Inclusion of neotropical populations of Big-leaf Mahogany *Swietenia macrophylla* in Appendix II, including logs, sawn timber, veneer and plywood. Proponents: Guatemala and Nicaragua.

Summary: Big-leaf Mahogany is the only one of the three true Mahogany (*Swietenia*) species still exploited in quantity for commercial trade; the others (*Swietenia humilis* and *S. mahagoni*), which are currently listed in Appendix II, are already considered commercially extinct. This species was first proposed for inclusion in Appendix II in 1992 and again in 1994 and 1997. First included in Appendix III in 1995, it is now listed in this Appendix by six countries. The species is slow-growing, taking from 55 to 120 years to reach a commercially exploitable size; it is patchily distributed as it regenerates in forest clearings and tends to occur in even-aged stands, which are easily harvested out by loggers. In areas of exploitation up to 85% of the adult population is often harvested, significantly reducing the production of seed in subsequent years. Recruitment after harvest is generally poor. Genetically distinct populations exist throughout the range, but do not have subspecific status. Natural distribution stretches from southern Mexico through Central America into Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela, an area of around 235 million hectares of forest, much of which has been logged for the species. Within the area of distribution, forest loss and degradation over the past decade are estimated at around 0.38% p.a., but forest loss may be much higher in areas where Big-leaf Mahogany occurs as these are often suitable for agriculture. Deforestation is estimated to have reduced Big-leaf Mahogany range by 30% in South America and 66% in Central America. After decades of exploitation, the species is evidently virtually commercially extinct in much of Central America and parts of Bolivia and Brazil. Mahogany has been exported to Europe and the USA since the 18th century. As stocks of Mahogany have been exploited the source of timber in trade has shifted from Central to South America, as demonstrated by import statistics from the USA dating to the 1890s. The majority of range States have some form of legislation in place that regulates trade, but this does not appear to have reduced illegal trade to low levels. Currently, the major legal exporters in order of export quantity are Peru and Bolivia; Brazil banned cutting in 2001. Data resulting from the Appendix III listing indicate declines in exports, which are accompanied by rising international prices. The proposal seeks to include the neotropical populations of *S. macrophylla* in Appendix II in accordance with Resolution Conf. 9.24, Annex 2a criteria bi) or bii) on the basis that current trade levels are unsustainable.

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Analysis Following Resolution Conf. 9.24 the species appears to meet the criteria for inclusion in Appendix II. The overall range of the species has declined by at least one third. Within the remaining area, there are clear indications of local over-exploitation with commercial extinction in some Central American range States, indicated by the shifting trade patterns from production in Central America until the late 1980s to South America in the 1990s, and the shifts in production from Bolivia and Brazil to Peru during the 1990s. The species appears more secure in South America than Central America, but even in South America reported increases in illegal logging levels have prompted several range States to impose trade moratoria. Given the protracted time required for individuals to reach commercial size, with a cutting cycle of 40 years, and specialised regeneration requirements, it appears that the current levels of harvest, both legal and illegal, will not be sustainable.

Supporting Statement (SS)	Additional information
Taxonomy	
Taxonomy is uncertain as *S. macrophylla* can hybridise with *S. humilis*.	*Hybridisation does occur, but* S. macrophylla *is a clearly recognised species (Rodan, 2002a).* *Synonyms:* Swietenia belisensis *Lundell;* Swietenia krukovii *Gleason;* Swietenia tessamannii *Harms*
Range	
Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Peru, Panama, Venezuela	
IUCN Global Category	
VU A1cd +2cd	

Supporting Statement (SS)	Additional information

Biological and trade criteria for inclusion in Appendix II

A) Trade regulation needed to prevent future inclusion in Appendix I

B) Harvesting for international trade has, or may have, detrimental impact on population

(i) exceeds sustainable yield; (ii) reduces population to potentially threatened level

Mahogany takes from 50 to 120 years to reach commercial size. It generally requires specialised conditions for regeneration and tends to occur in even-aged stands. Seed production increases with the size of the tree, so logging removes the most reproductively active individuals and can reduce seed production by 85%.

Information on Big-leaf Mahogany status is extrapolated from the overall change in forest cover within the range of the species. The area of distribution has recently been revised to 235 million ha of forest. Within this area an estimated 28% of total forest cover has already been lost to various forms of deforestation. The loss of Big-leaf Mahogany will be greater than suggested by overall deforestation rates as the areas that it occurs in are particularly favourable for agriculture. In addition, Mahogany is preferentially logged from remaining areas of forest cover. Mahogany is patchily distributed, and density estimates rarely fully account for this but estimates in different parts of the range for commercially sized trees vary from 0.025 to 2 trees per ha.

In Central America, two-thirds of Big-leaf Mahogany habitat has disappeared. Costa Rica and El Salvador have no commercial production due to exhaustion of the resource.

About 25% of the wood cut remains in the forest. Of the wood extracted, the yield from processing is around 50%. Around one third of this yield is used domestically. Exports currently total around 150 000 m^3 per annum; in 1999 the majority (85 000 m^3) was destined for the USA, followed by 11 000 m^3 to the Dominican Republic and 10 000 m^3 to Europe. The major exporting countries were Brazil, Peru and Bolivia. The appearance of a constant source of supply has been maintained by reducing cutting diameters and changing the source of supply once areas are exhausted.

In Central America it is estimated that illegal logging produces twice the amount produced by legal logging. In Brazil in 2001 IBAMA found over 80% of *S. macrophylla* was produced illegally.

Peak reproductive activity occurs at about 80 years (see Gullison, 1995), but trees may start to produce seed at 12 years. In Mexico, Snook (2002) records that trees may reproduce at 20 years, but more reliable seed production begins at 75 cm dbh (trunk diameter at breast height), when trees are probably aged 150-200 years. Average longevity is estimated at 300-500 years. In Brazil, Grogan (2002) reports that flowering and fruiting onset occurs at 20 cm dbh (20-40 years), but more commonly at 30 cm dbh with fecundity rising until full reproductive maturity is reached at 60-70 cm dbh on average. There is no seed bank in the soil and because of the prevalence of even-aged stands, harvesting tends to remove 90% of seed trees in one cut (Snook, 2002).

Net deforestation in Latin America between 1990 and 2000 (ie. gross deforestation less re-growth and new plantation area) was estimated by FAO as running at ca 4.2 million hectares annually, or a loss of ca 0.51% (FAO, 2000). This figure covers all forest types in the region. A recent study using a different sampling approach estimates a somewhat lower rate of change for humid tropical forests in Latin America in the region of 0.38% pa gross deforestation and 0.13% pa visible degradation with 0.04% pa regrowth (Achard et al*., 2002).*

Big-leaf Mahogany exhibits preferred ecotypes and gross range estimates overstate its true spatial distribution (See Verissimo and Grogan, 1998). Estimates based on forest cover also fail to account for loss through selective logging of mature specimens and seed trees (Rodan, 2002b).

Grogan (2002) notes that whilst distribution may not change following logging, population structures do, leading to reduced reproductive capacity.

At the 2001 CITES Mahogany Working Group meeting no inventory information was presented despite this having been flagged as a major need at the working group meeting in 1998.

Martinez (2002) reports that preliminary data from a study undertaken by Conservation International in three countries show an average reduction of 55% of the original range of Big-leaf Mahogany (Ecuador=42%, Peru = 53%, Venezuela =70%). The area of Mahogany in Mexico had declined by 80% (Snook, 2002). In Central America, populations are declining fast, with an estimated reduction of over 70% since 1950, and distribution is now highly fragmented by development (Navarro, 2002; Snook, 2002).

Reviewers concur that reported trade levels are not sustainable (Grogan, 2002; Navarro, 2002; Rodan, 2002b; Snook, 2002). The pattern of shifting supply is also seen in the ephemeral nature of companies supplying mahogany within range States which change

Supporting Statement (SS)	Additional information
	rapidly as the local resource is depleted (see Blundell and Rodan, 2002). *The driving factor behind logging is the international trade and premium prices paid therein (currently USD 1 300 per m^3) (Rodan, 2002b). Robbins (2000) quoted ITTO 2000 to show that prices in the USA had increased 17% since 1995.* *Rodan (2002b) notes that reported CITES and Customs trade levels do not reflect illegal trade. Narvarro (2002) maintains that Illegal logging is the most common form of harvest. Country reports to the first meeting of the Mahogany Working Group include a range of estimates of the extent of illegal trade in most range States.* *According to Robins (2002), U.S. wood importers are reporting a decline in quality of Mahogany imports, suggesting a decline in supply of premium quality wood.*

Inclusion in Appendix II to improve control of other listed species

Specimens resemble other species and are difficult to distinguish, or most of taxon is already listed

The two other true Mahogany species, *Swietenia humilis* and *S. mahagoni,* are both included in Appendix II, but are both commercially extinct.	

Other information

Threats

The main threats are deforestation and logging. A study in Central America showed that cutting was directly associated with the reduction of genetic diversity of *S. macrophylla* for regeneration. It is reasonable to assume that such reduction is harmful.	*Significant insect predators include the stem-borer* Hypsipyla grandella *(Pyralidae) and* Steniscadia *sp., the latter reportedly only in southern Para, Brazil (Grogan, 2002).*

Conservation, management and legislation

The species has been included in Appendix III by the following countries: Costa Rica (1995); Bolivia, Mexico, Brazil (1998); Peru, Colombia (2001). According to the CITES Mahogany Working Group, this listing has been useful in regulating overall trade and obtaining trade information. Brazil has managed Mahogany logging through decreasing export quotas since 1992 and banned cutting in 2001 in an attempt to eliminate illegal logging. Bolivia requires management plans and non-detriment findings to be made before exports are sanctioned. A number of countries have prohibited exports including Colombia (1967), Costa Rica (1997) and Honduras (2000). Three percent of the distribution area of the species is included in Protected Areas. In Central America, 300 000 ha are managed and certified through the Forest Stewardship Council.	*Many of the range States have legally required intervention strategies for replanting following logging, but the survival of these seedlings is low (Rodan, 2002b). In general national legislation is not effectively implemented in much of the region owing to lack of resources (Navarro, 2002).* *There is no apparent scientific basis for Brazil's export quotas (Grogan 2002). Brazil reports that 80% of its harvest is inconsistent with its laws (Anon., 2002)* *A new Peruvian forestry law requires that concessions granted after 2000 have management plans and bans the harvesting of Mahogany in certain river basins for ten years and requires that only worked products be exported from certain areas.* *Protected areas within Brazil do not afford real protection to wild Mahogany populations from illegal harvest (Grogan, 2002).* *Comparisons of CITES reported import and export data show that trade monitoring is not yet consistent and further efforts to implement the Appendix III listing are needed (TRAFFIC South America, 2002).*

Supporting Statement (SS)	Additional information
Similar species	
As well as the other *Swietenia* species, *S. macrophylla* timber can be confused with *Carapa guianensis*, *Cedrela odorata*, the African Mahoganies *Khaya* spp. and *Entadrophragma* spp.	*Cut wood is difficult to distinguish from other tropical woods with similar red/brown colouration, except by an expert (Rodan, 2002b; Snook, 2002). However various US agencies have developed a CITES Mahogany identification manual (APHIS, 2002). Five countries reported difficulties in identifying the species in trade (TRAFFIC, 2001).*
Artificial propagation	
There are approximately 200 000 ha of plantations globally, but little wood enters international trade from this source. American buyers consider plantation wood inferior to wild-sourced wood. Plantations are generally found outside the natural range of the species; in the latter they are vulnerable to attack by the stem borer *Hypsipyla* spp.	*Whilst sylviculture operations are possible, economic factors mitigate against their success so long as wild populations continue to be illegally logged (Rodan, 2002b).* *Plantations in Indonesia and Fiji are ready for harvest and Indonesia produces furniture from this source (Snook, 2002).*
Other comments	
Distinct genetic populations are recognised throughout the range.	*Navarro (2002) supports the proposal. Rodan (2002b) notes that the trade is unsustainable at the global level, and at the local level sustainability depends on the particular logging plan and whether or not it is followed.* *Blundell and Rodan (2002) note that tracking of Mahogany from forest to consumer is critical if the current over-exploitation of the species is to be controlled.*

Reviewers: J. Grogan, M. Martinez, C. Navarro, B. Rodan, L. Snook, TRAFFIC North America, TRAFFIC South America.

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