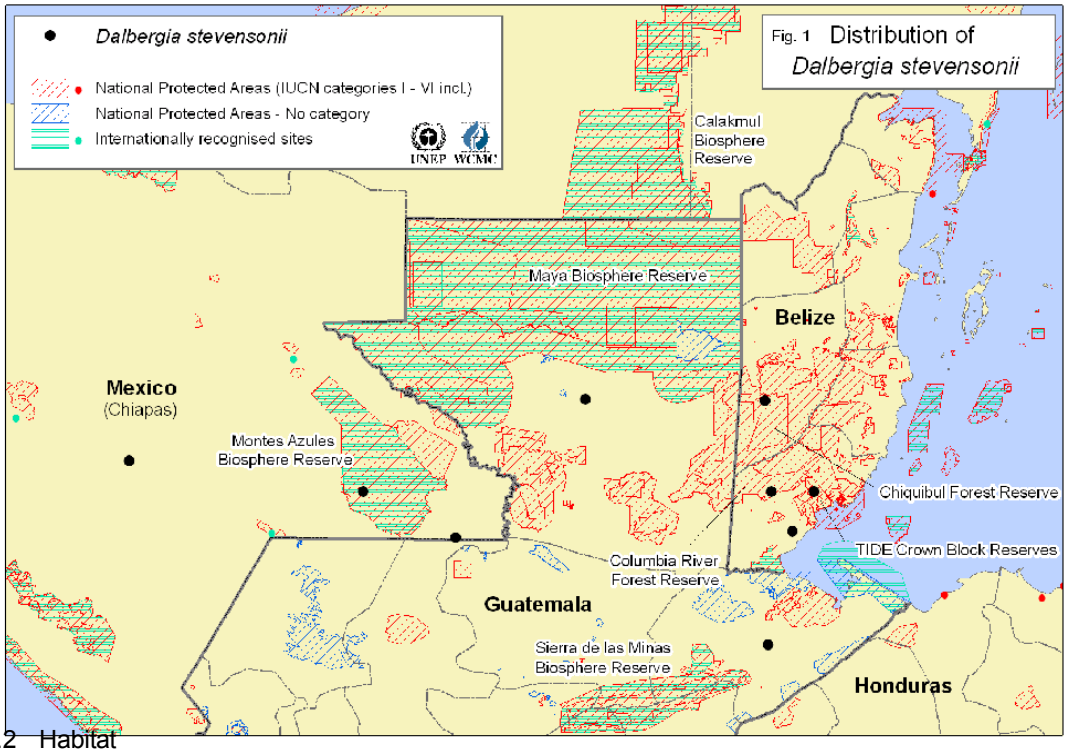
D. stevensonii is included on the list of principal forest species of **Guatemala** (INAB, 2006). MOBOT (2006) records the following specimens with coordinates from **Guatemala**:

– 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/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

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 Honduras[1], where large volumes await utilization” (Longwood, 1962).

[1] *Now Belize.*

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).

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.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.

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 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).

Suppliers on the internet include: www.southernlumber.com; www.eisenbran.com; www.highlandhardwoods.com - calls *D. stevensonii* "morado", which is the common name of Bolivian Rosewood, *Machaerium scleroxylon*; www.exotichardwood.com; http://www.woodcraft.com; http://www.colonialtonewoods.com.

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 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 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.edensawveneers.com, www.exoticflooring.com- this supplier also sources from **Guatemala**). Other suppliers fail to supply country of origin information on their websites (www.highlandhardwoods.com, www.colonialtonewoods.com) or give the vague description "Central America" (www.ellisguitars.com, www.woodcraft.com).

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.

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CoP14 Prop. 33

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

Cedrela odorata 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.

All other species in the genus *Cedrela* are proposed for listing in Appendix II of CITES for look-alike reasons in accordance with Article II, paragraph 2(b) of the Convention and Resolution Conf. 9.24 (Rev. CoP13) Annex 2 b, Paragraph A.

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: Sapindales

1.3 Family: Meliaceae

1.4 Genus, species or subspecies, including author and year: *Cedrela odorata* L. (1759).
See Annex 1 for other *Cedrela* species

1.5 Scientific synonyms: See Annex 2. Taxonomic note: some authors have considered *C. odorata* only to include those trees originating from the West Indies and others to be of the species *C. mexicana*. In the revision of *Cedrela* by Smith (1960) *C. mexicana* was recognized as a synonym of *C. odorata*. This is the widely accepted convention used here, however, where *C. mexicana* is the synonym used in country information, this has been noted.

1.6 Common names:
English: cedar, Barbados cedar, cigar-box cedar, Central American cedar, Honduran cedar, Mexican cedar, Nicaraguan cedar, red cedar, Spanish cedar, West Indian cedar
French: acajou rouge, acajou-bois, cédrat, cèdre acajou, cèdre des barbares, cèdre rouge
Spanish: cedro amargo, cedro cebolla, cedro cubano, cedro hembro cedro macho, cedro real, cedro rojo
German: Zigarrenkitschenholz, westindische Zeder
See Pennington (1981) for an extensive list of local names.

1.7 Code numbers: ---

2. Overview

The native range of *Cedrela odorata* is in seasonally dry forests of Central and South America. Once a common tree, *C. odorata* has had a long history of over-exploitation for its valuable timber. Combined with extensive loss of habitat through deforestation (Section 4.1) this is a serious threat to the future of the species. The timber is valued locally for its resistance against rotting and insects and internationally as a quality wood (Section 6.1). As a result, it has been selectively cut for at least 250 years, both for domestic use and for export (Section 6.1). Cutting has continued such that many countries throughout its native range report that numbers have been reduced, some to the extent that it is threatened (Section 4.5). In many places, populations have been reduced to inaccessible areas (Section 4.4). Large, well-formed trees are now particularly uncommon. The species is intolerant of shade and natural regeneration is scarce in rainforest conditions, though better in semi-deciduous forest (Section 3.3). Logging of *C. odorata* from natural forests is not sustainable, particularly as the potential habitat available for the species has been greatly reduced by deforestation. The species has been listed in CITES Appendix III by Colombia and Peru since 2001. CITES trade reports provide evidence of international trade in the wood from range States. Plantations of *C. odorata* have been established both within and outside of the native range (Section 8.4). These provide a source of timber that may otherwise be sought from the wild.

This document suggests that *Cedrela odorata* meets the criteria for inclusion 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:

> *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.*

All other species in the genus *Cedrela* are proposed inclusion in Appendix II of CITES for look-alike reasons, in accordance with Article II, paragraph 2(b), of the Convention and Resolution Conf. 9.24 (Rev. CoP13) Annex 2 b, Paragraph A.

3. Species characteristics

3.1 Distribution

Cedrela odorata

The natural range is obscured by exploitation, forestry plantings, and escapes from cultivation (Pennington, 1981). *Cedrela odorata* grows throughout lowland Central America and South America to northern Argentina and most Caribbean Islands within a latitudinal range of 26°N and 28°S (Pennington, 1981; Cintron, 1990). The distribution is fragmented due to extensive deforestation in the neotropical region. In Central America and Mexico it only occurs on non-flooded sites, often on well-drained limestone, as in the semi-deciduous forests of the Yucatan peninsula. However, in Amazonian Peru and Brazil it is most common on fertile soils which are periodically flooded by the rise and fall of the Amazon and its major tributaries (Pennington, 2006).

Within the native range: **Antigua and Barbuda**: Reported to occur in Antigua (Grisebach, 1864). **Argentina:** Reduced localities (Zapater *et al*., 2004). The southern limit of the species (Lamb, 1968). Northern region (Pennington, 2006). **Barbados**: Formerly common and widespread, but becoming rare (Gooding *et al.,* 1965). **Belize**: Occurs scattered in primary rainforest but has a greater distribution in secondary rainforest (Stevenson, 1927). **Bolivia**: Specimen reported from Beni (Smith, 1960). **Brazil**: Specimens reported from the states of Acre, Amazonas and Pará (Smith, 1960). Occurs in Amazonian, central and eastern coastal region (Pennington, 2006). **Cayman Islands**: Found in Grand Cayman and Cayman Brac (Proctor, 1984). **Colombia**: Present in warm lowlands and Valle de Magdalena (Cortés, circa 1900). Not listed in the national Red List (Calderon, 2003). **Costa Rica**: a widely distributed species (INBio, 1999). Occurs in an area of 42,978.5 km^2 from 0-1,000 m in the regions: Central Valley, North Pacific, Central Pacific, South Pacific, Northern Zone and Atlantic Zone. Found in forests in subtropical, humid tropical or seasonally dry areas (ITCR/EIF, 2006). **Cuba**: A prominent element of the upper canopy layer in semi-deciduous mesophytic forests (Borhidi, 1991). Found in all provinces (*C. mexicana*; Sauget and Liogier, 1951). **Curaçao** (the Netherlands): Specimens reported from Cas Cora (Smith, 1960). **Dominica**: Found on the West coast of Dominica at 30 m; specimen from Pointe Michel: may be cultivated (Nicholson, 1991). **Dominican Republic**: The species was included in lists of threatened plants in the Dominican

Republic (Jiménez, 1978). **Ecuador**: Specimen reported from Esmeraldas (Smith, 1960). Introduced in the Galápagos Islands, where the risk of problems with invasion of the species has been identified (Brockie *et al*., 1988). **El Salvador**: Specimen reported from San Martin (Smith, 1960). **French Guiana**: Specimen reported from Carel Francois (Smith, 1960). **Grenada**: Specimen reported from Saint Georges (Smith, 1960). **Guadeloupe** (France): Specimen reported from Basse Terre (Smith, 1960). Local uses described (Questel, 1951). **Guatemala**: Common throughout most of the lowlands, in some places forming a substantial part of the forest (*C. mexicana*; Standley and Steyermark, 1946). **Guyana**: Rare to occasional in mora forest, seasonal forest and mixed forest on poorly drained soils throughout the country (Polak, 1992). **Haiti**: Specimens reported from Tortue Island, Morne Pedegral, Morne Fourrise, Saint Marc and Puerto Rata (Smith, 1960). **Honduras**: Specimens reported from El Paraíso, Zamorano, El Jacarito, Chahuite, Comayagua (Smith, 1960). **Jamaica**: Common in places where probably planted, especially pastures and roadsides (Adams, 1972). Common in the plains and lower hills (Grisebach, 1984). One of the most valuable timber trees of the island (Fawcett and Rendle, 1920). **Martinique** (France): Specimen reported from Rivière Pilot (Smith, 1960). **Mexico**: Found along the Pacific coast from the State of Sinaloa to Guerrero and Chiapas and on the subtropical Atlantic coast from Tamaulipas to Yucatán (Pennington, 1981). The pacific slopes form the most northerly limit of the distribution (Lamb, 1968). **Montserrat** (United Kingdom of Great Britain and Northern Ireland): Specimens reported from Roches (Smith, 1960). **Nicaragua**: Specimens reported from Jinotega and Chinandega (Smith, 1960). **Paraguay** (Pennington, 2006). **Panama**: The species is restricted to the Pacific side of the isthmus, and is nowhere common although it can be found regularly in secondary forests around Panama City (Condit & Pérez, 2002). **Peru**: Occurs in low and high forests, tropical Pacific forest (sub-humid mountain woodland), woods in the lifezones: subtropical; humid tropical; sub-humid or seasonally dry. Occurs up to 1,000 m in the departments of Tumbes, Amazonas, San Martin, Loreto, Ucayali, Madre de Dios (INRENA, 2006). **Puerto Rico** (United States of America): Occurs mostly as widely distributed trees in government-managed reserves [see section 8.1 (Gabel, 2006]. The native trees have been reduced to scattered remote areas, chiefly in moist limestone and lower Cordillera forest regions. In the Cordillera, restricted to steep rocky areas with soils in the Mucara group or in associated well-drained soils (Little and Wadsworth, 1964). **Saint Kitts and Nevis**: Occurrence reported (Americas Regional Workshop, 1998; WCMC, 1999). **Saint Lucia**: Specimen reported from La Perle (Smith, 1960). **Suriname**: Occurs in the rainforest regions (FAO, 2004)**. Trinidad and Tobago**: a fairly wide distribution, but confined to better soils (*C. mexicana*; Marshall, 1934). Found on hillsides, roadsides and cultivated land (*C. mexicana*; Williams, 1928). Widely distributed both in rainforest and drier, semi-deciduous types, but nowhere common (Marshall, 1939). **Venezuela (Bolivarian Republic of)**: Frequent in warm lowlands (Schnee, 1960). **Virgin Islands** (United States): Known only from a few trees on US National Park Service land on the island of Saint John (Acevedo-Rodriguez, 1996, Gabel, 2006).

The species has been widely introduced: **American Samoa, Bermuda, Bahamas, Cook Islands, Fiji**, **Micronesia (Federated States of), New Caledonia** (France), **Samoa**, **South Africa, Tonga, United States** (PIER, 2005) and in plantations elsewhere: **Australia** (Griffiths *et al*., 2001); **Côte d'Ivoire** (Dupuy, 1995), **Ghana** (Atuahene, 2001), **Madagascar**, **Malaysia**, **Singapore**, **South Africa**, the **Philippines, Uganda**, the **United Republic of Tanzania** and **Samoa** (Lemmens *et al*., 1995). **Indonesia** (Rachmatsjah and Wylie, 2001), **Solomon Islands** (Ngoro, 2001), **Sri Lanka** (Tilakaratna, 2001) and small or trial plantations in **Malaysia** (Khoo, 2001), **Papua New Guinea** (Dobunaba and Kosi, 2001) and **Thailand** (Eungwijarnpanya, 1997).

This species is so widely protected and cultivated for its timber that it is often difficult to be sure of the origin of roadside trees (Pennington, 2006).

Range of *Cedrela* species other than *C. odorata*: see Annex 1.

3.2 Habitat

C. odorata needs a plentiful supply of nutrients and is very intolerant of waterlogging (Cintron, 1990; Marshall, 1939; Lamb, 1968). Pennington (2006) notes that this intolerance applies mainly to Central America and that conversely in the Amazon basin the species is more or less confined to fertile, periodically flooded forest.

C. odorata is most successful in drier closed forest conditions, which generally have good aeration and an accumulation of bases in soils (Lamb, 1968). *C. odorata* is deciduous (Cintron, 1990). It is rare in evergreen forest types and prefers sites with a marked dry season (Lamb, 1968). Early failures in plantations have been attributed to overly wet and unsuitable soil types in experimental sites (Cintron, 1990). However, high mortality rates in trial plantations in dry forests of **Costa Rica** were attributed to susceptibility to long periods of drought during establishment (Piotto *et al.*, 2004).

C. odorata is strongly light-demanding and will grow in a climate with an annual rainfall between 1,200-2,500 mm at altitudes between 0-1,500 m above sea level (Webb *et al*., 1984), although Pennington (2006) notes that the range is generally from near sea level to 800 m, with a few records up to 1,500 m, but these may be introduced as plants.

Grows in well drained soils and does not tolerate nutritionally imbalanced soils well. Tolerates variation in pH and requires good levels of light. In primary forest it is an emergent or member of the upper canopy. It grows often, but not exclusively in limestone and tolerates a long dry period. It does not prosper in areas with more than 3,000 mm precipitation or in areas with dense or waterlogged soil. In general individual trees are found in mixed forests dominated by other species. It grows in dry forest on the Pacific coast and in humid woods on both coasts, from sea-level to 1,200 m (ITCR/EIF, 2006). Very common in secondary forest derived from lowland evergreen rain forest and seasonal rain forest, and present on both volcanic and sedimentary formations (Pennington, 2006).

The temperature ranges are a mean maximum temperate of 27-36ºC during the hottest month and a mean minimum temperature of 11-22ºC in the coldest month, with a mean annual temperature of 20-32ºC (Webb *et al*., 1984).

3.3 Biological characteristics

C. odorata trees are moderately long-lived. Lamb (1968) gives an example of a tree in **Belize** with 110 rings and Marshall (1939) reports that trees with a girth of 13-14" (1m) have an average age of 125 years. Pennington (2006) disputes this, noting that *C. odorata* is a fast growing species and under optimal conditions will reach 1 m in diameter in 50-60 years, in terms of height it grows at a rate of 3 m per year.

C. odorata is a fast-growing and light-demanding monoecious species that is insect-pollinated and has wind-dispersed seed (Cavers *et al.,* 2004). Early growth of up to 2.3 m/year is possible in favourable conditions (Lamb, 1968). Trees bear fruit from the age of 10 years according to Lamb (1968) or 15 years according to Lamprecht (1989). Flowers appear early in the rainy season and fruits mature during the dry season when the leaves become deciduous. Seeds are wind-dispersed (James *et al.,* 1998).

The flowers show features associated with entomophily; bees and moths are believed to be the chief pollinators (Styles and Khosla, 1976). Allozymes on seedlings germinated from wild-collected seed used to produce outcrossing estimates for *C. odorata* revealed no evidence of self-fertilization (James *et al.*, 1998).

In spite of plentiful production of seedlings, natural regeneration of *C. odorata* was reported by Marshall (1939) to be 'extremely scarce' in rainforest conditions, though better in semi-deciduous forest. Marshall considered poor regeneration to be due to a combination of heavy shade, drips from branches in heavy rains and waterlogging of the soil preventing root establishment, leading to a very low survival rate for *C. odorata* seedlings. Opening of canopies by felling led to weeds and vines quickly taking over and hindering seedling establishment. Good regeneration followed two incidents where the canopy had been opened considerably – a forest fire in 1912 and a cyclonic storm in 1933 (Marshall, 1939). Pennington (2006) notes that, like nearly all rainforest species, *C. odorata* occurs naturally at a distribution of less than one individual (mature tree) per hectare. This refers to forest undisturbed by man. Because of its strong competitive ability it flourishes in forest disturbed by man and under these conditions can be found at much higher densities.

INRENA (2006) list three national herbaria in **Peru** which have herbarium specimens of cedar in: Universidad Nacional Agraria la Molina; Universidad Nacional Mayor de San Marcos; Universidad San Antonio Abad del Cusco.

3.4 Morphological characteristics

C. odorata varies considerably in size and form, reaching 30 m or more in height (Anon., 2004; Rendle, 1969; Ricker & Daly, 1997) and has a diameter of about 2.5 m (Anon., 2004). The bark is yellowish or grey-yellowish (Anon., 2004). The size varies according to locality of growth, and it exhibits a wide variation in its general character due to the age and conditions of growth of individual trees (Farmer, 1972). It is ecologically very variable, with the largest trees developing in lowland evergreen rain forest and in seasonal rain forest. It is also widespread in much drier semi-deciduous forest, but here it develops as a much smaller tree (Pennington, 2006).

The timber has a pleasant smell, similar to cedar, and varies considerably according to origin and growth conditions (Titmuss and Patterson, 1988). The colour ranges from pale to medium red-brown but darkens on exposure (Rendle, 1969). The timber of vigorous growth tends to be paler and lighter in weight than that from more slowly grown trees (Rendle, 1969). The grain may be either straight or irregular (Titmuss, 1971). The texture was described by Titmuss (1971) as being moderately coarse and uneven and by Echenique-Marique & Plumptre (1990) as being fine to medium. Growth rings are distinct, marked by differences in pore size and initial parenchyma (Lemmens *et al*., 1995). The heartwood is durable with termite resistance, but the sapwood is non-durable and prone to staining and powder-post beetles (Lemmens *et al*., 1995).

3.5 Role of the species in its ecosystem

C. odorata was reported by Cho (Pers. Comm.) to be a dominant component of various dry forest types. *C. odorata* is often associated with other Meliaceae (*Swietenia* and *Guarea* sp.) and leguminous trees (Pennington, 1981). Seeds are wind-dispersed (Cintron, 1990). The seeds of *C. odorata* are generally ignored by parrots, in spite of appearing ideally suited for predation. Janzen (1983) speculates that this may be due to chemical defences in the seeds. Macaws, however, which specialize in eating unripe seeds and fruits avoided by or toxic to other animals (Renton, 1990) are known to eat the seeds of *C. odorata* (Matuzak and Dear, 2003).

It is strongly demanding of light and frequently appears as a fast-growing pioneer species in secondary forest (Pennington, 1981). It is a source of pollen and nectar for bees (Sandker, and Totaro, L. no date), though it is considered to be without significant ecological value (Mostacedo & Fredericksen, 1999).

4. Status and trends

Cedrela odorata is listed in the IUCN category VU A1cd+2cd, i.e. the species faces a high risk of extinction in the wild in the medium-term future. (Americas Regional Workshop, Conservation and sustainable management of trees project, 1998). For threat category definitions, see http://www.iucnredlist.org/info/categories_criteria1994.

Vulnerable in **Peru** according to scientific reviews for the categorization of threatened wild flora in Peru, approved by Decreto Supremo No. 043-2006-AG (INRENA, 2006)

4.1 Habitat trends

C. odorata colonizes secondary forest, abandoned pastures and agricultural land (INBio, 1999). It occurs in humid or dry tropical and subtropical forest (Anon., 2004), preferring well-drained soils, up to an altitude of 1,200 m (Pennington, 1981). Of these habitat types, tropical dry forests have suffered an enormous decline in area, particularly during the 20th century. Once the most common forest type along the Pacific coast of Central America, now less than 2 % of the original forest remains intact (Janzen, 1986). Deforestation is also a problem generally in Central and South America (Laurance, 1999; Mayaux *et al.*, 2005; Myers, 1994 for example).

Habitat loss alone will underestimate the loss of natural populations due to selective logging. Although the greatest threat to natural forests in the Central American region is conversion of the land to other uses, selective harvesting of timber is particularly threatening native species including *C. odorata* and *S. macrophylla* (UNEP, 2003).

Exploitation of the timber by selective logging causes an increased risk of forest fires as the slash is left on the ground and the forest canopy is opened, warming and drying the slash (Uhl and Viera, 1989). *C. odorata* has no fire tolerance (USDA, no date).

Occurs in well-drained soil, often but not exclusively in limestone ground. Tolerates a long dry season but does not flourish in areas with more than 3,000 mm precipitation., or in areas with dense or waterlogged soils. Found in sub-humid mountain woods, humid woods in meandering plains and woods in dissected terraces. Individual trees are in general found scattered in mixed semi-evergreen or semi-caducifolious dominated by other species (INRENA, 2006).

Cedar develops best in humid tropical forests.. Reaches greatest prominence with 1,200 to 2,400 mm precipitation, with a dry season of two to five months. The growth of the tree and its reproduction are synchronised to the start of the rains. Cedar survives in areas with less precipitation (up to c.

1,000 mm per year) but grows slowly in a contorted form. Also grows sporadically in areas that receive more than 3,500 mm precipitation, but only in very well-drained sites (INRENA, 2006).

Cedar may be very demanding in terms of soil requirements, but these demands are not known with certainty. The common denominator appears to be the drainage and aeration of the soil, but not the pH. It is common in well-drained soils; soil fertility can also be important, and it grows better in soils enriched with burnt remains of the secondary forest (INRENA, 2006).

4.2 Population size

Estimates of current total population are not available. *Cedrela odorata* is reported to occur in abundance, most notably in Central America (Americas Regional Workshop, 1998; Arce Benavides, 1998). However, Navarro *et al.,* (2004) reported that although widespread, *C. odorata* was not common throughout moist tropical American forests and that its numbers continued to be reduced by exploitation without successful regeneration. The species is included in the IUCN Red List of threatened species in 1998 under the category VU A1cd+2cd (Americas Regional Workshop, 1998).

4.3 Population structure

Cavers *et al.,* (2004) used a combination of genetic markers (chloroplast sequence and Amplified Fragment Length Polymorphism, AFLP) and morphological characters to describe variation in *C. odorata* throughout Mesoamerica. They found three separate units: **Mexico**, **Belize** and **Guatemala**; **Honduras** and **Nicaragua**; **Costa Rica** and **Panama**. Variation can be further divided within each country. Molecular genetic markers (Random amplified polymorphic DNA, RAPDs) found a high level of genetic differentiation between populations of *C. odorata* from northern and southern regions of **Costa Rica** (Gillies *et al*., 1997).

Population density varies considerably. Rio San Juan, **Nicaragua**, has a density of 1 *C. odorata* tree per 100 ha (Paniagua, no date). A density of 2.9 stems of cedar per 100 ha was estimated in the Bladen Reserve of **Belize** (Johnson and Woods, 1976, cited by Newman, 2004). In **Guatemala**, average densities of 7.9 trees per 100 ha were recorded in the Multiple Use area of the Peten Biosphere Reserve (Szejner, 2005). However in some regions, almost pure stands are to be found, such as in successional forests on intermediate-age river terraces of Manu National Park, **Peru** (Gentry, no date).

The age distributions of some *C. odorata* populations have been skewed by logging of the largest trees (Bird, 1998; Marshall, 1939) and there have been reports of trees being felled before they reach maturity (Americas Regional Workshop, 1998).

Logging in natural forests selectively destroys those trees with the best growth form (dysgenic selection), leaving behind a population depleted in the most favoured genotypes (Mejía, 2001). Maintenance of genetic variation is essential for ensuring a future supply of the wood. However, *Cedrela* species have suffered substantial genetic degradation, particularly in the dry zone (Mejía, 2001).

4.4 Population trends

Although *C. odorata* is widespread, it is seldom common in moist tropical forests and its numbers are being reduced by exploitation without successful regeneration (Cintron, 1990). Exploitation of *C. odorata* for timber has had a long history. In 1756, Browne described the tree as one of the largest timber trees in the woods of Jamaica and reported that the tree “was very common and still continues to grow in many parts of the island.” This was taken by Smith (1960) to imply that even by 1756, populations of *C. odorata* had already suffered from over-exploitation.

Marshall (1939) described cedar as having been heavily cut over, large trees being only found in the more inaccessible regions. They were once, however, fairly common and Marshall continued that the large stumps “bear evidence of the past magnificence of these species”.

Smith (1960) reported a reduction in the volume of timber being cut in the West Indian Islands owing to the heavy culling of accessible forest, particularly in **Cuba**. Smith (1960) also reported selective cutting of *C. odorata* in **Panama** and **Venezuela** and heavy logging in **Mexico**, with small trees having been harvested before they had even produced a full seed crop. In **Brazil**, Brune and Melchior (1976) reported strong selective cutting for *Cedrela odorata* in the várzea (seasonally flooded lowland by the rivers) of the Amazon.

Due to significant over-exploitation, genetic erosion of this species has already occurred throughout its natural distribution and trees of good form are now rarely found except in isolated areas (Cavers *et al*., 2004).

4.5 Geographic trends

Within its native range, *C. odorata* has suffered large declines due to logging and a reduction in habitat availability. The species was included in a list of threatened plants by the FAO (1986). There are genetically distinct units throughout Mesoamerica (Section 4.3).

It has been severely extracted in natural forests and is considered endangered in Mesoamerica (Navarro *et al*., 2004). A trend towards rarity has been reported in several countries and territories, including **Argentina**, **Barbados** and **Puerto Rico** (Section 3.1). Populations of *C. odorata* remain in **Peru**, and many of the Protected Areas in the country contain individuals of the species. However, some populations are drastically being reduced (Reynel, 1988). It is threatened in **Costa Rica** where it is exploited heavily (INBio, 1999).

In **Belize** it is threatened by illegal exploitation, over-harvesting and some habitat loss (Cho, Pers. Comm.).

In **Bolivia**, the species's rarity has resulted in trees only being cut opportunistically while mahogany, *Amburana* and *Machaerium* are being sought (Americas Regional Workshop, 1998; Killeen, 1997).

In **Costa Rica** its habitat has been reduced by 56.7 % (ITCR/EIF, 2006). The species is in a vulnerable condition because of: the reduction in habitat; its extraction for its valued timber; its current scarcity; and its limited State protection (ITCR/EIF, 2006).

By 1946, numbers in **Guatemala** had been greatly reduced by intensive lumbering operations (Standley and Steyermark, 1946). Standley and Steyermark (1946) warned that about 10 million board feet of the wood are used in the United States every year, but nowhere had any significant attempt been made to replace the supply, which was being rapidly exhausted. It is still present in some national parks in the country (Section 8.5).

In **Nicaragua**, it is threatened by unsuitable procedures and, especially, uncontrolled forest fires (Pommier, no date).

In **Panama**, most trees are less than 50 cm in diameter with only small buttresses. It is rare in the Canal area (Condit & Pérez, 2002). This species may have been once more common on the Pacific slope but large individuals probably would have been harvested (Condit & Pérez, 2002). It is included in lists of threatened plants in **Panama** (Asociación Nacional para la Conservación de la Naturaleza, 1990).

C. odorata has been extensively introduced outside of its native range (Section 3.1). Cultivation in plantations has been undertaken in trials over a wide geographical range (Floyd and Hauxwell, 2001; Section 8.4). *C. odorata* is sometimes an invasive species, for example in **South Africa** (PIER, 2005).

5. Threats

Cedrela odorata has been of great commercial interest for over 200 years and in this time its distribution has been diminished by excessive exploitation over its entire range to the extent that large trees of good form and size are now rarely found (Pennington, 1981).

Inefficient timber processing and logging cause much of the potential timber harvest to be wasted. Chainsaw cutting is particularly wasteful and, in spite of being banned, it is common in El Sira, **Peru** (Parkswatch, 2003c) and Pilón Lajas, **Bolivia** (Pauquet, 2005b). Inefficient sawmills have been identified as common in **Belize** (Newman, 2004), **Panama** (Parker *et al*., 2004) and **Trinidad and Tobago** (Applewhite and Billings, 2000) and it is likely that inefficient sawmills are also prevalent in the other range States.

Populations have been reduced on private and lease lands surrounding communities. The demand for cedar timber on the local market is still high and depletion of mature trees represents a threat to the existing population (Cho, Pers. Comm.).

Natural regeneration of the species following logging is scarce (Section 3.3) and selective removal of *C. odorata* has left the forest in some parts of the neotropics with insufficient stock of seed trees (Cintron, 1990). Attack by the shoot boring moth *Hypsipyla* sp. has severely restricted reforestation programmes with *C. odorata* (Watt *et al.,* 2001 and references therein).

Illegal logging further threatens the remaining stocks of the species and has been reported in National Parks in several countries (Section 8.5).

C. odorata is vulnerable to the isolating effects of habitat fragmentation and reduction in population density. In a study of the influence of reproductive isolation and fragmentation on progeny growth rates in **Costa Rica**, isolated mother trees were found to produce inferior progeny when compared to trees from continuous forests and pastures (Navarro, 2002).

Deforestation and the associated habitat loss threaten the species. In Latin America, this is driven by a number of factors, including: migration, road building, land speculation, settlement, government policy and a lack of support for parks and reserves (Mahar and Schneider, 1994).

6. Utilization and trade

6.1 National utilization

Cedrela is used on a massive scale locally, especially in Peru (Pennington, 2006).

Considered to be of high economic value (Mostacedo & Fredericksen, 1999), *C. odorata* produces the most valuable timber within the genus. The wood is aromatic, weather-resistant and durable. By virtue of its durability, excellent working qualities and appearance, it was reported to be perhaps the most important local timber for domestic use in tropical America (Rendle, 1969). The wood is also in high demand in the American tropics because of its natural resistance to termites and rot (Cintron, 1990).

It has been used for all kinds of building work, with the exception of heavy construction, and in joinery and cabinet work (Rendle, 1969). The wood is suitable for making non-structural elements for exteriors and interiors, quality furniture and novelty and craft items (Anon., 2004; Echenique-Marique & Plumptre, 1990). Used for cigar-boxes, insect-resistant chests and wardrobes (Little and Wadsworth, 1964; Titmuss, 1971), roofing shingles, canoes, pencils (Titmuss, 1971), and musical instruments (Ricker & Daly, 1997) particularly guitars (INBio, 1999). In **Jamaica**, it is recommended for wainscoting rooms, chests, the inside work of clothes presses and drawers and shingles to cover houses (Fawcett and Rendle, 1920).

The bark is used as a febrifuge and tonic in some localities in **Guatemala** and as an infusion to treat eruptions in the mouth (Standley and Steyermark, 1946). The plant is used in traditional medicine in **Sao Tome and Principe** mainly for treatment of malaria as well as a febrifuge and against diabetes (Martins *et al*., 2003). Anti-malarial activity has been found in extracts from *C. odorata* wood (MacKinnon *et al*., 1997) and has been found to be effective in *in vivo* trials (Omar *et al*., 2003).

C. odorata is a honey plant (Little and Wadsworth, 1964). It is a primary source of pollen and a secondary source of nectar. Pollen collection by several species of bees has been reported and it is an important nectar source for the honey bee [*Apis mellifera*; Sandker and Totaro (no date and references therein)] and has been part of a reforestation programme by Proyecto de Manejo de Abejas y del Bosque (PROMABOS) for the purpose of beekeeping.

It has been used as a shade tree in coffee and cacao plantations (Cintron, 1990; FAO, 1986; Little and Wadsworth, 1964; Pennington, 1981). In **Papua New Guinea**, the bark has been used for twine (Lemmens *et al*., 1995).

On the Yucatan Peninsula, **Mexico**, individual mature trees of *Cedrela odorata* are often observed outside private houses; the owners consider that the tree represents a type of 'savings' account for the future (Valera, 1997).

6.2 Legal trade

The timber is usually considered next in value in the New World after mahogany *Swietenia mahagoni* (Condit and Pérez, 2002). Throughout the species's range, Spanish cedar has played a major role in

the timber trade (WCMC, 1999). Trade in *C. odorata* and *Cedrela* sp. reported to CITES between 2000 and 2004 is shown in Tables 1-3 in Annex 3. Trade in *Cedrela odorata* reported by INRENA, Peru, is shown in Table 4 in Annex 3.

Between 1986 and 1987 three species, one of which was *C. odorata*, accounted for 58 % of the sawn wood produced in **Belize** (Harcourt & Sayer, 1996). Export trade from **Belize** is difficult to quantify since it is usually classed along with mahogany (*Swietenia macrophylla*). However, the majority of local production is destined for the local market (Cho and Quiroz, 2005). In 1994, **Brazil** exported 97,000 m³ of *Cedrela* sp., selling at an average price of USD 260.00/m³. It was one of the most exploited woods in northern **Costa Rica** (Harcourt & Sayer, 1996) and although it remained one of the most valuable trees in the **Costa Rican** market, it was traded only in the domestic market (Arce Benavides, 1998). In 1995, **Ecuador** was reported to have exported 6000 m³ of *C. odorata* sawn wood at an average price of USD 584/m³. **Guatemala** authorized extraction of 3,248.66 m³ from forests in the Peten in 2003 and in 2005, 35.45 m³ of sawn wood were exported (Szejner, 2005). In **Honduras,** *C. odorata* is used mainly for local construction, but also for sale (Mejía, 2001 and references therein). In spite of the high value of *C. odorata* in the international market, carpenters from communities in **Honduras** receive a very low price that does not vary greatly with species (Mejía, 2001). Based on information in the management plan for the Atlantic forest region of **Honduras**, the potential annual productivity of this species in this region is 342 m³ (Anon., 2004). Records from 1994 indicate that **Honduras** exported logs, sawn wood, plywood and veneer sheets of *C. odorata* and that **Peru** and **Colombia** were exporting sawn wood (ITTO, 1995). For **Mexico**, the ITTO (2004) trends show an expected 200 % increase in trade of high commercial value tropical timber species (*C. odorata, S. macrophylla*, etc.) from the next decade onwards. In **Puerto Rico** some harvest from privately owned land may occur for local domestic use (Gabel, 2006). The United States imported a total of 23,000 m³ *Cedrela* sp. plywood at USD 474/m³ in 1995 (ITTO, 1997). **Peru** and **Trinidad and Tobago** exported sawn wood (ITTO, 1997). There is currently no commercial harvest in **Panama** (Condit & Pérez, 2002).

In Southeast Asia, plantations of *C. odorata* are of small scale and most of the timber is consumed locally. International trade of the species from these countries is of no importance (Lemmens *et al*., 1995).

6.3 Parts and derivatives in trade

Cedrela odorata is valued for its timber, which is traded internationally.

It is used for furniture construction and other specialist uses. Being a wood with high mechanical, physical and resistant properties it has for a long time been used in construction work. However, due to its vulnerability to extinction its use has been substituted by other species, grown in forestry plantations (ITCF/EIF, 2006).

There is evidence on the Internet of international trade in specimens of *C. odorata* harvested in Suriname for medicinal purposes as tincture, bark and seeds (www.tropilab.com).

The timber of *Cedrela odorata* is one of the most widely-used tropical hardwoods both locally in Central and South America and in international trade, second only to true mahogany (*Swietenia macrophylla*). The characteristics which make the timber so prized are the attractive reddish-brown colour, its stability and resistance to fungal and insect attack. It is light in weight, easy to work, aromatic and with an attractive grain which takes a fine polish and is used for furniture, cabinet making, panelling and joinery in general. It is now probably the most widely used timber in houses, hotels and offices in tropical America. The fragrant wood is still preferred above all others for lining cigar boxes. In the forest it is most frequently used for canoes and paddles due to its light weight and resistance to decay (Pennington, 2006).

6.4 Illegal trade

A recent report revealed that the National Institute of Natural Resources of Puno seized, among other species, 3,035 board feet of Spanish cedar at the inter-oceanic highway in southern **Peru**, which were supported by fake documents. The trucks were confiscated and charges are to be pressed against the companies and personnel involved (ITTO, 2006).

There are many reports of illegal logging, even within protected areas (Section 8.5). Globally, it is difficult to quantify, however Griffiths (2005) refers to a recent estimate suggesting that 90 % of timber extraction in the Peruvian Amazon is illegal and that most Peruvian hardwood timber is exported to

Mexico, the United States, Canada and Belgium. Del Gatto (2004) cites an estimate that 75-85 % of broadleaf timber extracted from **Honduras** (including *C. odorata*) is removed illegally. Most logging in **Nicaragua** is either partly or totally illegal (Pommier, no date). Illegal logging of *C. odorata* in **Guatemala** has also been reported (WRM, 2000). Illegal logging has been reported from protected areas in several of the range States (Section 8.5).

6.5 Actual or potential trade impacts

Given the extent of habitat loss and the effect of the long history of over-exploitation, steps must be taken to ensure that trade is limited to sustainable levels. Since unsustainable logging is promoted by international trade, the requirements of CITES Appendix II could be used to achieve sustainability.

7. Legal instruments

7.1 National

C. odorata was added to CITES Appendix III by **Peru** (12/06/01) and then **Colombia** (29/10/01). Both listings have the annotation: "Designates logs, sawn wood and veneer sheets". In **Peru**, forestry law since 2001 has aimed to promote sustainable timber harvesting [though Griffiths (2005) claims this is flawed legislation]. The species has been protected in **Nicaragua** since 1997 by Decree No. 30-97, however Nicaragua's forestry law has been criticized for discouraging small landowners from allowing cedars to regenerate naturally on their farms, due to the bureaucracy involved to gain permission to cut them at a later stage (Mendoza Vidaurre, 2002). The species is present in protected areas in **Bolivia**, the **Bolivian Republic of Venezuela, Costa Rica**, **Guatemala**, **Mexico**, **Peru** and the **Virgin Islands of the United States** (Section 8.5).

7.2 International

No national export quotas for this species have been reported to CITES. The FAO Panel of Experts on Forest Gene Resources listed *Cedrela* species as a high priority for genetic conservation in priority lists elaborated by the Panel in 1985, 1990 and 1994 (Valera, 1997).

8. Species management

8.1 Management measures

Much attention has been paid to management of *C. odorata* in **Belize**; there have been some un-evaluated attempts at plantations (Cho, Pers. Comm.). There are currently no felling restrictions in **Belize** on this species, except for the minimum girth limit of 72 inches (Cho, Pers. Comm.).

Regeneration was reported to be problematic in **Bolivia** due to poor or irregular seed production and a lack of large clearings with adequate light availability (Mostacedo & Fredericksen, 1999). Evidence from nurseries suggests that more than 80 % regeneration can be achieved (INBio, 1999). Although knowledge is available on how to establish regeneration, available techniques are costly or otherwise difficult to implement (Mostacedo & Fredericksen, 1999).

In Pará, **Brazil**, CEMEX (Comercial Madeiras Exportação, S.A.) began two reforestation/forest enrichment projects in 1989. 71,875 *C. odorata* seedlings were planted each year and 200 ha were planted with a mixture of valuable timber trees by the end of 1992 (Smith *et al.,* 1995).

The species has existed in plots established for genetic improvement in **Costa Rica** since 1991 (Piotto *et al*., 2004). CATIE are developing micropropagation technologies with *C. odorata* for multiplication, conservation and genetic improvement programmes (CATIE, no date).

In response to the genetic degradation of dry zone tree species in **Honduras**, CONSEFORH (Conservation and Silviculture of Honduran Dry Forest Species; a bilateral project between the Governments of **Honduras** and the **United Kingdom**) has established a process of evaluation and seed orchards to conserve genetic material that could be used in future reforestation activities.

The species occurs in the following reserves managed by the Government of Puerto Rico: Carite, Guajataca, Guilarte, Maricao, Rio Abajo and Toro Negro. Limited harvest perhaps opportunistically, may occur on those lands, and possible on private owned lands. For many years the US Forest Service has extensively planted seedlings of *C. odorata* in secondary forests in the Luquillo

Mountains in **Puerto Rico**. However, no harvest is occurring from those lands, nor is there a current emphasis to harvest trees from the National Forest (Gabel, 2006).

Worldwide, 19 enterprises producing *C. odorata* have been issued with forest management certificates from the Forest Stewardship Council (FSC, 2006).

A study of the neutral genetic variation of the species identified conservation units within Mesoamerica for each of which a conservation strategy should be devised (Cavers *et al*., 2004).

8.2 Population monitoring

No population monitoring reports have been published for this species.

8.3 Control measures

No population monitoring reports have been published for this species.

8.3.1 International

Listed by Colombia and Peru on CITES Appendix III since 2001.

8.3.2 Domestic

No information.

8.4 Artificial propagation

Although plantations of *C. odorata* have had mixed success, with careful management they have the potential to meet at least some of the demand that would otherwise be met from wild specimens.

The species has been planted in various countries in pure plantation trials but results have not always been satisfactory (Navarro *et al*., 2004). Plantations are difficult to establish because of the severe attack of the shoot borer *Hypsipyla grandella* on the apical buds of seedlings (Navarro *et al*., 2004; Cintron, 1990) and it is for this reason the species is not grown in pure stands. Some success has been achieved in Manu, **Peru,** where seedlings are planted at a distance from one another (Americas Regional Workshop, 1998). More recently, agroforestry systems using *C. odorata* as shade for coffee have been shown to be an economical option for conservation of endangered populations of this species (Navarro *et al*., 2004). In trials in dry tropical region in **Costa Rica**, it was considered a slow growth species that had the lowest survival rates (11-12 % survival) of seven native species planted, due to drought susceptibility and attacks of *H. grandella* (Piotto *et al*., 2004). It exhibited good growth in mixed plantations but poor growth in pure stand plantations (Piotto *et al*., 2004). Due to the wide distribution and the morphological variability of this species, provenances of good growth that are more resistant to the attack of the shoot borer can be obtained (Navarro *et al*., 2004). Navarro *et al.,* (2004) found that provenances from dry areas presented lower growth but also lower frequency of attack than those from wet areas.

C. odorata has been widely introduced into plantations throughout the world (Cintron, 1990). Webb *et al.,* (1984) report that *C. odorata* plantations worldwide produce yields of 11-22 m^3/ha/an. Yields in 40-year-old plantations in Africa of 455 m^3/ha and 150 to 270 m^3/ha in **Suriname** are far greater than annual yields of 0.004 m^3/ha in natural forests in **Mexico**, which reflect the low stocking of the tree in natural forests, partly due to past exploitation and lack of regeneration (Cintron 1990; Lemmens *et al*., 1995 and references therein). Forestry plantations of *C. odorata* in **Mexico** yield between 15 and 20 m^3/ha/yr (Fernandez *et al*., 2002). By optimizing growth parameters, the average height growth after 17 months was increased 2.7-fold, from 55 to 147 cm (Ricker *et al*., 2000). During the first nine years of trial plantations in **Java**, yields of 17 m^3/ha/an were observed at 650 m altitude and 28 m^3/ha/an at 800 m altitude (Lemmens *et al*., 1995 and references therein).

This species is shade-intolerant (Mostacedo & Fredericksen, 1999). One study in Veracruz, **Mexico**, found that *C. odorata* grew best under maximum canopy openness, and so is most suitable for reforestation in the open (Ricker *et al*., 2000).

Plantation experiments in **Puerto Rico** using native seeds were not promising, although seeds from continental America (of *C. mexicana*, "formerly regarded as a distinct species") had mixed results:

most trees died, though a few grew rapidly (Little and Wadsworth, 1964). Plantations of *Cedrela odorata* have been established in the States of **Campeche** and **Yucatan**, **Mexico**, totalling close to 3,500 ha (Valera, 1997). *Cedrela odorata* is included in plantation schemes in Antioquia, **Colombia** (ITTO, 2004).

Outside of the native range, it is one of the most important plantation species in **Solomon Islands** (Ngoro, 2001). However, it has not gained popularity since its introduction into plantations in **Sri Lanka** (Tilakaratna, 2001).

8.5 Habitat conservation

Cedrela odorata is present in protected areas of several countries. However, the protection provided for the species is often threatened by illegal activities, as outlined in some examples below.

In **Peru**, commercial logging is prohibited within National Reserves by Supreme Decree No. 038-2001-AG. *C. odorata* is present in Tambopata National Reserve but illegal logging, agriculture and land conversion are pressing problems (Parkswatch, 2002a). All valuable wood, including *C. odorata*, has already been extracted in accessible places of Alto Mayo Protection Forest (Parkswatch, 2003a). The species is considered to be vulnerable in Machu Picchu Historic Sanctuary (Parkswatch, 2004a). It is one of the most prominent species in Alto Purús Reserved Zone, where illegal logging is increasing (Parkswatch, 2003b). Excessive logging in El Sira Communal Reserve has meant that *C. odorata* is no longer easily found in accessible areas (Parkswatch, 2003c).

In **Bolivia**, in spite of a total logging ban, extraction of valuable timber including *C. odorata* is a great threat in Amboró National Park (Pauquet *et al.,* 2005). Extraction of *C. odorata* continues in Madidi National Park and large volumes of timber are illegally extracted (Pauquet, 2005a). In Pilón Lajas Biosphere Reserve, *C. odorata* remains only in poorly accessible areas. Chainsaw logging has diminished due to exhaustion of supply but illegal logging threatens the remaining stands (Pauquet, 2005b). Illegal settlements, land invasions, agriculture and illegal timber extraction are serious threats in Carrasco National Park, which has important reservoirs of commercially valuable species such as *C. odorata* (Lilienfeld and Pauquet, 2005).

In **Costa Rica,** *C. odorata* is found in the following conservation areas: Amistad Caribe, Amistad Pacifico, Huetar Norte, Arenal, Cordillera Volcánica Central, Guanacaste (including Santa Rosa and Guanacaste National Parks), Osa (including the Golfo Dulce Forest Reserve), Pacifico Central (including the El Rodeo protected zone, and the Carara Biological Reserve), Tempisque (including Palo Verde National Park and Lomas de Barbudal Biological Reserve), and Tortuguero and it probably occurs in other areas of conservation (INBio, 1999). According to ITCR/EIF (2006), State protection is limited.

In **Guatemala**, large numbers of *C. odorata* are present at San Miguel la Palotada Protected Biotope, however the area is threatened with forest fires, illegal extraction of forestry products and road construction (Parkswatch, 2002b). *C. odorata* is favoured by illegal extractors in Cerro Cahuí Protected Biotope (Parkswatch, 2003d). It is found in San Miguel la Palotada Protected Biotope, though some logging continues (Parkswatch, 2002c). It is common in Ceibal Cultural Monument, although illegal deforestation threatens this area (Parkswatch 2002d).

In **Venezuela**, there are reports of illegal trafficking of *Cedrela* sp. for commercial purposes in Guatopo National Park (Parkswatch, 2004b).

In **Mexico**, *C. odorata* is protected from logging in Montes Azules Biosphere Reserve. The biggest threats here include forest fires, deforestation and land invasions (Parkswatch, 2004c).

In the **Virgin Islands of the United States**, the species only occurs on US National Park Service land, where harvest of all trees is prohibited (Gabel, 2006).

8.6 Safeguards

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9. Information on similar species

Cedrela odorata is proposed for listing on the basis 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. All other species in the genus are proposed for listing for look-alike reasons. Information on these species is provided in Annex 1.

Swietenia macrophylla, *S. mahagoni* and *S. humilis* are all included in CITES Appendix II. The wood of *C. odorata* may be confused with *S. macrophylla*; distinguishing characteristics are the absence of fragrance, greater hardness and finer texture in the latter. Microscopy can reveal septate fibres, which distinguish *S. macrophylla* from *C. odorata* (Baas and van Heuven, 2002).

Record and Mell (1924) found it impossible to distinguish between the woods of the different species within the genus *Cedrela*.

Titmuss (1971) reported that it should not be confused with the Honduras cedar, which sometimes reaches the market under the description of West Indian cedar.

According to the wood anatomist at the Royal Botanic Garden Kew, *Cedrela* is fairly straightforward to identify to genus, but even separating the taxonomically distinct *C. odorata* from *C. fissilis* is problematic from the wood anatomy point of view.

The wood of C. odorata is ring-porous and therefore easily separated from that of *Swietenia* which is diffuse porous. *Swietenia* and *Cedrela* often grow together as they require similar conditions; fertile, periodically flooded soils. As *Cedrela* is much more plentiful than *Swietenia* it is more commonly used (Pennington, 2006).

10. Consultations

The document was discussed at the 16th meeting of the CITES Plants Committee. The Netherlands sent a draft proposal to include *Cedrela odorata* in Appendix II to all Parties within the range of this species. Comments received by 14 December 2006 are incorporated in the text. These comprise responses from: Costa Rica (ITCR/EIF, 2006); Peru (INRENA, 2006); the United States (Gabel, 2006). 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).

The United States (Gabel, 2006) noted that to better estimate the extent of trade and its effect on the species in the wild, it would be useful to have additional data, on: harvest from the wild v. plantations; international v. national trade; harvest from third party certified forests; forests with *C. odorata* with protective status; conservation status of the species in each range State; domestic control measures.

Brazil expressed there strong support for the inclusion of *Cedrela* spp. in Appendix II. If it had been possible in the time available before the deadline Brazil would have submitted the proposal as a co-proponent.

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 report (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 *Cedrela odorata* 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 following 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.

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CEDRELA SPECIES (OTHER THAN *C. ODORATA)* AND DISTRIBUTION

The genus Cedrela has undergone major systematic revisions since 1960.

The genus *Cedrela* was described by P. Browne in 1756. In 1759 Linneaus described *C. odorata*. Since then, 69 species have been placed in this genus, including species which occur in the Americas, India, Southeast Asia and Australasia. In 1960 Smith carried out a review of the genus and, based on this study, the Asian and Australasian species were placed in the genus *Toona*, leaving the genus *Cedrela* with only nine species, all of them occurring in the Americas (Patiño Valera, 1997).

1981 Revision

In 1981 Styles (in Pennington, Styles and Taylor, 1981) reviewed the genus with M.T. Germán. These authors recognize seven species:

C. fissilis Vellozo;

C. lilloi C. De Candolle;

C. montana Moritz ex Turczaninov;

C. oaxacensis C. De Candolle & Rose;

C. salvadorensis Standley; and

C. tonduzii C. De Candolle.

The same authors consider four species insufficiently known: *C. angustifolia* Moçiño and Sessé Ex P. de Candolle; *C. discolor* S.F. Blake; *C. imparipinnata* C. de Candolle and *C. weberbaueri* Harms. In 1990, Calderón de Rzedowski G. and Germán M.T., in reporting on the Meliaceae of the Bajío region (Mexico), recognized the existence of *Cedrela dugesii* Watson, which is considered by various authors a synonym of *C. odorata* (Patiño Valera, 1997).

The distribution of the principal species of *Cedrela* in the neotropics is as follows:

– *C. oaxacensis* is endemic to the Balsas River basin in Mexico, occurring in dry areas of the States of Morelos, Guerrero and Oaxaca. In certain areas it is associated with *Pinus* species. Populations consist of small trees of no actual economic importance (Standley and Steyermark, 1946; Lamb, 1968; Pennington, 1981).

– *C. salvadorensis*, occurs in dry tropical forests, from the State of Jalisco to Chiapas in Mexico, continuing through Central America to the north of Panama, generally in dry tropical or deciduous humid forests, on stony and calcareous soils, and generally at altitudes of less than 1,000 meters above sea level, although occasionally the species has been reported to grow at 1,500 meters (Standley and Steyermark, 1946; Lamb, 1968; Pennington, 1981).

– *C. tonduzii* is found from Oaxaca and Chiapas in Mexico through to Panama in Central America. It is a large tree, with good wood properties; on occasion it grows in association with *Pinus* and *Liquidambar* species, at altitudes of 1,100 to 2,800 meters above sea level, generally on soils that are volcanic in origin, fertile and well drained. It is of potential importance in plantations (Standley and Steyermark, 1946; Lamb, 1968; Pennington, 1981).

– The distribution of *C. lilloi* C.D.C is confined to South America. It is found in Bolivia, Peru, Brazil and Argentina. In Bolivia and Argentina the species is found in mountain forests, at altitudes from 1,000 to 3,400 meters above sea level, but is also reported to occur at altitudes as low as 800 meters. In Peru, it is found in high valleys where it forms extensive forests and is also planted for shade. It is a cold-resistant species, deciduous in winter, and is of importance as a producer of wood for local use (Standley and Steyermark, 1946; Lamb, 1968; Pennington, 1981).

– *C. montana* is a species found in the cloud-forest belt and in the 'paramo' areas. It can be seen frequently in open pastureland and in abandoned agricultural areas. In South America, it occurs in the same areas as *C. lilloi*, with which it is associated in the highlands of Venezuela and Peru (1,400 to 3,100 meters above sea level). It is a locally important species (Standley and Steyermark, 1946; Lamb, 1968; Pennington, 1981).

– *C. fissilis* is found from Costa Rica in Central America to southern Brazil and northern Argentina in South America. The wood of this species is considered inferior to that of *C. odorata*, nonetheless in some areas wood of the two species is marketed interchangeably. *C. fissilis* is extremely variable especially in terms of leaf morphology. This has been reflected in a large number of synonyms and varieties that have been described for this species (Standley and Steyermark, 1946, Lamb, 1968; Pennington, 1981).

SCIENTIFIC SYNONYMS OF *CEDRELA ODORATA*

Synonyms according to Pennington, T. D. (In prep.) Monograph on *Cedrela*

Cedrela adenophylla Martius, 1878;

Cedrela brachystachya (C. de Candolle) C. de Candolle, 1907;

Cedrela brownii Loefl. 1891;

Cedrela ciliolata S.F. Blake, 1921;

Cedrela cubensis Bisse, 1974.

Cedrela glaziovii C. de Candolle, 1878;

Cedrela guianensis Adr. Jussieu, 1830;

Cedrela hassleri (C. de Candolle) C. de Candolle, 1907;

Cedrela longipes S.F. Blake, 1922;

Cedrela mexicana M.J. Roemer, 1846; *C. mexicana* var. *puberula*

Cedrela mourae C. de Candolle, 1907;

Cedrela occidentalis C. de Candolle & Rose, 1905;

Cedrela odorata L. var. *xerogeiton*

Cedrela palustris Handro, 1962;

Cedrela paraguariensis Martius, 1837; *C. p.* var. *brachystachya*; *C. p.* var. *multijuga*; *C. p.* var. *hassleri*

Cedrela rotunda S.F. Blake, 1920;

Cedrela sintenisii C. de Candolle, 1907;

Cedrela velloziana M.J. Roemer, 1846;

Cedrela whitfordii S.F. Blake, 1920;

Cedrela yucatana S.F. Blake, 1920;

Surenus brownii (Loefling ex O. Kuntze) Kuntze, 1891;

Surenus glaziovii (C. de Candolle) Kuntze *[DATE?]*

Surenus guianensis (Adr. Jussieu) Kuntze, 1891;

Surenus mexicana (M.J. Roemer) Kuntze, 1891;

Surenus velloziana (M.J. Roemer) Kuntze, 1891;

TRADE DATA FOR *CEDRELA ODORATA*

Table 1. Reported trade in *Cedrela odorata* from range States (wild source material)[1]

Range State	Term/units	Reported by:	1999	2000	2001	2002	2003	2004	2005	Total
Bolivia	m^2	Importer					9			9
	m^3	Exporter			1,372	47,038	23,391	14,159	10,949	96,909
		Importer				62	38	158	84	342
	timber pieces	Importer							4,657	4,657
Brazil	kg	Importer					25,800			25,800
	m^3	Importer				739	1,195	1,697	1,516	5,148
	sawn wood	Importer					1,408			1,408
Colombia	g	Importer				100				100
Ecuador	m^3	Importer				81				81
Guatemala	m^3	Exporter						26		26
Nicaragua	m^3	Exporter					108	38		146
		Importer				6				6
Peru	m^3	Exporter	3,675	1,473	2,936	8,680	11,627	29,391		57,783
		Importer			308	4,581	10,363	24,652	10,387	50,290
	carvings	Exporter				4	226			230
Suriname	m^3	Exporter						23		23
		Importer						18		18
Venezuela	m^3	Exporter						16		16
		Importer						16		16
	carvings	Exporter						50		50

[1] *Data taken from CITES Trade Database, 27 November 2006. Excludes pre-Convention data and re-exports. NB:* Cedrela odorata *was included in CITES Appendix III in 2001 by Colombia and Peru, see Section 7.1.*

Table 2. Trade in *Cedrela* sp. reported to CITES

Exporter	Term	1999	2001
Bolivia	Veneer		49,603 m^2
	Sawn wood		2,069 m^3
Peru	Sawn wood	1,900 m^3	

(Data taken from CITES Trade Database 27 November 2006)

Table 3. Exports of *Cedrela* sp. from Brazil, 1993-1995 (Source: IBAMA, 1996)

Year	Sawn wood		Veneer	
	Tonnes	USD FOB#	Tonnes	USD FOB
1993	37.197	21,609	1.098	807
1994	32.598	22,165	833	616
1995	22.125	16,510	416	655

FOB – Free On Board – includes cost of delivery to specified point

Table 4. Exports of *Cedrela odorata* from Peru, 2000-2001 (Source: INRENA, 2006)

Year	Number of permits	Volume m^3	Value FOB $	$. m^3
2000	92	5,550.18	3,538,619.60	637.57
2001	38	2,998.82	1,846,520.83	617.81
2002	111	8,760.97	5,638,073.00	643.54
2003	184	11,588.05	6,865,184.10	592.44
2004	402	29,390.87	19,339,143.77	658.00
2005	405	29,163.48	18,825,504.07	645.52

Conf. 9.24 (Rev. CoP14)* Criteria for amendment of Appendices I and II

RECALLING that Resolution Conf. 9.24, adopted by the Conference of the Parties at its ninth meeting (Fort Lauderdale, 1994) recommended that the text and the annexes of this Resolution be fully reviewed before the 12th meeting of the Conference of the Parties with regard to the scientific validity of the criteria, definitions, notes and guidelines and their applicability to different groups of organisms;

RECALLING that the Conference of the Parties at its 12th meeting (Santiago, 2002), approved procedures for this review, laid down in Decision 12.97[2];

CONSIDERING the fundamental principles in paragraphs 1 and 2 of Article II of the Convention, which specify the species to be included in Appendices I and II;

RECOGNIZING that to qualify for inclusion in Appendix I a species must meet biological and trade criteria;

RECALLING that Article II, paragraph 2 (a), provides for the inclusion of species which may become threatened with extinction in Appendix II, in order to avoid utilization incompatible with their survival;

RECOGNIZING that for the proper implementation of this provision it is necessary to adopt appropriate criteria, considering both biological and trade factors;

RECALLING that paragraph 2 (b) of Article II provides only for the inclusion in Appendix II of species which must be subject to regulation in order that trade in specimens of certain species included in Appendix II in accordance with Article II, paragraph 2 (a), may be brought under effective control;

CONSIDERING, however, that this provision should also apply where there is a need to bring under effective control trade in specimens of species included in Appendix I;

RECOGNIZING that the range States of a species subject to an amendment proposal should be consulted by the proponent, or on its behalf by the Secretariat, in accordance with the relevant Resolutions of the Conference of the Parties, and that all Parties shall be consulted by the Secretariat in accordance with Article XV, paragraph 1 (a), of the Convention;

RECOGNIZING further that the Secretariat, in accordance with the same Article, shall consult intergovernmental bodies having a function in relation to marine species;

CONSIDERING that the Secretariat should also consult other intergovernmental bodies having a function in relation to any species subject to a proposal for amendment;

RECALLING that the international trade in all wild fauna and flora is under the purview of the Convention;

EMPHASIZING the importance of Resolution Conf. 3.4, adopted by the Conference of the Parties at its third meeting (New Delhi, 1981), regarding the need to provide to developing countries technical assistance in matters relating to the Convention, and specifically in the application of the criteria for amendment of Appendices I and II;

NOTING the objective to ensure that decisions to amend the Convention's Appendices are founded on sound and relevant scientific information, take into account socio–economic factors, and meet agreed biological and trade criteria for such amendments;

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* *Amended at the 12th, 13th and 14th meetings of the Conference of the Parties.*

[2] *Deleted at the 13th meeting of the Conference of the Parties.*

RECOGNIZING the importance of the application of Rio Principle 15, the Precautionary Approach, in cases of uncertainty;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

ADOPTS the following Annexes as an integral part of this Resolution:

Annex 1: Biological criteria for Appendix I;

Annex 2 a: Criteria for the inclusion of species in Appendix II in accordance with Article II, paragraph 2 (a), of the Convention;

Annex 2 b: Criteria for the inclusion of species in Appendix II in accordance with Article II, paragraph 2 (b), of the Convention;

Annex 3: Special cases;

Annex 4: Precautionary measures;

Annex 5: Definitions, explanations and guidelines; and

Annex 6: Format for proposals to amend the Appendices;

RESOLVES that, when considering proposals to amend Appendix I or II, the Parties shall, by virtue of the precautionary approach and in case of uncertainty either as regards the status of a species or the impact of trade on the conservation of a species, act in the best interest of the conservation of the species concerned and adopt measures that are proportionate to the anticipated risks to the species;

RESOLVES that, when considering proposals to amend Appendices I and II, the following applies:

a) species that are or may be affected by trade should be included in Appendix I in accordance with Article II, paragraph 1, if they meet at least one of the biological criteria listed in Annex 1;

b) species should be included in Appendix II under the provisions of Article II, paragraph 2 (a), if they satisfy the criteria listed in Annex 2 a;

c) species should be included in Appendix II under the provisions of Article II, paragraph 2 (b), if they satisfy the criteria listed in Annex 2 b;

d) no single species may be included in more than one Appendix at the same time;

e) however subspecies, populations or other subcategories of a species may be included in different Appendices at the same time in accordance with the relevant criteria in Annex 3;

f) higher taxa should be included in the Appendices only if they satisfy the relevant criteria in Annex 3;

g) hybrids may be specifically included in the Appendices but only if they form distinct and stable populations in the wild;

h) species of which all specimens in trade have been bred in captivity or artificially propagated should not be included in the Appendices if there is a negligible probability of trade taking place in specimens of wild origin;

i) species included in Appendix I for which sufficient data are available to demonstrate that they do not meet the criteria listed in Annex 1 should be transferred to Appendix II only in accordance with the relevant precautionary measures listed in Annex 4;

j) species included in Appendix II in accordance with Article II, paragraph 2 (a), that do not meet the criteria listed in Annex 2 a, should be deleted only in accordance with the relevant precautionary measures listed in Annex 4; and species included in accordance with Article II, paragraph 2 (b), because they look like the species subject to the deletion, or for a related reason, should also be deleted only in accordance with the relevant precautionary measures; and

k) the views, if any, of intergovernmental bodies with competence for the management of the species concerned should be taken into account;

RESOLVES that proposals to amend Appendices I and II should be based on the best information available and, when appropriate, presented in the format in Annex 6;

ENCOURAGES proponents that submit proposals to transfer species to Appendix I, or to establish zero export quotas for species under review in accordance with the provisions of the Review of Significant Trade, to take account of the applicable findings of that review;

RESOLVES that annotations to proposals to amend Appendix I or Appendix II should be made in accordance with the applicable Resolutions of the Conference of the Parties, be specific and accurate as to affected parts and derivatives and should, to the extent possible, be harmonized with existing annotations;

ENCOURAGES Parties, when sufficient relevant biological data are available, to include a quantitative evaluation in the supporting statement of the amendment proposal;

RESOLVES that, to monitor the effectiveness of protection offered by the Convention, the status of species included in Appendices I and II should be regularly reviewed by the range States and proponents, in collaboration with the Animals Committee or the Plants Committee, subject to the availability of funds;

URGES Parties and cooperating organizations to provide financial and technical assistance, when requested, in the preparation of proposals to amend the Appendices, the development of management programmes, and the review of the effectiveness of the inclusion of species in the Appendices. Parties should be open to using other available international mechanisms and instruments for these purposes in the broader context of biodiversity; and

REPEALS part of Resolution Conf. 1.3 (Bern, 1976) – Deletion of species from Appendix II or III in certain circumstances – paragraph a).

Annex 1 Biological criteria for Appendix I

The following criteria must be read in conjunction with the definitions, explanations and guidelines listed in Annex 5, including the footnote with respect to application of the definition of 'decline' for commercially exploited aquatic species.

A species is considered to be threatened with extinction if it meets, or is likely to meet, **at least one** of the following criteria.

A. The wild population is small, and is characterized by **at least one** of the following:

   i) an observed, inferred or projected decline in the number of individuals or the area and quality of habitat; or

   ii) each subpopulation being very small; or

   iii) a majority of individuals being concentrated geographically during one or more life-history phases; or

   iv) large short-term fluctuations in population size; or

   v) a high vulnerability to either intrinsic or extrinsic factors.

B. The wild population has a restricted area of distribution and is characterized by **at least one** of the following:

   i) fragmentation or occurrence at very few locations; or

   ii) large fluctuations in the area of distribution or the number of subpopulations; or

   iii) a high vulnerability to either intrinsic or extrinsic factors; or

   iv) an observed, inferred or projected decrease in any one of the following:

      – the area of distribution; or
      – the area of habitat; or
      – the number of subpopulations; or
      – the number of individuals; or
      – the quality of habitat; or
      – the recruitment.

C. A marked decline in the population size in the wild, which has been **either**:

i) observed as ongoing or as having occurred in the past (but with a potential to resume); or

ii) inferred or projected on the basis of any one of the following:

– a decrease in area of habitat; or
– a decrease in quality of habitat; or
– levels or patterns of exploitation; or
– a high vulnerability to either intrinsic or extrinsic factors; or
– a decreasing recruitment.

Annex 2 a — Criteria for the inclusion of species in Appendix II in accordance with Article II, paragraph 2 (a), of the Convention

The following criteria must be read in conjunction with the definitions, explanations and guidelines listed in Annex 5, including the footnote with respect to application of the definition of 'decline' for commercially exploited aquatic species.

A species should be included in Appendix II when, on the basis of available trade data and information on the status and trends of the wild population(s), **at least one** of the following criteria is met:

A. It is known, or can be inferred or projected, that the regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future; or

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.

Annex 2 b — Criteria for the inclusion of species in Appendix II in accordance with Article II, paragraph 2 (b), of the Convention

Species may be included in Appendix II in accordance with Article II, paragraph 2 (b), if **either one** of the following criteria is met:

A. The specimens of the species in the form in which they are traded resemble specimens of a species included in Appendix II under the provisions of Article II, paragraph 2 (a), or in Appendix I, such that enforcement officers who encounter specimens of CITES-listed species, are unlikely to be able to distinguish between them; or

B. There are compelling reasons other than those given in criterion A above to ensure that effective control of trade in currently listed species is achieved.

Annex 3 — Special cases

Split-listing

Listing of a species in more than one Appendix should be avoided in general in view of the enforcement problems it creates.

When split-listing does occur, this should generally be on the basis of national or regional populations, rather than subspecies. Split-listings that place some populations of a species in the Appendices, and the rest outside the Appendices, should normally not be permitted.

For species outside the jurisdiction of any State, listing in the Appendices should use the terms used in other relevant international agreements, if any, to define the population. If no such international agreement exists, then the Appendices should define the population by region or by geographic coordinates.

Taxonomic names below the species level should not be used in the Appendices unless the taxon in question is highly distinctive and the use of the name would not give rise to enforcement problems.

Higher taxa

If all species of a higher taxon are included in Appendix I or II, they should be included under the name of the higher taxon. If some species in a higher taxon are included in Appendix I or II and all the rest in the other Appendix, the latter species should be included under the name of the higher taxon, with an appropriate annotation made in accordance with the provisions of the relevant Resolutions on the use of annotations in the Appendices.

Parties contemplating preparing a proposal to transfer an individual plant species from a higher-taxon listing in Appendix II to a separate listing in Appendix I should consider:

i) the ease with which it can be propagated artificially;

ii) the extent to which it is currently available in cultivation from artificially propagated specimens; and

iii) any practical problems in identifying the species, particularly in the form in which it may be traded.

Annex 4 Precautionary measures

When considering proposals to amend Appendix I or II, the Parties shall, by virtue of the precautionary approach and in case of uncertainty either as regards the status of a species or the impact of trade on the conservation of a species, act in the best interest of the conservation of the species concerned and adopt measures that are proportionate to the anticipated risks to the species.

A. 1. No species listed in Appendix I shall be removed from the Appendices unless it has been first transferred to Appendix II, with monitoring of any impact of trade on the species for at least two intervals between meetings of the Conference of the Parties.

2. Species included in Appendix I should only be transferred to Appendix II if they do not satisfy the relevant criteria in Annex 1 and only when one of the following precautionary safeguards is met:

a) the species is not in demand for international trade, nor is its transfer to Appendix II likely to stimulate trade in, or cause enforcement problems for, any other species included in Appendix I; or

b) the species is likely to be in demand for trade, but its management is such that the Conference of the Parties is satisfied with:

i) implementation by the range States of the requirements of the Convention, in particular Article IV; and

ii) appropriate enforcement controls and compliance with the requirements of the Convention; or

c) an integral part of the amendment proposal is an export quota or other special measure approved by the Conference of the Parties, based on management measures described in the supporting statement of the amendment proposal, provided that effective enforcement controls are in place; or

d) a ranching proposal is submitted consistent with the applicable Resolutions of the Conference of the Parties and is approved.

3. No proposal for transfer of a species from Appendix I to Appendix II shall be considered from a Party that has entered a reservation for the species in question, unless that Party agrees to remove the reservation within 90 days of the adoption of the amendment.

4. No species should be deleted from Appendix II if such deletion would be likely to result in it qualifying for inclusion in the Appendices in the near future.

5. No species should be deleted from Appendix II if, within the last two intervals between meetings of the Conference of the Parties, it has been subject to a recommendation under the provisions of the Review of Significant Trade to improve its conservation status.

B. The following review procedures shall apply when a species is transferred to Appendix II pursuant to paragraph A. 2. c) above.

1. Where the Plants Committee, the Animals Committee or a Party becomes aware of problems in compliance with the management measures and export quotas of another Party, the Secretariat shall be informed and, if the Secretariat fails to resolve the matter satisfactorily, it shall inform the Standing Committee which may, after consultation with the Party concerned, recommend to all Parties that they suspend trade with that Party in specimens of CITES-listed species, and/or request the Depositary Government to prepare a proposal to transfer the population back to Appendix I.

2. If, on review of a quota and its supporting management measures, the Animals or Plants Committee encounters any problems with compliance or potential detriment to a species, the relevant Committee shall request the Depositary Government to prepare a proposal for appropriate remedial action.

C. With regard to quotas established pursuant to paragraph A. 2. c) above.

1. If a Party wishes to renew, amend or delete such a quota, it shall submit an appropriate proposal for consideration at the next meeting of the Conference of the Parties.

2. When a quota has been established for a limited period of time, after that period the quota will become zero until a new quota has been established.

D. Species that are regarded as possibly extinct should not be deleted from Appendix I if they may be affected by trade in the event of their rediscovery; these species should be annotated in the Appendices as 'possibly extinct'.

Annex 5 Definitions, explanations and guidelines

NOTE: Where numerical guidelines are cited in this Annex, they are presented only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology.

Species

In Article I of the Convention, the term 'species' is defined as "any species, subspecies or geographically separate population thereof".

'Species' and 'subspecies' refer to the biological concept of a species, and do not require any further definition.

The two terms also cover varieties.

'Geographically separate population' refers to parts of a species or a subspecies within particular geographical boundaries. This can also refer to populations or subpopulations, or, for the sake of convenience in certain cases, to 'stocks' as the term is understood in fisheries management.

Until now, the Conference of the Parties has interpreted 'geographically separate populations' as populations delimited by geopolitical boundaries, whereas they have rarely used the other option of geographical boundaries.

Affected by trade

A species "is or may be affected by trade" if:

i) it is known to be in trade (using the definition of 'trade' in Article I of the Convention), and that trade has or may have a detrimental impact on the status of the species; or

ii) it is suspected to be in trade, or there is demonstrable potential international demand for the species, that may be detrimental to its survival in the wild.

Area of distribution

The 'area of distribution' of a species is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of occurrence, excluding cases of vagrancy and introductions outside its natural range (though inferring and projecting area of occurrence should be undertaken carefully, and in a precautionary manner). The area within the imaginary boundary should, however, exclude significant areas where the species does not occur, and so, in defining an area of distribution, account should be taken of discontinuities or disjunctions in the spatial distribution of species. This encompasses the concept of area of occupancy. For migratory species, the area of distribution is the smallest area essential at any stage for the survival of that species (e.g. colonial nesting sites, feeding sites for migratory taxa, etc.). The determination that a species has a restricted area of distribution is taxon-specific and should take into account considerations such as habitat specificity, population density and endemism.

Decline

A 'decline' is a reduction in the abundance, or area of distribution, or area of habitat of a species. The assessment of decline by reference to area of habitat may be more appropriate where there are intrinsic difficulties in measuring the number of individuals.

Decline can be expressed in two different ways: (i) the overall long-term extent of decline; or (ii) the recent rate of decline. The long-term extent of decline is the total estimated or inferred percentage reduction from a baseline level of abundance or area of distribution. The recent rate of decline is the percentage change in abundance or area of distribution over a recent time period. The data used to estimate or infer a baseline for extent of decline should extend as far back into the past as possible.

The judgement that a decline is marked is taxon-specific and can be justified by a number of considerations for example, the population dynamics of a related taxonomic group. A general guideline for a marked historical extent of decline is a percentage decline to 5%-30% of the baseline, depending on the biology and productivity of the species. Productivity is the maximum percentage growth rate of a population. It is a complex function of reproductive biology, fecundity, individual growth rates, natural mortality, age at maturity and longevity. More-productive species tend to have high fecundity, rapid individual growth rates and high turnover of generations.

The extremes of 5% and 30% will be applicable to only a relatively small number of species, but some species may even fall outside of these extremes. However, both these figures are presented only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology ([3]see footnote with respect to application of decline to commercially exploited aquatic species).

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[3] **Application of decline for commercially exploited aquatic species**

In marine and large freshwater bodies, a narrower range of 5-20% is deemed to be more appropriate in most cases, with a range of 5-10% being applicable for species with high productivity, 10-15% for species with medium productivity and 15-20% for species with low productivity. Nevertheless some species may fall outside this range. Low productivity is correlated with low mortality rate and high productivity with high mortality. One possible guideline for indexing productivity is the natural mortality rate, with the range 0.2-0.5 per year indicating medium productivity.

In general, historical extent of decline should be the primary criterion for consideration of listing in Appendix I. However, in circumstances where information to estimate extent-of-decline is limited, rate-of-decline over a recent period could itself still provide some information on extent-of-decline.

For listing in Appendix II, the historical extent of decline and the recent rate of decline should be considered in conjunction with one another. The higher the historical extent of decline, and the lower the productivity of the species, the more important a given recent rate of decline is.

A general guideline for a marked recent rate of decline is the rate of decline that would drive a population down within approximately a 10-year period from the current population level to the historical extent of decline guideline (i.e. 5-20% of baseline for exploited fish

A general guideline for a marked recent rate of decline is a percentage decline of 50% or more in the last 10 years or three generations, whichever is the longer. If the population is small, a percentage decline of 20% or more in the last 5 years or 2 generations (whichever is the longer) may be more appropriate. However, these figures are presented only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology.

The historical extent of decline and the recent rate of decline should be considered in conjunction with one another. In general, the higher the historical extent of decline, and the lower the productivity of the species, the more important a given recent rate of decline is.

In estimating or inferring the historical extent of decline or the recent rate of decline, all relevant data should be taken into account. A decline need not necessarily be ongoing. If data are available only for a short period and the extent or rate of decline based on these data are cause for concern, the guidelines above (extrapolated as necessary or relevant) should still apply. However, natural fluctuations should not normally count as part of a decline, but an observed decline should not necessarily be considered part of a natural fluctuation unless there is evidence for this. A decline that is the result of legal activities carried out pursuant to a scientifically based harvesting programme that reduces the population to a planned level, not detrimental to the survival of the species, would not normally be covered by the term 'decline'.

Fluctuations

Fluctuations in population size or area of distribution are considered large when the population size or area in question varies widely, rapidly or frequently. The judgement that there are large short-term fluctuations in the number of individuals is taxon-specific. For instance, it depends on the generation length of the taxon.

Fragmentation

'Fragmentation' refers to the case where most individuals within a taxon are found in small and relatively isolated subpopulations, which increases the probability that these small subpopulations will become extinct and the opportunities for re-establishment are limited.

Generation length

'Generation length' is the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural (i.e. pre-disturbance) generation length should be used.

Inferred or projected

This refers to estimations using indirect or direct methods. Inferences may be made on the basis either of direct measurements or from indirect evidence. Projection involves extrapolation to infer likely future values.

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species). There should rarely be a need for concern for populations that have exhibited an historical extent of decline of less than 50%, unless the recent rate of decline has been extremely high.

Even if a population is not declining appreciably, it could be considered for listing in Appendix II if it is near the extent-of-decline guidelines recommended above for consideration for Appendix-I-listing. A range of between 5% and 10% above the relevant extent-of-decline might be considered as a definition of 'near', taking due account of the productivity of the species.

A recent rate-of-decline is important only if it is still occurring, or may resume, and is projected to lead to the species reaching the applicable point for that species in the Appendix-I extent-of-decline guidelines within approximately a 10-year period. Otherwise the overall extent-of-decline is what is important. When sufficient data are available, the recent rate-of-decline should be calculated over approximately a 10-year period. If fewer data are available, annual rates over a shorter period could be used. If there is evidence of a change in the trend, greater weight should be given to the more recent consistent trend. In most cases, listing would only be considered if the decline were projected to continue.

In considering the percentages indicated above, account needs to be taken of taxon- and case-specific biological and other factors that are likely to affect extinction risk. Depending on the biology, patterns of exploitation and area of distribution of the taxon, vulnerability factors (as listed in this Annex) may increase this risk, whereas mitigating factors (e.g. large absolute numbers or refugia) may reduce it.

Near future

This refers to a time period in which it can be projected or inferred that a species would satisfy one (or more) of the criteria in Annex I unless it is included in Appendix II. This will be taxon- and case-specific but should be greater than 5 years and less than 10 years.

Population issues

Population

'Population' refers to the total number of individuals of the species (as 'species' is defined in Article I of the Convention and in this Annex).

Wild population

'Wild population' refers to the total number of free-living individuals of the species within its area of distribution, as defined in this Annex.

Subpopulation

'Subpopulations' are defined as geographically or otherwise distinct groups in the population between which there is limited genetic exchange.

Population size

When providing details on the size of a population or subpopulation, it should be made clear whether the information presented relates to an estimate of the total number of individuals or to the effective population size (i.e. individuals capable of reproduction, excluding individuals that are environmentally and behaviourally or otherwise reproductively suppressed in the wild) or to another appropriate measure, index or component of the population.

In the case of species biologically dependent on other species for all or part of their life cycles, biologically appropriate values for the host or co-dependent species should be chosen.

Small wild population

The judgement that a wild population is small is taxon-specific and can be justified by a number of considerations. For example, the population of a related taxonomic group. For some low-productivity species where data exist to make an estimate, a figure of less than 5,000 individuals has been found to be an appropriate guideline (not a threshold) of what constitutes a small wild population but the number could be higher for higher productivity species. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable to all taxa. There will be many cases where this numerical guideline does not apply.

Very small wild subpopulation

The judgement that a wild subpopulation is very small is taxon-specific. For some species where data exist to make an estimate, a figure of less than 500 individuals has been found to be an appropriate guideline (not a threshold) of what constitutes a very small wild subpopulation. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable to all taxa. There will be many cases where this numerical guideline does not apply.

Possibly extinct

A species is 'possibly extinct' when exhaustive surveys in known and/or suspected habitat, and at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Before a species can be declared possibly extinct, surveys should take place over a time-frame appropriate to the species' life cycle and life form.

Recruitment

'Recruitment' is the total number of individuals added to any particular demographic class of a population by either sexual or asexual reproduction.

Threatened with extinction

'Threatened with extinction' is defined by Annex 1. The vulnerability of a species to threats of extinction depends on its population demographics, biological characteristics (such as body size, trophic level, life cycle, breeding structure or social structure requirements for successful reproduction), and vulnerability due to aggregating habits, natural fluctuations in population size, and/or residency/migratory patterns. This makes it impossible to give numerical threshold values for population size or area of distribution that are applicable to all taxa.

Vulnerability

'Vulnerability' can be defined as the susceptibility to intrinsic or external effects which increase the risk of extinction (even when mitigating factors are taken into account). There are a number of taxon- or case-specific biological and other factors that may affect the extinction risk associated with a given percentage decline, small population size or restricted area of distribution. These can be, but are not limited to, aspects of any of the following:

Intrinsic factors

- Life history (e.g. low fecundity, slow growth rate of the individual, high age at first maturity, long generation time)
- Low absolute numbers or biomass or restricted area of distribution
- Population structure (age/size structure, sex ratio)
- Behavioural factors (e.g. social structure, migration, aggregating behaviour)
- Density (for sessile or semi-sessile species)
- Specialized niche requirements (e.g. diet, habitat)
- Species associations such as symbiosis and other forms of co-dependency
- Reduced genetic diversity
- Depensation (prone to continuing decline even in the absence of exploitation)
- Endemism
- Seed dispersal mechanism
- Specialized pollinators

Extrinsic factors

- Selectivity of removals (that may compromise recruitment)
- Threats from alien invasive species (hybridization, disease transmission, depredation, etc.)
- Habitat degradation (contamination, soil erosion, alteration by alien invasive species, etc.)
- Habitat loss/destruction
- Habitat fragmentation
- Harsh environmental conditions
- Threats from disease
- Rapid environmental change (e.g. climate regime shifts)
- Stochastic events.

Annex 6 Format for proposals to amend the Appendices

The following provides information and instructions for the submission of a proposal to amend the Appendices and the appropriate supporting statement. Proponents should be guided by the need to provide to the Conference of the Parties sufficient information, of sufficient quality and in sufficient detail, to allow it to judge the proposal against the criteria established for the proposed action. This means that the relevant published and unpublished sources of information should be used, although for some species the amount of scientific information will be limited. Analogy with related taxonomic groups or species that are ecologically similar may be used to guide judgements. Where research has been undertaken specifically to obtain information for the proposal, it should be presented in sufficient detail to be assessed by the Parties.

Parties are reminded that proposals should normally be limited to 12 pages (exclusive of references cited). If the proposal is longer than 12 pages, the proponent should provide translations into the working languages of the Convention. Furthermore, this means that it may not be possible to address all elements of the proposal format.

A. Proposal

The proponent should indicate the specific amendment to the Appendices and any relevant annotations or qualifications. The proponent should justify the basis on which the species meets the relevant criteria.

- Inclusion in Appendix I or transfer from Appendix II to Appendix I. Specify which of the criteria in Annex 1 of the Resolution are satisfied.
- Inclusion in Appendix II
    - in accordance with Article II 2 (a). Specify which of the criteria in Annex 2 a of the Resolution are satisfied.
    - in accordance with Article II 2 (b)
        - for reasons of look-alike problems (criterion A of Annex 2 b). In this case, the names of the similar species already included in the Appendices should be given in section C11, 'Additional remarks'.
        - for other reasons (such as those referred to in Annex 2 b, criterion B and/or Annex 3 to this Resolution).
- Transfer from Appendix I to Appendix II in accordance with a precautionary measure specified in Annex 4 to this Resolution. Specify which of the criteria in Annex 2 of this Resolution are satisfied; specify why the criteria in Annex 1 of this Resolution are no longer satisfied; specify which of the measures in Annex 4 of this Resolution are satisfied or implemented.
- Deletion from Appendix II. Specify why the criteria in Annex 2 of this Resolution are not satisfied.
- Other action (provide explanation, e.g. amendment of a quota).

Annotations

If a specific annotation to the listing in the Appendices is proposed, the proponent should:

- ensure that the proposed annotation is in compliance with the applicable Resolution;
- indicate the practical intent of the annotation;
- harmonize new annotations with existing annotations; and
- be specific and accurate as to affected parts and derivatives.

B. Proponent

The proponent may only be a Party to the Convention, in accordance with Article XV of the Convention.

C. Supporting statement

1. Taxonomy

The proponent should provide sufficient information to allow the Conference of the Parties to identify clearly the taxon that is the subject of the proposal.

1.1 Class

1.2 Order

1.3 Family

1.4 Genus, species or subspecies, including author and year

If the species concerned is included in one of the standard lists of names or taxonomic references adopted by the Conference of the Parties, the name provided by that reference should be entered here. If the species concerned is not included in one of the adopted standard references, the proponent should provide references as to the source of the name used.

1.5 Scientific synonyms

The proponent should provide information on other scientific names or synonyms under which the species concerned may be known currently, especially if these names are used in the trade in the species.

1.6 Common names (including, where appropriate, trade names)

1.7 Code numbers

If the species concerned is already included in the Appendices, refer to the code numbers in the CITES Identification Manual.

2. Overview

Provide a brief overview of key elements of the proposal. Parties should cite key sections of the supporting statement.

3. Species characteristics

The information required in this section is a summary of surveys, literature searches, and relevant studies. The references used must be listed in section 12 of the proposal. It is understood that the quality of the information available will vary a lot, but these instructions indicate the type of information that is required. If the proposal relates to a geographically separate population or subspecies, it should consider, where relevant, the biological species in its entirety to provide the appropriate context.

3.1 Distribution

Specify the currently known range of the species. If possible, provide information to indicate whether or not the distribution of the species is continuous and, if it is not, indicate to what degree it is fragmented.

3.2 Habitat

Specify the types of habitats occupied by the species and, when relevant, the degree of habitat specificity and the extent of each habitat type over the range of the species.

3.3 Biological characteristics

Provide a summary of general biological and life history characteristics of the species (e.g. reproduction, recruitment, survival rate, migration, sex ratio, regeneration or reproductive strategies).

3.4 Morphological characteristics

Provide a general description of the morphological diagnostic characteristics of the species, including colour, and information on morphological features by which the species can be differentiated from taxonomically closely related species.

3.5 Role of the species in its ecosystem

If available, provide information about the role of this species in its ecosystem, and other relevant ecological information, as well as the potential impact of this proposal on that role.

4. Status and trends

This section includes qualitative and quantitative information that allows past and present trends to be evaluated pursuant to the criteria. The sources used must be referenced in section 12 of the proposal. It is understood that the quality of the information available will vary. The instructions below indicate the type of information that should be provided if possible. If the proposal relates to a geographically separate population or subspecies, it should consider, when relevant, the biological species in its entirety to provide the appropriate context. If available, the proposal should include any relevant quantitative analyses, stock assessments, etc. The proposal should note whether conclusions are based on observations, inferences or projections.

4.1 Habitat trends

Give information on the nature, rate and extent of habitat change (e.g. loss, degradation or modification), noting when applicable the degree of fragmentation and discernible changes in the quality of habitat. Where appropriate, the relationship between habitat and population trends should be described.

4.2 Population size

Give an estimate of the current total population or number of individuals differentiated by relevant age classes where possible, or other indices of population abundance, based on the most recently available data. Provide information on the source of the data used. Where appropriate provide the

number of subpopulations, and their estimated sizes. Population size may be estimated by reference to population density, having due regard to habitat type and other methodological considerations.

4.3 Population structure

Provide basic information on the current structure of the population and any past or current changes over time in that structure (e.g. social structure, population demographics, proportion of mature individuals or sex ratio).

4.4 Population trends

Basic, quantitative and qualitative information, when available, should be provided on current and past trends in the species' abundance (provide sources). The period over which these trends, if any, have been measured should be indicated. If the species naturally undergoes marked fluctuations in population size, information should be provided to demonstrate that the trend transcends natural fluctuations. If generation-time has been used in estimating the trend, state how the generation-time has been estimated.

4.5 Geographic trends

Provide information, when available on current and past trends in the species' distribution, indicating the period over which these trends, if any, have been measured. If relevant give data on the degree and periodicity of fluctuations in the area of distribution.

5. Threats

Specify the nature, intensity and if possible relative importance of human-induced threats (e.g. habitat loss and/or degradation; over-exploitation; effects of competition/ predation/disease by introduced species, hybridization, toxins and pollutants; etc.).

6. Utilization and trade

6.1 National utilization

Specify the types and extent of all known uses of the species, indicating trends if possible. Provide details of harvest methods. Indicate the extent to which utilization is from captive-bred, artificially propagated, or wild specimens.

Provide details of any stockpiles known to exist, and the measures that might be taken to dispose of them.

6.2 Legal trade

Quantify the level of international trade, identifying the source of statistics used (e.g. Customs statistics, CITES annual report data, FAO data, industry reports, etc.). Provide justification for inferences made about trade levels. Provide information about the nature of the trade (e.g. primarily for commercial purposes, primarily live specimens, primarily parts and derivatives, primarily of captive-bred or artificially propagated specimens, etc.) and about how the proposed amendment is expected to affect the nature of the trade.

6.3 Parts and derivatives in trade

To the extent possible, list parts and derivatives, including types of products in trade, Customs tariff codes specific to those parts and derivatives, and major importing and exporting countries that trade in those parts and derivatives.

6.4 Illegal trade

To the extent possible, quantify the level of illegal trade, nationally and internationally, and describe its nature. Assess the relative importance of this trade in relation to legal offtake for national use or legal international trade. Provide information on how the proposed amendment is expected to affect the nature of the trade.

6.5 Actual or potential trade impacts

Discuss the importance of current and/or future exploitation for international trade relative to overall use (domestic included) as a threat to the species in question.

7. Legal instruments

7.1 National

Provide details of legislation relating to the conservation of the species, including its habitat, either specifically (such as endangered-species legislation) or generally (such as legislation on wildlife and accompanying regulations). Indicate the nature of legal protection (i.e. is the species totally protected, or whether harvesting is regulated or controlled). Provide an assessment of the effectiveness of this legislation in ensuring the conservation and/or management of the species.

Provide similar information relating to legislation governing the management of trade in the species in question. Provide an assessment of the effectiveness of this legislation in controlling illegal trade in the species.

7.2 International

Provide details of international instruments relating to the species in question, including the nature of the protection afforded by such instruments. Provide an assessment of the effectiveness of these instruments in ensuring the conservation and/or management of the species.

Provide similar information on international instruments relating to the management of trade in the species in question. Provide an assessment of the effectiveness of these instruments in controlling illegal trade in the species.

8. Species management

8.1 Management measures

Provide details of programmes in place in the range States to manage populations of the species in question (e.g. controlled harvest from the wild, captive breeding or artificial propagation, reintroduction, ranching, quota systems, etc.). Include, where appropriate, details such as planned harvest rates, planned population sizes procedures for the establishment and implementation of quotas, and mechanisms for ensuring that wildlife management advice is taken into account.

Where applicable, provide details of any mechanisms used to ensure a return from utilization of the species in question to conservation and/or management programmes (e.g. pricing schemes, community ownership plans, export tariffs, etc.).

8.2 Population monitoring

Provide details of programmes in place to monitor the status of wild populations and the sustainability of offtake from the wild.

8.3 Control measures

8.3.1 International

Provide information on measures in place, in addition to CITES, to control the movement of specimens of the species in question across international borders. Include information about marking schemes in place, if any.

8.3.2 Domestic

Provide information on controls in the range States aimed at ensuring a sustainable harvest from the wild of the species in question. Include information on education, compliance and enforcement activities as appropriate and an assessment of the effectiveness of the programmes.

8.4 Captive breeding and artificial propagation

Where applicable, provide details of commercial captive-breeding or artificial propagation operations, including plantations, for the species in question within the country in question, including the size of captive stocks and the production, and the extent to which these operations are either contributing to a conservation programme or meeting a demand that would otherwise be met by specimens from the wild. Discuss any management implications of captive-breeding or artificial propagation programmes. Also provide information on the extent of captive-breeding or artificial propagation outside the country or countries of origin to the extent possible.

8.5 Habitat conservation

Provide information, where available, regarding the number, size and type of protected areas relevant to the habitat of the species, and on habitat conservation programmes outside protected areas.

8.6 Safeguards

In the case of proposals to transfer species from Appendix I to Appendix II or deletion from Appendix II, or proposals involving substantive annotations, provide information on any relevant safeguards.

If the proposed amendment is likely to lead to an increase in trade in the species concerned, explain why this would not result in unsustainable trade in similar species.

9. Information on similar species

Give the names of species of which specimens in trade look very similar. Provide details on how they may be distinguished, including, in particular, details on those commodities or parts and derivatives most common in trade, and explain whether or not it is reasonable to expect an informed non-expert to be able to make a firm identification. Provide details on how to resolve potential difficulties in distinguishing specimens of the species proposed for listing from those of similar species, in particular those specimens most common in trade.

10. Consultations

Provide details of the consultation undertaken to secure comments on the proposal from the range States of the species, either through direct contact or via the CITES Secretariat. Comments received from each country should be provided. Where comments were sought but not received in sufficient time to enable their inclusion in the supporting statement, this should be noted, as well as the date of the request.

In cases of proposals to transfer Appendix-II species that are subject to the Review of Significant Trade to Appendix I, the proponent should consult the affected range State(s) and, as appropriate, the Animals Committee or Plants Committee. The proponent should state the reasons to justify why the amendment proposal was made. In cases of consultation with Parties via the CITES Secretariat, information from range States and non-range States should be separated.

In the case of species that are also managed through other international agreements or intergovernmental bodies, provide details of the consultations undertaken to obtain the comments of those organizations or bodies, and indicate how those comments have been addressed in the supporting statement. Where comments were sought but not received in sufficient time to enable their inclusion in the supporting statement, this should be noted, as well as the date of the request.

11. Additional remarks

12. References