REVIEW OF *SWIETENIA MACROPHYLLA* FROM GUATEMALA

(Version edited for public release)

A report to the European Commission
Directorate General Environment
ENV.E.2. – Environmental Agreements and Trade

by the

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World Conservation Monitoring Centre

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INTRODUCTION

UNEP-WCMC produced for SRG 47 a document summarising the information available to the SRG when considering import of timber trees into the EC, and analysing this to assess the consistency in making NDFs and subsequent decision making. The report was intended to provide the SRG with a baseline of information on timber species in order to identify gaps in knowledge and address these with range States where necessary.

Following SRG 47 discussions on non-detriment findings for timber, the SRG formed a positive opinion for *Swietenia macrophylla* from Guatemala and requested UNEP-WCMC to prepare an in-depth review of this species/country combination for consideration at SRG 48.

This review used the approach taken in the SRG 47 species reviews, by using the criteria identified by Trees working groups at the Mexican NDF meeting.

MELIACEAE

SPECIES:	*Swietenia macrophylla*
SYNONYMS:	
COMMON NAMES:	Bredbladet mahogni (Danish), Amerikaans mahonie (Dutch), big leaf mahogany (English), bigleaf mahogany (English), big-leaf mahogany (English), Brazilian mahogany (English), Honduras mahogany (English), mahogani grands feuilles (French), águano (Portuguese), araputangá (Portuguese), cedroaraná (Portuguese), cedroi (Portuguese), mogno (Portuguese), caoba (Spanish), mara (Spanish)
RANGE STATES:	Belize, Bolivia, Brazil, Colombia, Costa Rica, Dominica, Ecuador, El Salvador, French Guiana, Guadeloupe, Guatemala, Guyana, Honduras, Martinique (int), Mexico, Montserrat (int), Nicaragua, Panama, Peru, Saint Lucia (int), Saint Vincent and the Grenadines (int), Venezuela
RANGE STATE UNDER REVIEW:	Guatemala
IUCN RED LIST:	Vulnerable
PREVIOUS EC OPINIONS:	Following in-depth discussions on timber non-detriment findings at SRG 47 on 12/03/2009, a positive opinion was formed for Guatemala and Mexico. It was also agreed that a 'no opinion with all applications to the SRG' be formed for Belize, Bolivia, Brazil, and Nicaragua and a 'no opinion' was formed for Peru. Previous negative opinion for Brazil first formed on 13/06/2005 and removed on 18/12/2006. Previous positive opinion for Peru first formed on 13/12/2004, last confirmed on 25/10/2005 and removed on 26/09/2006.

TRADE PATTERNS:

About 4,000 m^3 of *S. macrophylla* sawn wood were exported annually from Guatemala 2003-2006 and almost 6,000 m^3 in 2007. Less than 3% of these were imported into the EU, where Germany and the United Kingdom were the main importers (Table 1). The only indirect exports of *Swietenia macrophylla,* originating in Guatemala, to the EU, was a shipment of 10.61 m^3 imported by the United Kingdom from United States in 2005. It was reported as a re-export by the United States in 2004.

Globally, the United States was the main importer of *S. macrophylla* from Guatemala, accounting for nearly 75% of all global trade (Table 2).

López-Tejada (2006) reported: "Commercial interest in the exploitation of mahogany in Guatemala began between 1860 and 1870. Between 1900 and 1956, 2.1 million m^3 of mahogany were extracted from El Petén alone (37,500 m^3 annually). During this time Decree No. 543 was passed, entitled ´Law for the Exploitation of National Forests´. World War II had an impact on mahogany in Guatemala, with 200,000 m^3 logged within two years to meet the wartime demand from the USA. The period 1958-82 was a time of colonization in El Petén, and 50% of the forest was lost. It was during these years that industries were established to process cedar and mahogany extracted from the forest. Between 1983 and 1988 timber extraction in Guatemala was closed down. This period saw the start of illegal logging in the country."

Table 1. Direct exports of *Swietenia macrophylla* from Guatemala to EU-27, 2003-2007. All trade was in cubic metres of wild sourced sawn wood for commercial purposes.

Importer	Reported by	2003	2004	2005	2006	2007	Total
Belgium	Importer					26.41	26.41
	Exporter						
Bulgaria	Importer						
	Exporter					26.41	26.41
Germany	Importer	29.7	10.34	44.52	60.61	212.25	357.42
	Exporter	40.04		46.35	49.78	116.05	252.22
United Kingdom	Importer		156.08	6.00	78.00		240.08
	Exporter	127.87	33.00	101.45		5.66	267.98
Total	Importer	29.70	166.42	50.52	138.61	238.66	623.91
	Exporter	167.91	33.00	147.80	49.78	148.12	546.61

Table 2. Direct exports of *Swietenia macrophylla* from Guatemala to countries other than the EU-27, 2003-2007. All trade was in cubic metres of wild sourced sawn wood for commercial purposes.

Importer	Reported by	2003	2004	2005	2006	2007	Total
Bangladesh	Importer						
	Exporter					22.52	22.52
Belize	Importer				232.29		232.29
	Exporter						

Importer	Reported by	2003	2004	2005	2006	2007	Total
China	Importer						
	Exporter		10.61				10.61
Costa Rica	Importer				33.02		33.02
	Exporter					61.35	61.35
Dominican Rep.	Importer		1506.50		628.06	1647.20	3781.76
	Exporter	547.27	2374.48	1450.21	1013.04	1307.73	6692.73
Fiji	Importer						
	Exporter					83.57	83.57
Honduras	Importer						
	Exporter		246.50	264.00	70.78	70.75	652.03
Indonesia	Importer						
	Exporter					56.60	56.60
Japan	Importer		125.357	74.877	0.45		200.684
	Exporter	76.77	232.70	165.68	0.45	55.90	531.50
Mexico	Importer	136.56	81.33	47.17	37.50		302.55
	Exporter	103.05	116.70	81.94		65.75	367.44
United States	Importer	3556.17	2257.00	3096.00	2819.00	3913.00	15641.17
	Exporter	3744.23	2653.36	4354.82	436.39	4306.78	15495.58
Unknown	Importer						
	Exporter	105.88					105.88
Total	Importer	3692.725	3970.179	3218.043	3750.323	5560.2	20191.47
	Exporter	4577.199	5634.35	6316.654	1520.66	6030.95	24079.81

CONSERVATION STATUS in range states

The natural distribution of *S. macrophylla* was reported to extend from southern Mexico through southern Central America into South America and from there in an arc from Venezuela through the Amazon basin to Bolivia and Brazil (Lamb, 1966; cited in Anon, 2002a).

Calvo (2000) estimated that the original distribution area of *S. macrophylla* in Mesoamerica would have been 41 million ha, of which only 15 million ha (36% of original extent) remained in the mid 1990s.

Considered to be globally Vulnerable in the IUCN Red List (WCMC, 1998). It was considered that harvesting and processing of the species across range States generally has only around 50% efficiency (the conversion value of logs to timber), and there are few economic incentives to manage natural stands sustainably (WCMC, 1998).

Unsustainable exploitation was considered to be the main threat to the species (Anon, 2002a).

At the 12th meeting of the Conference of the Parties, Guatemala and Nicaragua presented a proposal (CoP12 Prop. 50) to include the Neotropical populations of *Swietenia macrophylla* in Appendix II of CITES, covering logs, sawn timber, veneer and plywood. The proposal was adopted and came into effect on 15th November 2003.

Guatemala:

Species distribution area (range) at relevant scales

The natural range of *S. macrophylla* in Guatemala was reported to have been nearly 6 million ha across the Atlantic lowlands of the country (Calvo, 2000; CONAP, 2003b). The species however, was reported to have suffered a substantial decrease in Guatemala owing to unsustainable exploitation and severe loss of habitat, and remnant populations were reported to be limited to El Petén (Anon, 2002a; CONAP, 2003b) and to a few small areas in the departments of El Quiché, Alta Verapaz and Izabal (CONAP, 2003b; López Tejada, 2006).

By the mid 1990s the area of forests with mahogany had been reduced to 2.77 million ha (i.e. a loss of 47%) (Calvo, 2000). The rate of deforestation in Guatemala was estimated to be 1.7% loss per year both during the 1980's and 1990's (Anon, 2002a).

The Multiple Use Zone of the Maya Biosphere Reserve encompasses 848,440 ha of the 2.1 million ha covered by the MBR, and this zone was estimated to hold 1.24 million m^3 of mahogany (CONAP, 2006). The core zone of the MBR in El Petén was reported to cover 767,000 ha, and mahogany was estimated to occur in 460,000 ha of this area (López Tejada, 2006).

Population parameters as indicators of sustainable management

Swietenia macrophylla is a large deciduous tree that frequently grows to over 30m and reaches diameters at breast height of over 1.5m (CITES Secretariat, 2003). At CoP12 prop. 50 it was reported that "Regeneration of *S. macrophylla* is infrequent. It generally occurs after large-scale disturbances. It germinates better in the shade (Morris *et al.,* 2000), and seedlings are relatively intolerant of strong light (Negreros-Castillo, 1991). If juveniles cannot benefit from a clearing in the canopy within the first years, they lose their ability to respond to high luminosity (Grogan, 2001). It seems that *S. macrophylla* requires a large amount of light created by large-scale disturbances, such as fires and hurricanes (Snook, 1993) or flooding (Gullison *et al.,* 1996). […] Exploitation can have a substantial harmful effect on regeneration because cutting removes seed-bearers and dramatically reduces the opportunity for regeneration when there are disturbances or natural catastrophes" (Anon, 2002a).

In Guatemala, the density of *S. macrophylla* trees over 60 cm diameter at breast height (dbh) was considered to range between 0.36 and 0.99 trees/ha, which was estimated to correspond to a commercial yield of 1.32-1.83 m^3/ha (Calvo, 2000).

López-Tejada (2006) provided the following weighted average diameter distribution of mahogany in the multiple use zone of the Maya Biosphere Reserve, El Petén, Guatemala (number of trees/ha in each diameter class):

DBH in cm	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>90	Total trees/ha
Trees/ha	0.93	0.59	0.55	0.36	0.27	0.20	0.16	0.09	0.15	3.29

Management systems and harvest rates

The institutions responsible for the management of the species within Guatemala are the National Council for Protected Areas (CONAP) within protected areas, and the National Forestry Institute (INAB) outside protected areas (CONAP, 2003b; CONAP, 2006).

The Guatemalan official delegation (Anon, 2002b) noted at CoP 12:

> "Between 1986 and 1993, the extraction of timber in Guatemala was chaotic and uncontrolled. Annually, more than 10,000 m^3 of mahogany was confiscated. Beginning in 1994, a new process began whereby buffer zones surrounding protected areas were managed by local communities and private companies. At the moment there are 530,000 hectares of managed forests. Of these, 314,000 hectares (59% of the total) are certified to standards set by the Forest Stewardship Council (FSC). Unsustainable and illegal extraction of mahogany has not stopped; it is a problem we are still facing."(Anon, 2002b)

Illegal logging was reported to be an important problem in the late 1990's in the Petén region of Guatemala, including in the Maya Biosphere Reserve (Ponciano, 1997). The 1989 Law of Protected Areas and efforts to reduce clandestine logging caused violent reactions in the region and the Government only regained control in 1995 with the help of the Guatemalan Army (Ponciano, 1997). As an option for achieving more positive relations between local communities and the administration of the Maya Biosphere Reserve, the concept of community forestry concessions was created and four initial experimental concessions were established (Ponciano, 1997; Carrera and Prins, 2002).

The species was listed in the Red List for Flora of Guatemala under criterion 3 (species not currently threatened but that could become threatened if harvest is not regulated), which establishes that the species can only be harvested in accordance with management plans that guarantee sustainability (CONAP, 2001). In addition, a number of national regulations afford protection to the species and provide guidance for its sustainable use (CONAP, 2003b).

CONAP (2003b) noted that the harvest of mahogany can be authorised through forestry concessions in the case of state-owned land or through Forestry Licenses in the case of privately owned land. In both cases, a management plan and an environmental impact assessment are necessary.

López-Tejada (2006) reported:

> "The five-year management plan for large forests establishes the arrangement of productive forest, and maps showing the areas to be used each year (annual harvesting areas –AHA) during the five years are prepared. For each annual harvesting area, an annual operating plan (AOP) is elaborated, and a census of all species of commercial interest is conducted. Within each AHA, the trees to be cut, seed trees and those left for future harvest are identified. The intensity of cut is

adjusted according to the specific sector of the forest. A polycyclic management system is used, with irregular management of stands. […]

Variables that are used to regulate harvesting are the minimum cutting diameter (MCD), the cutting cycle and the intensity of cut. The MCD for mahogany is between 55 and 60 cm diameter at breast height (DBH). Harvesting cycles vary from 25 to 40 years. The MCD of 55 cm is applied to management units with longer cutting cycles (40 years), while units with shorter cutting cycles (25 and 30 years) are managed with an MCD of 60 cm to compensate for the shorter rotation time.

The maximum allowable logging intensity is 80%. Trees with no commercial potential (due to defects in shape, for example) are not considered in this calculation. The logging intensity is adjusted for different scenarios to determine the volume authorized for harvest.

To predict the capacity for recuperation of the species, a rate of growth in diameter of 0.4 cm per year is used, along with a mortality rate of 1.5% per year. If the species recovers more rapidly than predicted, the logging intensity must be reduced for the next cut to ensure a maximum of 80% of the standing timber is harvested. In cases where the proportion of recoverable timber is relatively low (e.g. 45%), the logging intensity can be adjusted so that the final yield equals the recoverable portion plus one third of the non-recoverable wood, provided the maximum logging intensity of 80% is not exceeded.

Silvicultural activities include the opening of the upper canopy, the retention of seed trees (ideally 10% of trees), cutting of lianas on the trees for future harvest, the dispersion of residues, enrichment planting in disturbed areas (areas of fall, skid trails, etc.), and the dispersal of seeds."

Concession areas must be approved and then a forest inventory must be conducted, followed by a management plan and environmental impact assessment developed with standardized methodologies (Gretzinger, 1997). By 2006 there were reported to be 14 community concessions and two industrial concessions in Guatemala, stretching over half a million hectares, and the outcomes of this management system were regarded as generally positive in terms of sustainable use (Carrera and Prins, 2002; López Tejada, 2006).

Within the 16 concessions existing in the country, mahogany was believed to be present at a density of approximately 3 trees per hectare, which was considered to translate into 18-22 m^3/ha (López Tejada, 2006). In the Maya Biosphere Reserve (MBR), concessions have only been authorised in the Multiple Uses Zone (MUZ), and management follows five-year management plans and yearly 'operational plans' (CONAP, 2003b; CONAP, 2006). Harvesting cycles vary between 25 and 30 years, which were considered as precautionary, and the minimum harvestable diameter was established at 60 cm. Each selected tree is GPS-located and mapped and 15% of trees are left uncut to serve as sources of seeds and trees considered to be of no commercial quality are also left uncut (CONAP, 2003b). Outside protected areas management was also reported to follow this model (CONAP, 2003b).

López-Tejada (2006) reported the following volume and intensity of mahogany harvesting in the multiple use zone of the Maya Biosphere Reserve, El Petén, Guatemala, 2000-2003:

	2000	2001	2002	2003
Volume harvested (m^3)	8,851.8	11,632.4	11,731.2	12,972.9
Area harvested (ha)	8,762.5	10,707.8	10,659.8	12,990.4
Intensity of harvest (m^3per ha)	1.01	1.09	1.10	1.00

Monitoring and verifying harvests

CONAP (2006) mentioned that there are monitoring plans in place before, during and after harvesting, and also transport controls, as well as permanent sampling plots in commercial concessions.

In Guatemala, certification was reported to be required for all community forestry concessions and industrial groups under a scheme of the FSC, which has reportedly led to progress towards sustainable management of concessions (Calvo, 2000; Carrera *et al.*, 2006).

Carrera *et al.* (2006) reported, on forest certification in Guatemala:

> "The forest certification process in Guatemala has largely been confined to the forest concessions in the Maya Biosphere Reserve (MBR), representing 95 percent of the country's certified forest area. Sixteen forest management units covering close to half a million hectares of broadleaved forests have been certified, including 10 community concessions, four cooperatives or municipal *ejidos* and two industrial concessions. In addition, two forest plantations outside the MBR have been certified. For the time being, demand for certified wood on the domestic market is virtually non-existent. Almost the entirety of certified wood is exported to the USA, Mexico, and to a lesser extent, Europe. All exports of certified products must go through the handful of enterprises that have chain-of-custody certification. Despite the large area certified, annually harvested volume is low. The annual harvested area is less than 10,000 ha, with less than 2.5 m^3 harvestable volume per hectare. In 2002, this translated into an annual cut of approximately 20,000 m^3 (CONAP, 2003a). Less than half of this timber is being sold as certified sawn wood, principally mahogany (*Swietenia macrophylla*)"

The main environmental benefits of forest certification in Guatemala were considered to be greater understanding of good forest management by technical and professional personnel though the standards development process (Carrera *et al.*, 2006). Improvements in management planning reportedly included improved estimations of harvesting intensity; five-year management plans; inclusion of non-timber forest products; and financial analysis. In addition, certification standards reportedly "emphasized the protection of threatened species according to CITES, and the protection of seed trees, residual trees and those reserved for future harvests" (Carrera *et al.*, 2006).

Conservation and the precautionary principle

Approximately 0.59 million ha (21%) of Guatemalan forests where the species occurs are protected areas (Calvo, 2000), and include the Maya Biosphere Reserve (MBR) (CONAP, 2003b).

At SRG 47 (February 2009), the SRG discussed a document on non-detriment findings for timber, which noted that little information appeared to be available on the species in Guatemala. The SRG formed a positive opinion for this species/country combination on the basis of information available, but requested UNEP-WCMC prepares an in-depth review for consideration at SRG 48.

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