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

Sixteenth meeting of the Animals Committee
Shepherdstown (United States of America), 11-15 December 2000

Periodic review of animal taxa in the appendices

EVALUATION OF SPECIES SELECTED AT AC15

This document has been prepared by the CITES Secretariat.

Introduction

1. Reviews of species selected at the 15th meeting of the Animals Committee that have been received from members of the Animals Committee and Parties are provided as annexes to this document. Supplementary documents on these reviews were too voluminous to be be translated for the present meeting. Consequently, they will be provided on the CITES website (www.cites.org) and distributed at the meeting in the languages in which they were received.

2. Reviews are provided in the annexes for:

Review of *Macaca fascicularis*

Biological criteria for inclusion of crab-eating macaque*, Macaca fascicularis* in CITES Appendix I

Biological Criteria			Supporting statement	Additional statement
A	The wild population is small and is characterized by at least one of the following	No		
1	An observed, inferred or projected decline in the number of individuals or area and quality of habitat	No	Range: Lao People's Democratic Republic, Thailand, Viet Nam, Cambodia, Malaysia peninsular, Sarawak, Brunei Darussalam, the Philippines, Indonesia (Sumatra, Kalimantan, Java, Bali, Lesser Sunda Islands and recently Irian Jaya).	Size of wild populations in each range state was predicted stable or even increased because there was almost no predators for the animals [1]. Recent study in Indonesia indicated human (transmigration) to Irian Jaya and possibly Sulawesi. The new populations were adapted to the wild [2].
2	Each population being very small	No	Recent studies in South Sumatra and East Kalimantan indicated that wild populations were extremely abundant [2, 3.]	The species is easily adapted to new environment [1,3] and easily bred [4,5]
3	A majority of individuals, during one or more life-history phases, being concentrated in one sub population	No	Each wild population consist of 10 to 40 individuals depending on the habitat quality [1]	In Indonesia these populations are widely distributed across Sumatra, Kalimantan, Java. Lesser Sunda islands. Populations in other ranges states?
4	Large short-term fluctuations in the number of individuals	No	No evidence. In contrast, studies indicated that the species has wide biological tolerance [1]. The species belong to K species type [10]	
5	High vulnerability due to the species biology or behavior including migration	No	Ditto	The species well adapted to secondary forest, plantations or even human habitations [6].

B	The wild population has a restricted area of distribution and is characterized by at least one of the following			
1	Fragmentation or occurrence at very few locations	No	Although there were lots of indications of declining forest areas across their range states, there was no indication that such evidence affect the wild populations [2].	ditto
2	Large fluctuation in the area of distribution or the number of sub-populations	No	Ditto	
3	High vulnerability due to the species biology or behavior including migration	No	The species well adapted to secondary forest, plantations or even human habitations [6].	
4	An observed, inferred or projected decline in area distribution or the number of sub-populations or the number of individuals or area and quality of habitat reproductive potential	No	See B1	
C	A decline in the number of individuals in the wild which has been either	No		
1	Observed as ongoing or as having in the past	No	Studies in Indonesia, particularly in South Sumatra and East Kalimantan indicated that wild populations of this species are stable	
2	Inferred or projected decrease in area or quality of habitat or levels or pattern of exploitation	No	ditto	
3	Threats from extrinsic factors such as pathogens	No	No evidence on this subject	
4	Decreasing reproductive potential	No	No evidence on this subject	
D	If the species is not included in Appendix I, it would satisfy with A,B or C a period of five years	No		
Recommended for inclusion in Appendix I				

Biological Criteria for the inclusion of crab-eating macaque*, Macaca fascicularis* in CITES Appendix II
in accordance with Article II, Paragraph 2 (a) of the CITES Convention

Biological Criteria			Supporting statement	Additional statement
A	The wild population will meet at least either the following criteria in the near future	No		
1	An observed, inferred or projected decline in the number of individuals or area and quality of habitat	No	Range: Lao People's Democratic Republic, Thailand, Viet Nam, Cambodia, Malaysia peninsular, Sarawak, Brunei Darussalam, the Philippines, Indonesia (Sumatra, Kalimantan, Java, Bali, Lesser Sunda Islands and recently Irian Jaya).	Size of wild populations in each range state was predicted stable or even increased because there was almost no predators for the animals [1]. Recent study in Indonesia indicated that human (transmigration) has to Irian Jaya[6]and possibly Sulawesi. The newly populations were adapted to the wild [2].
2	Each population being very small	No	Recent studies in South Sumatra, East Kalimantan and Bali indicated that wild populations were extremely abundant [2, 3.]	The species is easily adapted to new environment [1, 3] and easily bred [4,5]
3	A majority of individuals, during one or more life-history phases, being concentrated in one sub population	No	Each group within a wild population consist of 10 to 40 individuals depending on the habitat quality [1]	In Indonesia these populations are widely distributed across Sumatra, Kalimantan, Java, Bali and Lesser Sunda islands. Populations in other ranges states?
4	Large short-term fluctuations in the number of individuals	No	No evidence. In contrast, studies indicated that the species has wide biological tolerance [1]. The species belong to K species type[10]	
5	High vulnerability due to the species biology or behavior including migration	No	Ditto	The species well adapted to secondary forest, plantations or even human habitations [7].
B	It is known, inferred or projected that the harvesting of specimens from the wild for	No		

	international trade has or may have a detrimental impact on the species by either			
1	Exceeding, over an extended period, the level that can be continued in perpetuity	No	No clear evidence. Indonesia has banned wild harvest since 1994.	The wild populations have reported frequently create problems to the settlements located nearby the forest areas in Sumatra and Kalimantan [7]
2	Reducing it to a population level at which its survival would be threatened by other influences	No	Studies indicated that the species has wide biological tolerance [1]. The species has high reproductive success [4,8,9,10].	Although there were lots of indications of declining forest areas across their range states, there was no indications that such evidence affect the wild populations[2].
	Recommended for inclusion in Appendix II	No		

Biological Criteria for the inclusion of crab-eating macaque*, Macaca fascicularis* in CITES Appendix II in accordance with Article II,Paragraph 2 (b) of the CITES Convention

Biological criteria			Supporting statement	Additional statement
A	The resemble specimens of a species included in Appendix II under the provisions of Article II, paragraph 2(a), or in Appendix I, such that a non expert, with reasonable effort, is unlikely to able to distinguish between them	No	*Macaca nemestrina* (listed in CITES Appendix II) has clearly difference appearance with *M. fascicularis*	The face, tail and body size of *M. nemestrina* and *M. fascicularis* are clearly different.
B	The species is a member of a taxon of which most of the species are included in Appendix II under the provision of Article II, paragraph 2(a), or in Appendix I, and the remaining species must be included to bring trade in specimens of the others under affective control	No	Ditto	
	Recommended for inclusion in Appendix II			

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Review of *Saiga tatarica* (saiga)

United States of America
U.S. Fish and Wildlife Service Division of Scientific Authority

I. Conservation Status and Rationale for Initial Listing

At COP 9, the United States of America submitted a proposal to include *Saiga tatarica* in Appendix II and the Mongolian population of *S. tatarica* in Appendix I. The proposal to add *S. tatarica* to Appendix II was adopted, but the proposal to add the Mongolian population (*S. t. mongolica*) to Appendix I was rejected, primarily because countries opposed a split listing for the species. Thus, the entire species *Saiga tatarica* is currently listed in Appendix II (CITES Secretariat 1996).

The species was listed under CITES primarily because of historical and recent population declines resulting from commercial harvest for meat and horns (saiga horn is used in traditional Chinese medicine). The COP 9 listing proposal and the TRAFFIC "analysis of proposal" summarized population status and trend information as well as international trade data through approximately 1993-94.

II. Summary of Population Status and Trends, Harvest, and Trade since the Listing

WCMC (1999) prepared a thorough review of recent information on saiga population status and trends. The information in this document is taken largely from that review, with additional information from Milner-Gulland (1994) and Teer (1999). One range country – Turkmenistan – completed and submitted the questionnaire. Official trade data for 1995 through 1998 are in Table 1.

Distribution and Population

China: The species has not been documented in China since the 1960s (Zhang 1997). It formerly occurred in Xinjiang Autonomous Region (Bole, western Yumin, eastern and southeastern Junggar) (WCMC 1999).

Kazakhstan: There are three distinct sub-populations in Kazakhstan: (1) the Ural population; (2) the Ustyurt population; and (3) the Betpak-dala population (WCMC 1999). Between 1954 and 1994, the total saiga population of Kazakhstan was estimated at 800,000 to 900,000 individuals (Teer 1999, WCMC 1999). As of 1998-99, the total saiga population in Kazakhstan was estimated at 570,000 to 650,000 individuals (Teer 1999, WCMC 1999).

The Ural population occurs between the Volga and Ural Rivers. The population in 1994 was estimated from aerial surveys to be 274,000 individuals (Bekenov et al. 1998 cited in WCMC 1996). Severe overwinter mortality in 1995-96 reduced the population to an estimated 104,000 animals in 1998; this estimate was based on vehicle observations (Bekenov and Grachev *in litt* to IUCN/SSC 1999 cited in WCMC 1999). The lack of recovery since 1996 has been attributed to allegedly severe poaching of this population (Bekenov and Grachev *in litt* to IUCN/SSC 1999 cited in WCMC 1999).

The Ustyurt population occurs primarily in the Ustyurt Plateau region of western Kazakstan and northwestern Uzbekistan, between the Ural River and Caspian Sea on the west and the Aral Sea on the east (WCMC 1999). The population in February 1998 was estimated from aerial surveys to number approximately 246,000 animals (Bekenov and Grachev *in litt* to IUCN/SSC 1999 cited in WCMC 1999). This population has been considered in "healthy" condition owing to low human population density and, consequently, low poaching pressure in the area where it occurs (Bekenov and Grachev *in litt* to IUCN/SSC 1999 cited in WCMC 1999).

The Betpak-dala population occurs through much of central Kazakhstan, from the Aral Sea eastward to south of Lake Balkash (WCMC 1999). The population in 1996 was estimated from aerial surveys to

number approximately 248,000 animals (Bekenov et al. 1998). The population survey in 1998 was inadequate to derive an estimate of population numbers, because less than half the range was surveyed (Bekenov and Grachev *in litt* to IUCN/SSC 1999, cited in WCMC 1999). Overwinter mortality in 1993-94 caused this population to decline sharply, from about 510,000 animals to about 280,000 animals (Bekenov and Grachev *in litt* to IUCN/SSC 1999 cited in WCMC 1999). This population apparently has not recovered, allegedly as a result of severe poaching (Bekenov and Grachev *in litt* to IUCN/SSC 1999 cited in WCMC 1999).

Mongolia: *S. t. mongolica* is endemic to Mongolia. Two populations exist, one in the Shargyn Gobi and one in Mankhan district. Surveys undertaken by Amgalan and Nyambayer (1998, cited in WCMC 1999) during November 1998 concluded that virtually all of the remaining *S. t. mongolica* occur within the Shargyn Gobi (~3,000 animals), while in January 1998 very few animals remained in Mankhan district (~40-50) (Shar 1998 cited in WCMC 1999). Surveys undertaken by Lushchekina *et al*. (1999) in 1997 have suggested that potential total range is approximately 5,300 km^2, however differences in habitat suitability were not taken into account. Survey results have confirmed that both numbers of *S. t. mongolica* and its range have been increasing since the early 1980s (Amgalan and Nyambayar 1998 and Lushchekina *et al*. 1999 both cited in WCMC 1999).

S. t. tatarica is possibly now extinct in northwest Mongolia (Anon.1994; Lushchekina *et al*., 1999).

Russian Federation: The saiga in the Russian Federation occurs primarily west of the Volga River in Kalmykia. According to figures in Teer (1999) this population has undergone quite large fluctuations since the mid-1970s. Between 1987 and 1995 this population was estimated at approximately 145,000 to 150,000 animals (Teer 1999). The population increased from 1995 to 1997, but decreased again in 1997-1998 (Teer 1999).

Turkmenistan: The Ustyurt population of *S. t. tatarica* (see Kazakhstan) may stray into north-western areas during extreme winters (Bekenov *et al*. 1998).

Uzbekistan: the Ustyurt population of *S. t. tatarica* (see Kazakhstan) occurs to the west of the Aral Sea during snowy winters, and through much of western Uzbekistan during extreme winters (Bekenov *et al*. 1998).

Reproductive Ecology

S. tatarica has a high rate of reproduction and recruitment. In years with a favourable climate the population can increase by up to 60% in a single year (Chan *et al*. 1995). The percentage of breeding females in a population is usually not less than 65%; up to 95% of females produce young in their first year, with twin calves being common, resulting in an average litter size of 1.6 young per breeding female (Chan *et al*. 1995). Female fertility is known to decrease after four years (Bekenov *et al*. 1998). The gestation period of *S. tatarica* is reported to be between 139 to 152 days, females usually reach sexual maturity within their first year, males become sexually mature at 19 to 20 months (Nowak 1991). The sex ratio among young animals is generally close to 1 : 1. Among older animals there are more females than males resulting from higher male mortality during the rut, and selective poaching of males for their horns (only males carry horns) (Bekenov *et al*. 1998). Very few animals in a population are more than 3.5 years old, indicating that the population is almost completely renewed after four years (Bekenov *et al*. 1998). Known maximum longevity in the wild is 10 to 12 years (Nowak 1991).

Domestic Use

After the recovery of populations from the low levels of the 1920s, *S. t. tatarica* have been hunted and managed primarily for their meat since 1950 (Milner-Gulland *et. al*. 1995). Populations have come under intense poaching pressure in recent years, particularly for the horns of males which are highly valued in traditional Oriental medicine (Chan *et al*. 1995).

Legal hunting for meat, horns, and other products: The harvest of *S. tatarica* is important to the Kazakhstan national economy. Bekenov *et al*. (1998) reported that between 1955 and 1993 5,572,000 *S.*

tatarica were killed in Kazakhstan, from which 91,000 tons of marketable meat was obtained.. Skins of *S. tatarica* are used to make box-calf and suede. *S. tatarica* provides a source of cheap meat, raw materials used in the leather and traditional medicinal industries and hard currency (Bekenov *et al*. 1998). Between 1991 and 1996 the annual commercial harvest in Kazakhstan was reduced from 112,000 to 30,000 animals due to concern about the decrease in population growth rate caused by poaching, habitat loss, and inadequate conservation measures (Bekenov, *et al*. 1998). In 1998 the legal quota was 30,000 animals of the Ustyurt population, 10,000 of the Ural population, no licences were issued for hunting the Betpak-dala population (E.J. Milner-Gulland *in litt*. to IUCN/SSC Wildlife Trade Programme 1998).

Organized sport (non-commercial) hunting of *S. tatarica* appears to be popular, with trophies exhibited at Russian and international exhibitions (Sokolov and Zhirnov 1998). This limited hunting may provide economic benefits to local communities.

Use in traditional Oriental medicines: Chan *et al*. (1995) stated that the demand for *S. tatarica* horn has been driven by the appearance late last century of the horn as an ingredient in traditional Oriental medicine. Horn is used to reduce "heat" (which may appear as a fever), and to treat "internal wind" often associated with liver problems. In combination with other medicines it is also used to treat convulsions, headache, vertigo and other problems. The use of horn is common in China and wherever Chinese communities are found. It appears that horn is of lesser importance in Korean and Japanese medicine. Chan *et al*. (1995) were unable to determine whether demand for horn has changed over the last decades, but they were able to confirm that demand was high. Surveys conducted in May/June 1996 by the Chinese Academy of Science in six Chinese medicine markets in China showed that horns were widely available and among the most frequently observed materia medica (Guo *et al*. 1997).

Poaching

Sokolov and Zhirnov (1998) reported that illegal hunting of *S. t. tatarica* became extensive after "perestroyka" in the late 1980s. The State monopoly on foreign trade was eliminated and customs controls weakened. The profits gained by poaching animals attracted "businessmen" not only from Kalmykia and Kazakhstan but also from regions of the Russian Federation, Cis-Caucasica and Baltic countries. It has been estimated this that poaching caused annual losses of 100,000 individuals, most of them adult males, in 1989-1990 (Sokolov and Zhirnov 1998). The high prices paid by "businessmen" for horn stimulated poaching by local people (in 1994 horn was purchased from locals at US$ 30 per kg). According to Bekenov *et al*. (1998) poaching has now become a social institution; in many towns and villages a proportion of young people poach *S. tatarica* for horn instead of working. Bekenov *et al*. (1998) reported that *S. tatarica* have never received adequate protection from hunters, whereas previously they were shot mainly in autumn and winter for meat, they are now shot all year round for their horns.

Sokolov and Zhrinov (1998) reported that up to 500 cases of poaching have been documented annually in Kalmykia, and that more have remained undetected. According to the State Game Control Agency, about 700 fresh horns were taken from poachers in 1992–1993; while game servicemen found 480 poached animals with horns removed (Sokolov and Zhirnov 1998).

TRAFFIC Europe-Russia (*in litt*. to TRAFFIC International 1999a) report that decline in demand for horn in 1995-1996 resulted in reduced poaching of males in Kalmykia. However illegal hunting increased again in 1997-98. The main method of poaching involved hunting animals from motorbikes.

In Kazakhstan animals have been poached extensively over recent years (Sokolov and Zhirnov, 1998). The scale of poaching is difficult to assess as only small numbers of incidents have been detected by State Game Inspections (Bekenov *et al*. 1998, Sokolov and Zhirnov 1998). Chan *et al*. (1995) reported that each year about 1,500 cases of poaching are investigated in Kazakstan and 1,000 to 1,500 kg of horn are confiscated by militia and Customs officers. According to commercial hunting experts, at least as many animals are killed by poachers as are hunted legally (Bekenov *et al*., 1998). Illegal hunting by organized groups with high-speed vehicles has been reported (Sokolov and Zhirnov 1998).

Changes in population dynamics: According to Milner-Gulland *et. al*. (1995) populations of *S. tatarica* had remained relatively stable over recent years, probably through the recent reduction in legal hunting

(especially of males). However, the selective poaching of adult males for their horns in all four populations leading to a low proportion of males could lead to a sudden crash in *S. tatarica* numbers (Milner-Gulland *et. al*. 1995). Bekenov *et al*. (1998) reported that the number of sexually mature males in groups of *S. tatarica* has fallen from 2-27% between 1966 and 1980, to 2-18% between 1990 and 1994. The lack of males may influence population dynamics through increased juvenile mortality caused by the lengthening of the parturition period and reduced female fertility caused by a lack of mating opportunities (Milner-Gulland *et. al*. 1995).

International Trade

There are few reliable international trade data for *S. tatarica* prior to its listing in Appendix II of CITES in 1995. Song (1996) reported on imports of saiga horn into China for various years from 1980 through 1995 (Table 2). Reported trade peaked in 1990 through 1992, the years following the lifting of border controls with China (in 1988) and the breakup of the Soviet Union (in 1991). Song (1996) records the import of 6,000 kg of horn and horn powder into China during 1996, but there is no record of this in China's 1996 CITES Annual Report.

Fadeev and Sludsky (1982) determined that a pair of saiga horns processed for export weighs, on average, 250 grams. Thus, one kilogram of horn represents, on average, four pairs of horns or four animals. Using this number as a conversion factor, the Chinese import figures for 1990 through 1992 represent 441,200 saiga or roughly one-third of the estimated world population at that time.

Information available from the CITES Trade Database is limited to 1995 through 1997, with partial data from 1998 (Table 2). International trade in *S. tatarica* recorded in CITES Annual Reports is almost wholly in horn and derivatives. There is little trade reported in other products (trophies, live animals, skins, skulls).

Table 2. Imports of *S. tatarica* horn into China, 1980 – 1995 (Source: Song 1996)

Year	Kg	US$	US$/kg
1980	3,172	2,214,000	698
1981	-	-	-
1982	3,000	344,700	115
1983	4,500	637,500	142
1984	-	-	-
1985	4,500	1,031,100	229
-	-	-	-
1990	11,300	5,790,000	512
1991	56,000	1,930,000	34
1992	43,000	1,520,000	35
1993	1,000	50,000	50
1994	-	-	-
1995	6,000*	110,000	18

* horn and horn powder

Due to the legal protection of *S. tatarica* in Mongolia, neither domestic nor international trade of products are officially allowed. In 1996 the USA reported the seizure of *S. t. mongolica* horn products which had been exported from Canada. Lushchekina *et al*. (1999) reported upon the recent (1995) seizure of 84 *S. t. mongolica* horns hidden in the suitcase of a passenger travelling from Ulaanbaatar to Beijing. Milner-Gulland (1994) notes that there are difficulties in differentiating between the horns of juvenile male *S. t. tatarica* and *S. t. mongolica*.

The Kazakhstan Republic's hunting union 'Okhotzooprom' reports that some 44,000 kg of horn was illegally exported in 1994 to Singapore, China, Korea, Japan and some European countries and there were believed to be 5,000 kg of horn in Turkey (Chan *et al*., 1995).

Sokolov and Zhirnov (1998) reported that custom officers of Russia and other countries of the former USSR have recently seized large shipments of horns destined for the South-East Asian market, indicating extensive poaching; they further reported that Chinese dealers visiting Russia and Kazakhstan readily purchased horns of poached animals.

TRAFFIC Europe-Russia (*in litt*. to TRAFFIC International 1999a) report that a permanent channel in illegal trade operates in Russia; illegally obtained horn from Russia and Kazakhstan is collected into a shipment in Moscow or nearby, and then transported by train from Moscow to Beijing, where it enters the Chinese market. Small quantities of horn are also smuggled out of Russia via the Caucasus, and direct smuggling from Kazakhstan to China occurs (TRAFFIC Europe-Russia *in litt*. to TRAFFIC International 1999a).

During 1995 New Zealand seized 11 bags of *S. tatarica* (contents and quantity unrecorded); the exporting country and origin were unrecorded. During 1996 the USA reported the seizure of over 2,000 derivatives of an unspecified nature. Almost all of these were recorded in the USA CITES Annual Report as exports from the Republic of Korea. Small seizures of products have been reported in Hong Kong between 1995 and 1998 (Agriculture and Fisheries Department of Hong Kong SAR Government *in litt*. to TRAFFIC East Asia 1999).

The actual scale of illegal trade in *S. tatarica* remains difficult to assess as detection and reporting appear to be at a relatively low level. Once horn enters the market it is difficult to ascertain legality. Poaching is known to be a problem in range states, seizures have been made and the illegal trade is known to be on-going. It is therefore difficult to assess the impact of trade on populations when trade data are incomplete.

Other Factors

Habitat loss: Migration routes and suitable habitat for *S. tatarica* have been greatly affected by the construction of irrigation canals, cultivation of new land, settlements, fenced off pastures and other constructions (Bekenov *et al*. 1998). Loss of habitat through desertification, caused by a more intensive human use of the area, has been particularly severe in Kalmykia (Milner-Gulland *et. al*. 1995). The Kalmyk population began to decline in the 1980s with the construction of irrigation canals and increased degradation of the steppe habitat by overgrazing of domestic livestock (principally sheep). Only about 20% of the habitat remains (Chan *et al*. 1995).

Disease: Transmission of infectious and parasitic disease from domestic livestock to *S. tatarica* can lead to considerable levels of mortality (10 to 20% of the population) (Sokolov and Zhirnov 1998). Females and calves appear to be most affected (Khakhin and Sedov 1992)

Weather: The high recruitment rate of *S. tatarica* is much reduced in years of droughts (during spring and summer) or during especially snowy winters. In drought years female fertility is recorded to decrease by between 40 and 60%; the mortality of young antelopes can be as high as 70-80% of the years offspring (Chan *et al*. 1995). Excessive snow cover (30 cm or more) in the deserts and semi-deserts of Kazakhstan occurs every 10 to 11 years (known as *dzhuts*), and can lead to starvation and mass death, especially of males that have participated in the rut (50 to 70% mortality) (Bekenov *et al*. 1998, Chan *et al*. 1995).

III. Evaluation of Status Against Criteria in Resolution Conf. 9.24

Introduction

Because the saiga was listed under CITES at COP 9, information in the proposal's supporting statement was not evaluated against the listing criteria in Resolution Conf. 9.24. The following is an initial attempt to conduct such an evaluation, utilizing current information on saiga population status and trends, harvest, and trade.

Criteria for Inclusion in Appendix I

Criterion A.: The saiga does not satisfy Criterion A. for inclusion in Appendix I, because the wild population is not "small" according to the general guidelines in Resolution Conf. 9.24, or any other currently-accepted standards for defining "small" populations. If subspecies are considered, the Mongolian subspecies *S. t. mongolica* appears to qualify for Appendix I under Criterion A., because its total population is estimated at less than 5,000 animals.

Criterion B.: The saiga does not satisfy Criterion B. for inclusion in Appendix I, because the wild population does not have a "restricted area of distribution" according to the general guidelines in Resolution Conf. 9.24, or any other currently-accepted standards. If subspecies are considered, the Mongolian subspecies *S. t. mongolica* appears to qualify for Appendix I under Criterion B., because its geographic area of distribution is estimated at less than 2,500 sq. km.

Criterion C.: The saiga may satisfy Criterion C for inclusion in Appendix I, but this is difficult to assess because saiga populations are subject to large natural fluctuations as a consequence of periodic extreme climatic events. Saiga populations experience occasional episodes of high mortality as a result of harsh winter weather and/or summer drought. Population reductions of up to 75% have been reported (Teer 1999). Conversely, populations have the capacity to recover rapidly when conditions are good (Milner-Gulland 1994). During the past 40+ years, saiga population highs occurred in the mid-1970s, when the Kazakh population was estimated at around 1,200,000 and the Kalmyk population was estimated at 700,000. The current population in Kazakhstan is estimated to be 50% smaller than in the mid-1970s, while the current population in Kalmykia is estimated to be 70-80% smaller than in the mid-1970s. A number of sources have implicated overharvest, primarily in the form of illegal harvest (poaching), as an important factor in the decline of certain populations, and in the failure of certain populations to recover from natural declines. Because much of the harvest has been illegal, and therefore undocumented, the impact of this harvest on wild populations is difficult to assess. Nonetheless, available information appears to support a conclusion that natural population fluctuations have been altered by levels and patterns of exploitation, resulting in reduced population numbers. Thus, the saiga may satisfy Criterion C. ii) for inclusion in Appendix I.

Criterion D.: The saiga may satisfy Criterion D. for inclusion in Appendix I. Available information indicates that poaching and illegal trade in saiga horn is extensive, and, as a result, that populations may have declined or failed to recover. Although current evidence of a decline may not be considered conclusive by some, that evidence is likely to become more definitive within the next five years if current poaching trends continue, and especially so if one or more episodes of high natural mortality occur during that period.

Criteria for Inclusion in Appendix II

Criterion A.: The saiga may satisfy Criterion A. for inclusion in Appendix II. Available information indicates that poaching and illegal trade in saiga horn is extensive and that populations may have declined or failed to recover as a result. Although current evidence of a decline may not be considered conclusive by some, that evidence is likely to become more definitive within the next 6 to 10 years if current poaching trends continue, and especially so if one or more episodes of high natural mortality occur during that period.

Criterion B. i): The saiga satisfies Criterion B.i) for inclusion in Appendix II. Several sources have implicated overharvest, primarily in the form of illegal harvest (poaching), as an important factor in the decline of certain populations, and the failure of certain populations to recover from natural declines. Although much of the harvest and international trade appears to be illegal, this does not matter in the evaluation under this criterion. What matters is that it is very unlikely that current levels of harvest for international trade can be sustained in perpetuity.

Criterion B. ii): The saiga appears to satisfy Criterion B.ii) for inclusion in Appendix II. As previously stated, available information indicates that poaching and illegal trade in saiga horn is extensive, and that populations have declined as a result. It is possible that continued excessive harvest could reduce populations to a level where natural mortality factors threaten this species.

IV. Range Country and Other Recommendations

In its questionnaire response, Turkmenistan indicated that it believes that the saiga is properly listed in Appendix II of CITES. According to Teer (1999) authorities in Kalmykia and the Russian Federation do not believe the saiga should be placed on Appendix I. Teer (1999) does not mention their opinion toward the current Appendix-II listing. Teer (1999) says that the Government of Kazakhstan believes that the saiga should remain in Appendix II.

V. Conclusions

Our evaluation of the status of saiga against the criteria in Resolution Conf. 9.24 supports the conclusion that the species is properly listed in Appendix II of CITES. If population trends continue downward as a result of overharvest, the saiga may warrant consideration for uplisting to Appendix I. The saiga should remain the focus of Animals Committee monitoring and the significant trade process.

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Review of *Falco peregrinus* (peregrine falcon)

United States of America
U.S. Fish and Wildlife Service Division of Scientific Authority

Taxon: ***Falco peregrinus***
Kingdom: Animalia
Phylum: Cordata
Class: Aves
Order: Falconiformes
Family: Falconidae

Summary: The peregrine falcon (*Falco peregrinus*) was first listed as a CITES Appendix I species in July 1975. A survey was sent to all 109 range countries to test the robustness of the biological criteria for species listing and seek recommendations on possible changes of the species appendix status. There were 26 responses to the survey of peregrine falcon (*Falco peregrinus*) range countries (Table 1). Three surveys were received from Africa and one from Asia. Three responses were from territories (Cayman Islands, Falkland Islands, Gibraltar). Eight responses recommended downlisting to Appendix II and 14 responses recommended maintaining the species in Appendix I. Those that supported downlisting were primarily Western hemisphere countries while those that support the current listing are mostly eastern hemisphere countries. Four respondents could not support any changes to the current listing without information about the global status of the population. It is interesting to note that a number for peregrine population size may be considered large by one country and small by another. The survey does not request justification for how this determination was made.

General Biology: The peregrine falcon (*Falco peregrinus*) has 19 recognized subspecies. It breeds in habitats ranging from tropics to tundra, deserts, marine habitat, and altitudes up to 4000m. It feeds primarily on birds, but also consumes bats, rats, other small mammals, and insects. Over 300 species of birds are eaten by peregrine falcons in the northern hemisphere. Breeding seasons depend on the subspecies. Laying occurs in February and March in the northern temperate zone, April through May at northern high latitudes, August through October in the southern hemisphere, and June through December at the equator. Pairs establish breeding territories and do not build nests. Eggs are laid in cliff depressions, tree hollows, on the ground, and on buildings and other manmade structures. Northern temperate and Arctic zone falcons migrate to Central Argentina and Chile. Eurasian subspecies migrate to Central Africa, South Asia, and Indonesia (White 1994).

The peregrine falcon is not globally threatened. It is not included in *1996 IUCN Red List of Threatened Animals* (Baillie and Groombridge 1996). It has been listed in CITES Appendix-I since 1975. Declines in the mid-1960s through the 1970s were due to eggshell breakage, embryo mortality, and some adult mortality from chlorinated hydrocarbon contamination used as pesticides. Organocholorines are now banned in most countries. It is believed to have remained on the CITES list because of the physical similarities among common and uncommon subspecies (White 1994). The total breeding population was estimated at 12,000-18,000 pairs in the 1980s (White 1994). Although not listed in *Birds to Watch 2: The World List of Threatened Birds* (Collar et al. 1994), the authors caution that some subspecies may be valid species and would, therefore, deserve greater consideration in IUCN classification. They mention *F. p. madens*, the Cape Verde falcon as a potential species.

Subspecies and Distribution (White 1994)
F. p. tundrius Arctic tundra of North America, from Alaska to Greenland.
F. p. anatum North America south of the tundra to North Mexico.
F. p. pealei Coastal western North America from Washington to Alaska and through the Aleutian and Commander Islands.

F. p. cassini West South America from Ecuador south through Bolivia and northern Argentina to south Chile, Tierra del Fuego, and the Falkland Islands.
F. p. japonensis Northeastern Siberia south to Kamchatka and Japan.
F. p. furuitii Volcano Island and possibly Bonin Island.
F. p. calidus Eurasian tundra from Lapland to Siberia.
F. p. peregrinus Eurasia south of the tundra and north of the Pyrenees, Balkans, and Himalayas and from the British Isles to far eastern Russia.
F. p. brookei Southern France, Spain, and coastal north Africa through the Mediteranean and Caucasus.
F. p. babylonicus Asia from eastern Iran to Mongolia.
F. p. pelegrinoides Canary Islands east through inland North Africa to Iraq and possibly Iran.
F. p. madens Cape Verde Islands.
F. p. minor Subsaharan Africa and north into extreme southern Morocco.
F. p. radama Madagascar and Comoro Islands.
F. p. peregrinator Pakistan, India, and Sri Lanka east to southeast China.
F. p. ernesti Indonesia and Philippines east to New Guinea and the Bismarck Archipelago.
F. p. nesiotes Vanatu and New Caledonia east to Fiji.
F. p. macropus Australia except south west.
F. p. submelanogenys Southwestern Australia.

Survey Responses (Refer to Table 1 for country codes)

I. Area of distribution

Please indicate which of the following best describes the status of the peregrine falcon in your country (choose only one):

3 The wild population has a widespread and continuous distribution. GI, LI, CH
13 The wild population is widespread, but has a patchy or fragmented distribution. AU, BE, CA, KY, CR, FK, KE, NO, PE, SI, TM, GB, US
6 The wild population has a restricted area of distribution. DK, FI, HU, LI, NA, SE
3 Do not know. CO, ER, LK

II Population size

Please indicate which of the following best describes the status of the peregrine falcon in your country (may choose more than one):

5 The wild population is large. CA, CR, CH, LI (CH& LI, 250 pairs), US
16 The wild population is small. AU (3,000 pairs), BE, KY, DK, FK (500-900 pairs), FI (100-120 pairs), GI, KE, LI (2-10 pairs), NO (350 pairs), NA (150 pairs), PE, SI, TM, GB (1283 pairs), ZW (200 pairs)
2 Sub-populations are very small. HU (2 pairs), SE (60-80 pairs)
1 The majority of individuals, during one or more life-history phases, are concentrated in one sub-population. HU
3 Do not know. CO, ER, LK

III Population trends

1. If available, please provide details of programs in your country for the monitoring of the peregrine falcon (such programs may be conducted by the government, non-governmental organizations or scientific institutions).

2. Which of the following best describes the status of the peregrine falcon in your country (choose only one):

11 Number of individuals in the wild has increased. BE, Southern CA, DK, FK, HU, LU, LI, NO, CH, SE, GB, US
7 Number of individuals in the wild has remained stable. AU, Northern CA, CR, FI, GI, SI, ZW
2 Number of individuals in the wild has decreased. PE, TM
6 Do not know. CO, ER, KE, KY, LK, NA

3. If the wild population has declined, such trend has been either:

- observed as ongoing or as having occurred in the past (but with a potential to resume); or
- inferred or projected on the basis of the following:
  - 2 decrease in area or quality of habitat KE, PE
  - 1 levels or patterns of exploitation PE
- threats from extrinsic factors such as the effects of pathogens, competitors, parasites, predators, hybridization, introduced species and the effects of toxins and pollutants
- decreasing reproductive potential.

IV Threats

1. The wild population of the peregrine falcon is characterized by the following (may choose more than one):

10 fragmentation or occurrence at very few locations. BE, CO, KY, DK, HU, LU, NO, PE, SI, SE

2 large fluctuations in the area of distribution or the number of sub-populations. KY, PE

19 high vulnerability due to the species' biology or behaviour, including:

9 migratory species CO, CR, FI, KE, KY, LK, NO, PE, TM

4 has low fecundity AU, FI, KE, TM

1 high juvenile mortality NO

2 slow growth FI, NO

1 delayed reproduction FI

5 habitat specialization FI, HU, LU, SI, ZW

11 other *Pesticides* (AU, CR, SE, TM, ZW), *Breeding Site Vulnerability* (LU), *Poaching* (SE, TM, GB, ZW), DRAUGHT (NA)

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

2 area of distribution PE, SE

- number of sub-populations

4 number of individuals GI, PE, NA, SE

7 area or quality of habitat CR, ER, KE, LK, SI, GB, ZW

1 reproductive potential GI

Comments (If you need additional space, please use a separate sheet of paper):
Egg Collection (FI, SI), *Falconry* (FI, TM), *Paragliding* (LI, CH), *Rock Climbing* (LI, CH, SI)

A. The status of the peregrine falcon is such that if the species is not included in appendix I, is is likely to satisfy one or more of the above criteria within a period of five years.

8 Yes (BE, ER, HU, LU, PE, LK, SI, SE)

12 No (AU, FK, FI, GI, KE, NO, NA, CH, LI, GB, US, ZW)

Comments (If you need additional space, please use a separate sheet of paper):
No opinion - KY, Question unclear- CA, CO

V Legislation

1. Is the peregrine falcon protected or managed by national laws?

22 Yes (AU, BE, KY, CR, DK, FK, FI, HU, GI, KE, LI, LU, NO, NA, PE, CH, LK, SE, TM, GB, US, ZW)

3 No (CA, CO, ER)

2. If yes, please provide information (as detailed as possible) relating to the conservation and management of the peregrine falcon in your country.

3. Aside from CITES, is the peregrine falcon protected or managed by other international treaties or laws?

16 Yes (BE, KY, DK, FK, FI, GI, HU, LU, LI, NO, PE, CH, SI, SE, GB, US)
7 No (AU, CA, CO, ER, KE, NA, ZW)
1 Don't know (CR)

4. If yes, please provide detailed information relating to the conservation and management of the peregrine falcon on the international level.

5. In our view, the current listing of the species in Appendix II is:
14 appropriate, based on Resolution Conf. 9.24. BE, CO, DK, ER, FI, GI, HU, LU, NO, PE, LK, SI, SE, TM
8 inappropriate, based on Resolution Conf. 9.24.
7 Species should be in Appendix II. CA, CR, CH, KE, LI, NA, US, ZW
2 Species should not be listed in the CITES Appendices. CH, LI

Comments (If you need additional space, please use a separate sheet of paper):
No opinion - AU, KY, FK, GB

VI Trade

1. Is the peregrine falcon traded domestically?
13 Yes (BE, CA, CR, DK, LI, NA (illegally), PE (illegally), CH, SI, SE (illegally), GB, US, ZW)
12 No (AU, CO, KE, KY, ER, FK, FI, GI, HU, LU, NO, TM)
1 Data not available (LK)

2. If traded domestically, please describe:
a. purposes of trade

Falconry - BE, CA, DK, NA, GB, US, ZW
Captive Breeding - CA, SI, GB, US
Taxidermy - DK
Exhibition - GB
Pets - PE

b. trade levels and/or trends
Increasing - SI, GB
Low - BE, PE, US, ZW
Unknown - CA, LK

c. impact of trade on the wild populations
High - PE, SI
Low - BE, US
None - CA, NA, GB

3. What is the source of specimens in trade? Please indicate the total number or percentage of specimens in trade from the following sources:

Removed as adults from the wild GB, ZW
_____ ranched
Bred in captivity BE, CA, HU, CH, LI, NA, GB, US, ZW

Questionnaire comments are below. The response author is in italics.

Australia

Cindy Steensby, Australian CITES Scientific Authority: The wild population is widespread with a patchy distribution and is very small. 3,000-5,000 pairs in Australia. Population is monitored by individual researchers with banding permits. The population has remained stable although it declined locally in Tasmania and New South Wales. Use of DDT and low fecundity are continuing threats. The species is not listed nationally as threatened or endangered so its protection and management is provided by the states and territories. All states and territories in Australia provide legal protection to peregrines. The only trade in raptors occurs between wildlife and zoological parks although there is still some (but declining) illegal shooting, trapping, and poisoning. There is no domestic trade. Organochlorine pesticide use is banned or severely restricted. The respondent supports downlisting to **Appendix II** for Australia, but needs the world view before recommending downlisting for the global population.

Belgium

F. Argis, CITES Belgium: The wild population is widespread with a patchy distribution and is very small. 13 pairs present in 2000, 10 bred successfully, and 30 young fledged. The population is being monitored and nest boxes built by the Fund for Intervention on Raptors. Number of wild individuals is increasing. The bird is protected by EC Annex A (highest level of protection) and Belgium regional legislation. The respondent supports **Appendix I.** There is domestic trade for falconry with no known effects on the wild population and all birds in trade are captive-bred.

Canada

Dr. Geoff Holroyd (Research Scientist, Chair of Canadian Peregrine Recovery Team): The wild population is widespread, but has a patchy or fragmented distribution. Although the population lives in habitat patches, the distribution has not isolated any population because the birds can travel over 600 km. The wild population is large with over 1000 pairs. The population is surveyed once every 5 years with nests surveyed annually in southern Canada. The number of individuals in the wild is increasing in southern Canada and is stable in northern Canada. The peregrine is managed and fully protected by provincial and territorial wildlife agencies. CITES is the only international law affecting the bird in Canada. The respondent believes Appendix I is **inappropriate** based on Resolution Conf. 9.24 and that the species should be in **Appendix II.** It is traded domestically for falconry and captive breeding. All trade is of captive-bred falcons which are traded and sold with appropriate permits.

Cayman Islands

Ministry of Agriculture, Communications, Environment & Natural Resources, Cayman Islands: The wild population is widespread with a patchy distribution. The peregrine is an uncommon migrant in Fall and Spring. Because it is an incidental visitor, there are no monitoring programs. Since the species is not local, **no opinion** is offered on CITES status. Cayman Islands law prohibits take of this species. International laws are the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region. The peregrine is also listed in Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals.

Colombia

Filipe Estela, Asociación Calidris: There is no monitoring program of this species in Colombia so population size, trend, and area of distribution is unknown. There is, however, a raptor migration monitoring program in Fredonia. Threats to the population are fragmentation and vulnerability during migration. There are no national laws or international laws other than CITES known to protect the species. The bird is not traded domestically. The respondent recommends leaving the peregrine on **Appendix I**.

Costa Rica

Julio E. Sanchez, Carman Hidakio, and Johnny Villarreal, National Museum of Costa Rica: The population is widespread, but patchy. The peregrine is not a resident, but passes through Costa Rica during migration to and from South America. The population is large and stable, but there are no monitoring programs in place. Pesticides are still a threat. There is national legislation that prohibits its hunting or capture. The respondent recommends listing in **Appendix II**. The species is traded domestically.

Denmark

Morten Dehn, Danish Cites Management Authority: The wild population has a fragmented and restricted distribution. The population is small and nonbreeding, but may be breeding in the near future as two pairs have established home ranges. Up to 10 pairs bred in Denmark until 1950, but declined due to pollutants and persecution. There are no current monitoring programs. The number of individuals is increasing. There were 25-30 wintering birds and 235 migratory birds in 1995. The bird is protected by national laws and EU Council Directive 79/409/EEC on the Conservation of Wild Birds. The respondent supports **Appendix I**. The species is traded domestically for taxidermy, falconry, and export of hybrids.

Eritrea

Hagos Yohannes, Ministry of Agriculture: Occurs mainly in the eastern coastal lowlands, but its population status and trends are unknown. Drought and war may have affected peregrine habitat, but no surveys have been done. The respondent prefers to keep the species on **Appendix I** until scientific information is collected. There are no national or international laws affecting the bird's protection and no trade is known to exist.

Falkland Islands

T.W. Eggeling, Environmental Planning Department: The wild population is widespread with a patchy distribution. Breeding residents are mostly along the coasts, some may migrate. The respondent notes that there is a small wild population with between 500-900 pairs (recorded from 1983-1993), but no regular monitoring. The population has been increasing since 1917. No threats are known. The species is protected under the Conservation of Wildlife and Nature Ordinance of 1999 which prohibits disturbance, kill, or take of any live or dead animal or part. The peregrine is also protected by Annex A of EC Regulation 338/97. While not threatened in the Falkland Islands, **no opinion** is offered without looking at the global situation.

Finland

Dr. Risto A. Väisänen, Zoological Museum: The wild population is restricted to two areas with 90% breeding in large peatlands and 10% in cliffs. The population is small with 100-130 pairs. The population was stable in the 1990s, increased from the 1980s, and is monitored by the Forest and Park Service. The peregrine is vulnerable as a migratory species with low fecundity, slow growth, delayed reproduction, and its reliance on peatland for nesting (Finland only). Most serious threats are foreign egg collectors and falconers. It is not traded domestically. Using IUCN criteria, the falcon will be critically endangered in Finland from 2000 onward. The species is regulated by the EU as a species of special concern. There are also national laws protecting the species. The respondent notes unfavorable conservation status of the species in Europe although it is globally not concentrated in Europe. Maintain as **Appendix I**.

Gibraltar

John Cortes, Ph.D., The Gibraltar Ornithological and Natural History Society (GONHS): The wild population is small, widespread, and continuous. There are five nesting pairs on the island and nest sites are monitored by GONHS. The number of individuals remains stable and is limited by the size of the available habitat. The wild population is affected by the number and reproductive potential of individuals. The species has full protection under the Nature Protection Ordinance (1991) and is not traded domestically. **Appendix I** is considered appropriate.

Hungary

CITES Management Authority of Hungary: The wild population is a very small with most individuals concentrated in one subpopulation. The range of the birds is restricted. The peregrine disappeared from Hungary in 1964 and naturally repopulated in 1997. One pair bred in 1997, there was no breeding in 1998, and two pairs were observed in 1999 and 2000. Although the number of individuals has increased, there is no formal monitoring program because the population is still very small. Threats include fragmentation at very few locations and habitat specialization. The peregrine is listed as strictly protected in Hungary by *Decree No. 1/1982 (III.15.) OKTH on the Protected and Strictly Protected Species of Flora and Fauna, Value of their Specimens, Determination of the Range of Protected and Strictly Protected Caves and Exemptions from Restrictions and Prohibitions Set for Certain Protected Animal Species*, last amended by the 15/1996 (VII.26.) Decree of the Minister for Environment. It is also protected by the Nature Conservation Act No. 53 of 1996, Article 43 which requires National Park Directorate authorization for all uses of the animal or its parts. Government Decree No. 8/1998 (1.23.) Detailed Rules on Protection, Keeping, Display and Utilisation of Protected Species, prohibits keeping, displaying, or utilizing Strictly Protected Species. Exemptions are made for peregrines and other raptor species for falconry, but these birds must be captive bred and marked by microchip transponders. Species hybridization is prohibited. The species is also protected by Bern Convention Appendix II. The respondent feels that **Appendix I** is appropriate for this species.

Kenya

Leon Bennun, Ph.D., Ornithology Department, National Museums of Kenya: The wild population is small and widespread, but has a patchy or fragmented distribution. Subspecies *F. p. minor* is a localized breeding resident usually near cliffs in open country. Palaearctic migrants of *F. p. calidus* is regular and widespread from October through April, especially on passage along the coast. There is no information on monitoring programs or population trends, but it is likely that the population has decreased over the last 20 years due to reduced habitat availability. The species is known to nest in urban areas. Continuing threats include one *F. p. calidus* being migratory and both subspecies having low fecundity, however, the respondent believes the threats do not appear severe enough in Kenya to warrant Appendix I listing. The peregrine is fully protected nationally by the Wildlife Conservation and Management Act. National Parks and Reserves protect substantial amounts of suitable habitat. This species is not traded domestically. Other than CITES, no other international law protects the peregrine. The respondent believes the species should be listed in **Appendix II**.

Luxembourg

Patric Lorgé, Centrale Ornithologique: The wild population has a restricted distribution area and is between 2 and 10 pairs. The population is monitored year round by the Raptor Group of Luxembourgish League for the Protection of Birds and Nature. The population was extinct in the early 1960s. Releases in Germany led to the first breeding (1998) and the population has increased since then. The birds are threatened by the habitat fragmentation, specialization, and vulnerability at breeding sites. Protection is regulated by the Nature Conservation Law of 1982 and the Wild Birds Directive 79/409/CE of the EU. Maintain as **Appendix I**. There is no domestic trade of this species.

Namibia

R.E. Simmons, Ministry of Environment and Tourism: The wild population is small and has a very restricted area of distribution. Arid zones with low precipitation and mostly sandy beaches with few rocky areas for nesting are not conducive to a large population. The only rocky areas adequate for nesting are on the western half of Namibia. The population is estimated at no more than 150 pairs. There are no formal monitoring programs so the population trend is unknown. The long-term drought in an already arid landscape and the few individuals in one subpopulation are threats to the population. In 1999-2000, however, there were good rains. More individual birds have been observed in the city as the pigeon population has increased. The respondent does not see any anthropogenic threats that would restrict the birds to Appendix I and downlisting to **Appendix II** is recommended. The national law that protects the

peregrine is Nature Conservation Ordinance #4 of 1975. There is no legal trade although there was one case where a captive-bred bird from Cape Town was shipped illegally to Namibia for falconry. The bird was confiscated.

Norway

Oystein Stoerkersen, Directorate for Nature Management: The wild population is widespread and has a patchy coastal distribution. The small wild population is above 1000 pairs. Regional annual monitoring programs are performed by the National Ornithological Society and Norwegian Institute of Nature Research. The population is increasing. There is still some juvenile mortality and slow growth which could be threats to population growth. The species protected by the Wildlife Act which includes a ban on falconry. Internationally, it is protected by the Bern Convention. The respondent supports continued **Appendix I** listing as a precaution since the population is still low.

Peru

Josefiná Takahashi Sato, Ph.D., Chief of INRENA, Autoridad Administrativa y Científica CITES-Peru: The wild population is small, widespread, and distributed in patches. Although there are no monitoring programs in Peru, the number of individuals has probably decreased due to less habitat availablility and levels of exploitation. The species is also vulnerable since it is migratory. It is protected by a national law, Decreed Supreme No. 013-99-AG. There is some illegal trade for use of the falcon as a pet (about three adults removed from the wild per year), but it has a high impact on the wild population. Maintain as **Appendix I**.

Slovenia

Robert Boljesic and Martina Nacichik-Jancar, Ministry for the Environment and Spatial Planning and DOPPS-Birdlife Slovenia: The population is small and limited in its widespread distribution to rock walls. The population is stable and monitored by DOPPS-BirdLife Slovenia. Threats listed include fragmentation or occurrence at very few locations, habitat specialization, and area or quality of habitat. In Slovenia, the peregrine nests only in rock walls. The popularity of free climbing on rock walls represents a major threat to the species. Because control of trade is insufficient, birds are captured for breeding. Breeders, however, are a threat to the wild population since they are known to take eggs and chicks. Escaped birds have been observed. The respondents feel that this may affect the gene pool of the wild population and decrease reproductive potential. There is no management program for the peregrine. Slovenia ratified the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention or CMS) and the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The peregrine is listed in the appendices of both treaties. The Decree on the Protection of Endangered Animal Species (OJ RS, Nr. 57/93) is the national legislation protecting the species since 1993. Falconry is prohibited. Human activities in nesting areas of the Carst region are also prohibited. Exposed breeding sites are guarded by DOPPS. Legal trade of the bird occurs. There are eight breeders in Slovenia and the number is increasing. A permit can be issued by the Minister for the Environment for possession of captive-bred specimens, but this has also presented problems.

Sri Lanka

A.P.A. Gunasekera, Director, Department of Wildlife Conservation: The population size, trend, and distribution are unknown. Habitat quality has decreased. The species is vulnerable because it is migratory. It is protected by national laws. Trade data is unavailable, and the current **Appendix I** listing is appropriate.

Sweden

Lena Berg, Naturvardsverleet (SEPA): The wild population has restricted area of distribution with small subpopulations. The population is increasing, partly due to a re-stocking program. The population decreased to 10-15 pairs in the 1970s as a result of environmental contamination. A breeding program

was established in 1979 and birds have been released into the wild since the 1980s. There are now 40-50 pairs in the northern subpopulation and 20-30 pairs in the southern subpopulation. Continuing threats include illegal hunting and trade. The species has been totally protected since 1957. Dead and injured birds are the property of the state. There is no legal trade. Keeping and trade is controlled by national law, EU regulations, and the Bern Convention. Monitoring is done by non-governmental organizations with financial support from the Swedish EPA. Supports **Appendix I** listing.

Switzerland and Liechtenstein

Peter Dollinger, DVM, Ph.D., Head, Division Permits and Inspections, Swiss Federal Veterinary Office: The population is widespread with a continuous distribution. Peregrines are breeding throughout Switzerland on cliffs, tall buildings, but not above 1800m above sea level. The wild population is large (population increased 800% in the last 20 years) with birds as migrants, winter visitors, and residents. There are 250 breeding pairs. Monitoring is done by bird watchers and coordinated by the Swiss Ornithological Station at Sempach. The peregrine is breeding in the Canton of Zurich today after being considered extinct in the area from 1963-1988. The range is expanding. The only threats are paragliding and rock climbing. The bird is nationally protected in both countries, EU "Birds Directive" (Council Directive 79/409/EEC), and Convention on the Conservation of Migratory Species of Wild Animals (Bern Convention). The respondent believes it should be in **Appendix II** or not listed since the worldwide population is recovering, the birds breed easily in captivity, and Switzerland has not discovered or prosecuted a single illegal export in 24 years. There is no commercial trade in this species including captive-bred specimens.

Turkmenistan

Djumamurad Saparmuradov: The population is widespread, has a patchy distribution, and is small. The species status is monitored by the National Institute of Deserts, Flora, and Fauna. The wild population is decreasing due to poaching, falconry, and pesticide use in nesting areas in Russia. This affects the wintering population arriving in Turkmenistan. The species is protected by national laws. Harvesting and trade are prohibited as they are listed in the Red Data Book of Turkmenistan. The respondent prefers the **Appendix I** status.

United Kingdom

Joint Nature Conservation Committee: The population is widespread, patchy, and small. The most recent survey (1991) showed 1283 pairs in nesting territories and 4750 individuals. The United Kingdom population accounts for 20% of the peregrines west of the Urals and is considered small by CITES since there are fewer than 5000 individuals. Volunteer monitoring shows an overall increase the population although some areas have declined or not recovered their pre-1940 numbers. Threats include loss of habitat, less prey availability, persistent pollutants, and illegal killing and taking. There is still a demand from Germany and the Middle East for illegally taken eggs and chicks. Peregrines are protected by the Wildlife & Countryside Act in Great Britain and the Wildlife (Northern Ireland) Order. It is illegal to destroy nests, collect or sell, or transport any live wild peregrine. Other international protection include COTES (Control of Trade in Endangered Species), EC Directive 79/409/EEC, and EC Council Regulation 338/97. The respondent **reserves opinion** until there is a global overview of the bird's status. Wild-caught adults and captive-bred birds are traded domestically for falconry, captive breeding, and display. Licenses are issued. Illegal trade does not seem to be harming the wild population.

United States

According to the United States Fish and Wildlife Service (USFWS) Division of Migratory Bird Management, there are three subspecies in the United States. *F. p. pealei* is a nonmigratory population found in the British Columbia and Washington coastal area. This subspecies was never listed under the U.S. Endangered Species Act. There are over 200 pairs of *F. p. tundrius* in Alaska and up to 2000 pairs in Canada and Greenland. This subspecies was delisted from the U.S. Endangered Species list in 1994. *F. p. anatum* is widespread from the interior of Alaska through south Canada and most of the lower 48 states. Due to organochlorine pesticide restrictions in the United States and Canada as well as successful management activities, the population is well above recovery levels with 1650 known pairs. Recovery

goals for American peregrine falcons in the United States were substantially exceeded in some areas, and in August 1999 the American peregrine (*F. p. anatum*) was removed from the List of Endangered and Threatened Wildlife and Plants (64 FR 46542). However, monitoring of the status of the species is required and ongoing, and it is still protected under the Migratory Bird Treaty Act.

Delisting *F. p. anatum* from the List of Endangered and Threatened Wildlife removed the designation of endangered due to similarity of appearance for any free-flying peregrine falcon within the 48 contiguous states. A 12-year monitoring program is being developed to survey population trends, nesting success, and contaminant exposure. At the end of the monitoring period, the USFWS will review the status of the species and determine if relisting or continued monitoring are necessary.

Anticipating delisting, in June 1999 the States of the United States, through the International Association of Fish and Wildlife Agencies, proposed allowing take of nestling American peregrines for falconry. In response, in an October 1999 Federal Register notice (64 FR 53686), USFWS stated that it would consider a conservative take of nestling peregrines from healthy populations of American peregrine falcons in the western U.S. and Alaska, where recovery was most marked and where approximately 82% of the nesting pairs in the United States were found in 1998. The proposed action is to allow take of up to 5% of the *F. p. anatum* nestlings produced in Western States; take of any lesser amount could be allowed by a State. The 5% level of take should still allow population growth of 3% per year if post-first-year mortality is 20% and population density does not affect reproduction or survival. The draft plan is available until September 25, 2000 for public comment at http://migratorybirds.fws.gov/issues/americanperegrines/draftea.html.

According to Dr. Bill Burnham of The Peregrine Fund, the population is widespread and patchily distributed. It is large and increasing. There are no threats to the population in the United States. The population is protected by the Migratory Bird Treaty Act (national and international law). This organization would like the peregrine listed in **Appendix II.** It is traded domestically for falconry and captive breeding, but this has no impact on wild populations. All trade is of captive-bred falcons.

Zimbabwe

Dr. Peter Mundy, Department of National Parks: The population is widespread and continuous. The birds are found on high cliffs which are present throughout most of the country. Small population of 200 pairs. Subspecies *Falco perigrinus calidus* visits Zimbabwe in the northern winter. Monitoring is done by the Zimbabwe falconer's club. The club has been successful in captive breeding *Falco perigrinus minor*. The wild population is stable at historic eyries although two pairs recently nested in two cities. Habitat specialization, past use of DDT, decreasing available habitat (deforestation near cliffs), and competition with the lanner falcon, *Falco biarmicus*, continue to threaten the population. The bird is protected on the list of "Specially Protected Species" under the Parks and Wildlife Act of 1975 (Revised 1996). It has recovered dramatically since DDT and Dieldrin are no longer used. The species should be downlisted to **Appendix II.** It is not traded, but is used by permit domestically by the Falconer's Club (10 birds removed from the wild, 30 produced in captivity).

Supplemental Information from the Literature

Peregrine falcon numbers, ranges, and threats to survival seem to be more extensively studied in the Western nations. Very little is known about peregrine biology and population dynamics in Asia and the Pacific. In Fiji and most of southeast Asia, the species is probably uncommon and there is no information on clutch size, fledgling rates, and adult replacement (White et al. 1988). Surveys are needed in India and the western Pacific. Japan has an estimated 54-68 pairs and about 35-50 pairs of *F. p. babylonicus* are estimated for the Soviet central Asiatic republics (Cade 1988).

In Africa, peregrines can easily be confused with other falcons. While the populations of *F. p. pelegrinoides*, *F. p. minor*, and *F. p. calidus* have probably been stable over the past two centuries, the populations are predicted to decline due to rapid human population growth, clearcutting, and more widespread use of pesticides (Mendelsohn 1988, Platt 1988). *F. p. pelegrinoides* has been trapped for falconry, but there are no records of numbers or prices according to Platt (1988).

In Victoria, Australia, human activities have had a positive effect on the distribution of nesting peregrine falcons. 12% or the nests are on human-made structures and 51 % are on natural cliffs since 1950. However, 37% of nest sites are in hollow trees. Tree rot and destruction of large trees will probably occur at a more rapid rate than tree replacement (Emison et al. 1997).

The peregrine populations appear to be stable or increasing in the Americas. In Canada, *F. p. anatum* increased from the 1970s to 1995 coinciding with decreased use of organochlorine pesticides (Kirk and Hyslop 1998).

In Mexico, the population of falcons along the central west coast of the Baja California peninsula declined during the 1960s and 1970s, but has recovered. Human disturbances still need to be minimized and nesting sites need to be provided (Castellanos et al. 1997).

Based on 1988 data, it is estimated that South America has at least 1000 pairs which is larger and healthier than previously thought (McNutt et al. 1988). Peregrine reproductive rate is high and pesticide residues are low throughout Chile, Argentina, Peru, and Equador. The subspecies most common in South America is *F. p. cassini* (McNutt et al. 1988).

Conclusions: Although most of the range countries did not respond to the survey, the majority responding recommend that the peregrine falcon be maintained in CITES Appendix I throughout its range. The survey results demonstrate that the CITES listing criteria on which the survey was based are robust since recommendations on listing status reflect the responses to the survey questions (which are the biological criteria for Appendix I). Most of the respondents reported peregrine populations as being widespread, small, and patchy. Although numbers in the wild are increasing, respondents expressed concern about continued species vulnerability due to pesticides, poaching, and migration risks. Peregrines are protected by national and international non-CITES legislation in almost all responding countries. Some countries do allow limited national trade in captive-bred birds primarily for falconry. Because the population is recovering but is still small in most range countries or there is a lack of monitoring, most respondents support maintaining the peregrine on Appendix I.

Based on the survey results, scientific literature, and discussion with experts, we recognize it may be preferable to regulate trade at the Appendix I level due to subspecies scarcity or lack of monitoring in some range countries and because of potential illegal trade in less common subspecies that resemble abundant subspecies. White and Boyce (1988) recognize 19 subspecies of peregrine falcons based largely on morphology. However, these distinctions may not be easily recognized by law enforcement officials (Allen, Pers. comm. July 2000). With take of *F. p. anatum* likely to be permitted in the United States for falconry purposes, it will be difficult for officials throughout the world to determine the origin of a bird without feather analysis.

Table 1. Survey Appendix Listing Results

Country or Territory Responding	Recommendation	Rationale
Australia (AU)	App. II for Australia	Needs international info.
Belgium (BE)	App. I	Small population.
Canada (CA)	App. II	Large population.
Cayman Islands (KY)	No opinion	Incidental species.
Columbia (CO)	App. I	No monitoring.
Costa Rica (CR)	App. II	Many migrants.
Denmark (DK)	App. I	Small population.

Country or Territory Responding	Recommendation	Rationale
Eritrea (ER)	App. I	No monitoring.
Falkland Islands (FK)	No opinion	Needs international info.
Finland (FI)	App. I	Small, stable population.
Gibraltar (GI)	App. I	Small, stable population.
Hungary (HU)	App. I	Small, one subpopulation.
Kenya (KE)	App. II	Less severity of threats.
Liechtenstein (LI)	App. II	Large population.
Luxembourg (LU)	App. I	Small population.
Namibia (NA)	App. II	No anthropogenic threats.
Norway (NO)	App. I	Small population.
Peru (PE)	App. I	Decreasing population size.
Slovenia (SI)	App. I	Small population.
Sri Lanka (LK)	App. I	No data.
Sweden (SE)	App. I	Small population.
Switzerland (CH)	App. II	Large population.
Turkmenistan (TM)	App. I	Poaching, pesticides, sm. population
United Kingdom (GB)	No opinion.	Needs international info.
United States (US)	App. II	Large population.
Zimbabwe (ZW)	App. II	Large population.

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Review of *Macrocephalon maleo*

Biological criteria for inclusion of Maleo, *Macrocephalon maleo* in CITES Appendix I

	Biological Criteria	Estimate status of identified species	Supporting statement	Additional statement
A	The wild population is small and is characterised by at least one of the following			
1	An observed, inferred or projected decline in the number of individuals or area and quality of habitat	Yes	The bird is endemic to Sulawesi. Currently it occurs in North, Central and South East Sulawesi[1]. The bird was predicted extinct in South Sulawesi[2].	Habitat destruction and hunting for their eggs are the main threats[3,4]
2	Each population being very small	Yes	Recent inventory has found 85 nesting sites (48 in coastal areas and 37 in inland areas), 22 of them were abandoned[3].	Recent study indicated that the entire populations of Maleo which frequently use coastal areas for nesting sites was estimated between 335-370 pairs[5]
3	A majority of individuals, during one or more life-history phases, being concentrated in one sub population	Yes	The species normally breed in beach or near the hot spring areas[4].	Collectors of egg Maleo well known about this behaviour[4].
4	Large short-term fluctuations in the number of individuals	No	The species belongs to K-species type	-
5	High vulnerability due to the species biology or behaviour including migration	Yes	Ditto A3	-
B	The wild population has a restricted area of distribution and is characterised by at least one of the following			
1	Fragmentation or occurrence at very few locations	Yes	Most Maleo populations and their nesting areas only occur in Protected area or National Park in Sulawesi.	The wild populations occurs in non-protected areas are heavily threaten by illegal hunters, particularly their eggs.
2	Large fluctuation in the area of distribution or the number of sub-populations	No	The species occur in lowland areas in Sulawesi.	
3	High vulnerability due to the species biology or behaviour including migration	Yes	Ditto A3	

4	An observed, inferred or projected decline in area distribution or the number of sub-populations or the number of individuals or area and quality of habitat reproductive potential	Yes	Ditto A1	
C	A decline in the number of individuals in the wild which has been either			
1	Observed as ongoing or as having in the past	Yes	Illegal hunting still occurs in significant number. The coastal populations in North Sulawesi has declined into 95% while the inland populations in the same regions declined about 30%[4]	It was predicted that without serious conservation effort, the wild birds in the region might extinct in 10 to 20 years time[5]
2	Inferred or projected decrease in area or quality of habitat or levels or pattern of exploitation	Yes	Ditto B_1	DittoB_1
3	Threats from extrinsic factors such as pathogens	No (?)	No records	
4	Decreasing reproductive potential	No (?)	No records	
D	If the species is not included in Appendix I, it would satisfy with A,B or C a period of five years			
Recommended status for Appendix I		Yes		

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Review of *Dermochelys coriacea* (leatherback sea turtle)

United States of America
U.S. Fish and Wildlife Service Division of Scientific Authority

Taxon: ***Dermochelys coriacea***
Kingdom: Animalia
Phylum: Cordata
Class: Reptilia
Order: Testudinae
Family: Dermochelyidae
Subspecies: Two subspecies are currently recognized: *D. c. coriacea* (found in the Atlantic Ocean) and *D. c. schegelli* (found in the Pacific and Indian Oceans)
Common Name:
English: Leatherback, Leathery, Trunkback
Spanish: Laúd, Baula, Tinglar, Tinglado, Cardón, Canal
French: Luth

Summary of questionnaire responses: The leatherback sea turtle questionnaire was sent to 47 range states. To date, we have received 15 responses to the questionnaire, including 13 from range states and 2 from NGOs (IUCN Marine Turtle Specialist Group and the Center for Marine Conservation). We received responses from countries in all continents (except Oceania): North America (Bahamas, Costa Rica, Mexico, Saint Lucia, and United States), South America (Colombia and Peru), Europe (United Kingdom), Asia (India, Indonesia, Israel, and Sri Lanka), and Africa (Togo). One response was from a United Kingdom territory (Cayman Islands). Overall, all respondents agree that the current listing of the leatherback sea turtle in Appendix I is appropriate, based on Resolution Conf. 9.24.

Natural history: Leatherback sea turtles are omnivorous. They are mostly pelagic, occasionally entering shallow waters. Size and age of maturation of males is unknown, but nesting females average about 150 cm in carapace length. Atlantic leatherbacks nest April through November. Pacific leatherbacks nest throughout the year, depending on location. Clutch size ranges from 50 to 170 eggs, but many eggs are infertile (10-20% in nests from the Atlantic; 34-40% in nests from the Pacific). Incubation lasts 53-74 days.

I. Area of distribution

Globally

The leatherback turtle has a worldwide distribution. It is found from tropical to sub-polar oceans (Atlantic-eastern central, northeast, northwest, southeast, southwest, western central.-; Indian-eastern, western.-; Mediterranean and Black Sea; Pacific-eastern central, northeast, northwest, southeast, southwest, western central-), nesting on tropical (rarely subtropical) beaches. The main nesting areas are located in French Guyana, Suriname, Guyana, Angola, Gabon, Senegal, Liberia, Cote d'Ivoire, Ghana, Togo, Zaire, US Virgin Island, Trinidad and Tobago, Costa Rica, South Africa, Mexico, Indonesia, Sri Lanka and Malaysia. Other minor nesting areas are located in Anguilla, Antigua and Barbuda, Australia, Brazil, China (?), Colombia, Cuba, Dominica, Dominican Republic, El Salvador, Nicaragua, Panama, Grenada, Guadeloupe, Guatemala, India, Honduras, Martinique, Montserrat, Mozambique, Myanmar, Netherlands Antilles, Fiji (?), Papua New Guinea, Peru (?), Puerto Rico, Senegal, Solomon Island, St. Vincent, St. Lucia, Taiwan, Venezuela, Thailand.

By country

The Bahamas, Cayman Islands, Costa Rica, Mexico, United Kingdom, and United States consider their wild populations to be widespread, but having a patchy or fragmented distribution.

- Leatherbacks are occasional and transitory visitors to the Cayman Islands.

- In Mexico, leatherbacks nest along the entire Pacific coast. However, around 42% of all nestings occur in 3 playas and around 65% are concentrated in 6 beaches. These beaches are not contiguous and are separated by tenths of kilometers. In some beaches along the Gulf of Mexico and the Caribbean Sea, nestings occur sporadically (less than 10 a year throughout the entire region.
- In the United Kingdom, leatherbacks are regular summer visitors, with most occurrences reported along the northern and western coasts of Britain and Ireland.
- In the United States, the leatherback sea turtle is regularly found year round in the Gulf of Mexico and along the Atlantic coastline. Seasonal northward migrations of leatherbacks occur in the spring and early summer along the Atlantic coastline, although some individuals remain in waters off the southeast United States and do not appear to migrate northward. Along the United States Pacific mainland, leatherbacks are likely the most common sea turtle in U.S. waters and are regularly observed off southern California. Leatherbacks also regularly occur in U.S. waters surrounding the Hawaiian Islands. During the internesting intervals, leatherbacks are present in Caribbean waters surrounding the US Virgin Islands and Puerto Rico. In the United States, leatherbacks nest primarily along Florida's east coast; the main island of Puerto Rico; the islands of Culebra, Vieques, and Mona Island, Puerto Rico; and St. Croix, U.S. Virgin Islands. Nesting also occurs occasionally on the Florida panhandle, and in Georgia, South Carolina and North Carolina.

According to Colombia, India, Indonesia, Peru, St. Lucia, Sri Lanka, Togo, their wild populations of leatherback have a restricted area of distribution.

- In Colombia, the species is known to nest in two areas along the Caribbean: Gulf of Darien, and the beaches of Tayrona National Park and Sierra Nevada de Santa Marta National Park.
- In India, the only breeding population is found in the Andaman and Nicobar Islands.
- In Indonesia, leatherbacks occur only in East Java and Irian Java.

Israel noted that the species is rare in the Mediterranean.

II. Population size

Globally

The first attempt to evaluate the world population was done by Ross in 1979, estimating than 29,000 to 45,000 adult leatherback existed in the world, not counting the rookeries of the Eastern Pacific which had not been discovered yet (IUCN Marine Turtle Specialist Group 2000). Pritchard estimated in 1982 that the world population consisted of 115,000 adult females, and considered that the Mexican population supported up to 60% of the global total. In 1996, Spotila and collaborators provided the most recent global estimation, compiling published data, unpublished information and personal comments from 28 leatherback nesting sites, estimating that 20,000 to 30,000 adult females existed at that time in the world. This represents a reduction of the global population of 78% from Pritchard's estimation in 14 years, less than a single generation.

By country

Cayman Islands, Colombia, Costa Rica, Indonesia, Mexico, St. Lucia, and United States consider their leatherback populations to be small. The biggest nesting sites through the South East Asian Region are found in Irian Jaya, Indonesia. Colombia estimates that between 5 to 10 leatherback turtles nest annually on its beaches.

In Peru and Togo, the majority of individuals, during one or more life-history phases, are concentrated in one sub-population. Israel considers its sub-populations to be small.

Sri Lanka and the United Kingdom do not know population size of the species in their territory.

III. Population trends

Based on the 1979 and 1996 population estimates, the global population has experienced a reduction of 78% in 14 years, less than a single generation (IUCN Marine Turtle Specialist Group 2000). The major procedure for status evaluation in sea turtles is through surveys of reproduction activity at nesting beaches. Decline in nesting has been documented to be much greater than 80% in most of

the populations of the Pacific, which has been considered the species' major stronghold. In other areas of its range, the observed declines are not as severe, with some populations showing trends towards increasing or stable nesting activity.

Based on the number of nestings known to date, it has been mentioned that some of the most important populations have collapsed. For example, the rookery in Malaysia declined from 10,155 clutches in 1956 to 37 in 1995 on the same stretch of beach. The East Pacific leatherback population has been estimated to have collapsed to about 1,690 adult females in 2000, down from 4,638 in 1995, with the Mexican population in serious danger of collapse in spite of protection efforts applied for over a decade (e.g., number of nests have fallen from 5,080 to less than 100 annually in one of the main rookeries of the Pacific coast). In Costa Rica, number of nests have dropped from 1,646 to less than 500 in the main nesting beach on the Pacific coast. In the Pacific basin, only the Indonesian population remains as still somewhat abundant (2,983 nests in 1999 in a single beach, down from 13,000 nests in 1984), but with uncertain status and future prospects, since civil problems have hampered the continuation of monitoring and protection activities in the area, along with significant fisheries pressures that impact the population. There are areas in the Atlantic in which the number of nests per season has increased in the past few years, as is the case of the US Virgin Islands. However, these populations are relatively minor. Others populations in the Atlantic have decreased or fluctuated such as those in French Guyana and Surinam. In these two, the beach dynamics hinder an accurate evaluation of the population status, since whole beaches disappear, forcing females to search for alternative suitable nesting beaches. Along with this, the leatherback population is shared between Surinam, Guyana, French Guyana and possibly Trinidad and Brazil. Colombia and St. Lucia also report a decline in their populations. Until a true international cooperation program exists, it will not be possible to have thorough evaluations of such population. For the coast of Africa, there are historical records for South Africa. In the Indian Ocean, the population is increasing but cannot be considered a large population, with around 100 nests per season in 56 Km. in the last 4 years. Recent reports mention that west Africa has an important population with around 10,400 nests per season, but the total area occupied for the leatherbacks is not well known and there is no available historical information. This population could be currently the most important in the world.

In contrast, during the last 15-20 years, leatherback nesting has increased significantly on all of the major U.S. leatherback nesting beaches (personal communication with Earl Possardt, International Sea Turtle Coordinator, U.S. Fish and Wildlife Service). For example, at Sandy Point National Wildlife Refuge in St. Croix, U.S. Virgin Islands, the number of nests ranged from 82 to 242 during the period 1987-89 while a decade later (1997-99) nesting ranged from 251 to 720. Similarly nesting increased on the Florida east coast beaches from a range of 98 to 117 nests during 1987-89 to 351 to 558 nests between 1997-99. At Culebra, Puerto Rico, during the period 1987-89, the number of nests ranged from 73 to 184, while a decade later (1997-99) the number of nests ranged from 257 to 395. Nesting data for the main island of Puerto Rico are not as extensive or consistent over this period of time but nesting data for 1997-98 indicate a level of nesting comparable to Culebra (232-329 nests).

In countries where wild populations have declined, such trend has been either:
- observed as ongoing or as having occurred in the past, but with a potential to resume (Colombia, Costa Rica, Indonesia, Mexico); or

- inferred or projected on the basis of the following:
- decrease in area or quality of habitat (Colombia, Peru, St. Lucia)
- levels or patterns of exploitation (Colombia, Peru, St. Lucia)
- threats from extrinsic factors such as the effects of pathogens, competitors, parasites, predators, hybridization, introduced species and the effects of toxins and pollutants (Colombia, St. Lucia, Togo

-decreasing reproductive potential.

IV. Threats

1. According to those responding to our questionnaire, the wild population of the leatherback sea turtle is characterized by the following:

- fragmentation or occurrence at very few locations (Cayman Islands, Colombia, Costa Rica, Peru, St. Lucia, Sri Lanka).

- large fluctuations in the area of distribution or the number of sub-populations (Cayman Islands, Costa Rica, Peru).

- high vulnerability due to the species' biology or behaviour, including:

  - migratory species (Cayman Islands, Colombia, Mexico, Peru, Sri Lanka, United Kingdom, United States)

  - has low fecundity

  - high juvenile mortality (Cayman Islands, Costa Rica, Indonesia, Mexico, Peru, Sri Lanka)
  slow growth (Cayman Islands, Colombia, Costa Rica, Mexico, United Kingdom)
  delayed reproduction (Cayman Islands, Indonesia, Mexico, United Kingdom)
  habitat specialization (Sri Lanka, Togo, United Kingdom)
  other
  -vulnerable to by-catch from a number of fisheries, especially rope fisheries for crustaceans and pelagic drift nets etc. (Costa Rica, Israel, United Kingdom, United States)
  -ingestion of plastics and other marine anthropogenic debris is often noted from post-mortems and can be a cause of mortality (Israel, United Kingdom, United States)
  -predators (Indonesia)
  - collisions with motorized vessels (United States)
  - alteration of nesting habitat from shoreline armoring (e.g., seawalls, revetments) (United States)
  - artificial beachfront lighting (United States)

- an observed, inferred or projected decrease in any one of the following:
  - area of distribution (St. Lucia)

  - number of sub-populations (Costa Rica)

  - number of individuals (Colombia, Costa Rica, Mexico, Peru, St. Lucia)

  - area or quality of habitat (Colombia, Costa Rica, Indonesia, St. Lucia, Sri Lanka)

  - reproductive potential (Peru)

The main threats have been the intense and prolonged harvest of eggs on the nesting beaches, the intentional capture of nesting females on the beaches or inshore, incidental capture (adults and juveniles) in oceanic fisheries, marine contamination (especially plastics), and the loss or perturbation of nesting habitat (Marine Turtle Specialist Group 2000). In some areas, egg harvest and illegal poaching have removed more than 95% of the clutches; this has been recognized as the main cause for the collapse in the Malaysia population. Fishing activities using longline and driftnets are an important threat since juvenile and adult are captured in migratory routes. In some areas females are killed on the nesting beaches for oil extraction. Leatherback hunts, which have been stripped of their traditional customs and controls, are also a serious threats. Oceanic pollution, basically by plastics, is another cause of mortality. Phthalates, derived from plastics, have been found in the leatherback egg yolk.

2. The status of the leatherback sea turtle is such that if the species is not included in Appendix I, it is likely to satisfy one or more of the above criteria within a period of five years.
   - Yes (Colombia, Costa Rica, Indonesia, Israel, Peru, St. Lucia, Sri Lanka, United States)
   - No (Cayman Islands)

V. Legislation

1. Is the leatherback sea turtle protected or managed by national laws?

- Yes (Cayman Islands, Colombia, Costa Rica, Indonesia, Israel, Peru, St. Lucia, Sri Lanka, United Kingdom, United States)
- No (The Bahamas, Togo)

Costa Rica, St. Lucia, Sri Lanka, United Kingdom, and United States - No killing, injuring, capturing, taking, disturbance, or sale allowed.

Cayman Islands - Although the taking of wild sea turtles is allowed in territorial waters, it is strictly regulated. There is a limit to the number which may be taken and the manner in which sea turtles may be taken (only at sea and with small nets); no eggs may be taken; and there is a closed season during their mating and reproductive season. However, over time, the number of licensed persons is slowly being reduced, with the intent of eventually ceasing the taking on sea turtles.

Colombia prohibits the capture or sale of sea turtle specimens, but allows non-commercial taking of sea turtles for subsistence purposes.

Extraction of sea turtles and their products has become illegal in most countries (IUCN Marine Turtle Specialist Group 2000). In many, there are conservation programs to protect egg clutches and nesting females from poaching. Although international trade of all sea turtle products and sub-products is forbidden under CITES, the use of the leatherback meat, oil or eggs is allowed in some nations, as part of internal traditional customs or rituals.

2. Aside from CITES, is the leatherback sea turtle protected or managed by other international treaties or laws?

Worldwide - Convention on the Conservation of Migratory Species of Wild Animals; Convention on Biological Diversity

Caribbean -Annex II of the Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region - SPAW (entered into force in June 2000)

Americas - Convención Interamericana para la Protección y Conservación de las Tortugas Marinas (International Convention for the Protection and Conservation of Marine Turtles); Rio Conference (1992); Protocolo para la Conservación y Administración de las Areas Marinas y Costeras Protegidas del Pacífico Sudeste (Protocol for the Conservation and Management of Protected Marine and Coastal areas of the Southeastern Pacific; signed in September 1989)

European Union - Appendix II of the Bern Convention; Appendices I & II of the Bonn Convention; Annex IV of the European Community directive on the conservation of natural habitats and wild fauna and flora.

Southeast Asia - The ASEAN Sea Turtle Conservation and Protection (dated 12 September 1995)

While many international instruments require the protection of sea turtles in international waters, lack of effective monitoring in pelagic fishing operations still causes significant by-catch mortality (Marine Turtle Specialist Group 2000).

3. In our view, the current listing of the leatherback sea turtle in Appendix I is:

- appropriate, based on Resolution Conf. 9.24. (The Bahamas, Colombia, Costa Rica, Indonesia, Israel, Mexico, Peru, Sri Lanka, Togo, United Kingdom, United States)

- inappropriate, based on Resolution Conf. 9.24.

- Species should be in Appendix II.

- Species should not be listed in the CITES Appendices.

Because taking of leatherbacks is limited in its territory, the Cayman Islands feel that listing of the this species should be decided by those range countries with larger and less transitory populations, and which may have an economic interest in exploiting this resource.

VI. Trade

In the last two decades, the limited international legal trade in leatherback turtles has involved primarily biological specimens and eggs (see attached WCMC trade data). A large percentage of these specimens have been exported from range countries to the United States and Europe for scientific research.

1. Is the leatherback sea turtle traded domestically?
   - Yes, legally (Colombia)
   - Yes, illegally (The Bahamas, Cayman Islands, Costa Rica, India, Indonesia, Mexico, Peru, Sri Lanka, Togo)
   - No (Israel, United Kingdom, United States)

2. If traded domestically, please describe:
   a. purposes of trade
   - Colombia, Costa Rica, Peru, Sri Lanka - Leatherbacks are taken illegally for their eggs, meat and oil.

   - Mexico - Although domestic trade is illegal and there are laws that protect the species, there is a certain level of illegal domestic trade of unknown volume. However, Mexico estimates that it is not high based on conversations with friendly fisherman and low incidence of dead animals in the beaches. This domestic trade primarily involves oil. Leatherback meat is also occasionally used for bait in sharking fishing.

   b. trade levels and/or trends
   - Colombia - Levels of domestic trade have decreased as a result of a decrease in numbers of turtles nesting and reproducing in Colombia.

c. impact of trade on the wild populations
   - Mexico - Given the current status of the species in Mexico, the taking of animals or eggs (from a nest) possibly affects the population.

3. What is the source of specimens in trade? Please indicate the total number or percentage of specimens in trade from the following sources:
   - removed as eggs from the wild (Costa Rica)

   - removed as adults from the wild (Cayman Islands, Colombia, Sri Lanka)

- ranched

- bred in captivity

VII. Conclusion

Our evaluation of the status of leatherback turtles against the criteria in Resolution Conf. 9.24 supports the conclusion that the species is properly listed in Appendix I of CITES.

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Review of *Python anchietae*

Division: Specialist Support Services, Ministry of Environment and Tourism
Namibia

Present status: Appendix II

Despite continuous efforts to consult appropriate authorities in Angola during the past two years, it has not been possible. Therefore, the present review has not benefited from input from Angola (Angola is the only outstanding range state). Attempts to communicate with Angola will continue.

Distribution

The western escarpment of southwestern Angola and northern and central Namibia. Approximately 75% of the known range falls within Namibia. No subspecies are currently recognized. Not listed by IUCN

Angola
Southwestern Angola from Benguella and Hanha (c.12 30 S latitude) south to the Kunene River border with Namibia, and as far east as Ruacana (c. 14 E longitude)

Namibia
Western Namibia from the Angolan border in the northwest, south to about 25 30 S latitude, with an eastward extension of the Kaokoveld range into the Otavi highlands at least as far east as Tsumeb (c.18 E longitude) (reviewed by Branch & Griffin (1996)

Habitat and ecology

Restricted to mountainous situations or at least coarse-stony substrates. In Namibia, associated with schists, sandstones, granites, basalts and dolomites. In Namibia, reported from the Brandberg (a desert inselberg) at 2573m elevation and from Regenstein (highest point on the western escarpment) at 2479m elevation. Occurs in Miombo woodland in Angola (c.2000m elevation) to (presumably) near sea level at Benguella and Lobito (whether these are specific localities and truly refer to the coast, or district localities which could refer to higher ground inland is not known). The range of the species falls primarily within arid and semi-arid zones; between the 50 mm isohyet in the west and 600 mm in the Otavi highlands of Namibia and Miombo woodlands of Angola. The range of this species in Angola, however, is very poorly documented: potential habitats/substrates are available above the 2000m elevation and 1200mm rainfall range.

In Namibia, Dwarf Pythons are often associated with permanent fountains. Most specimens are reported as moving during daylight, but it is probable that the species is primarily nocturnal (Branch & Griffin, 1996). Due to this, plus a presumed high degree of secretiveness, the species is rarely encountered. Interviews with observant individuals, living in areas where Dwarf Pythons are known to occur support this supposition. Little is known about reproduction in the wild. In captivity (and within the natural climatic/daylight regime of natural populations) copulation takes place at the end of winter, 2-10 eggs are laid and hatching coincides with the summer rainfall season. Steyn & Els (1963) described capture and feeding on small birds and "balling" behaviour, similar to *Python regius* was described by Finkeldey, 1963. Branch & Griffin (1996) reviewed the status of the species in Namibia.

Threates to survival and domestic use

As a regional factor, human disturbance is probably negligible. Due to general aridity throughout the range of *Python anchietae*, human populations are relatively low. In Namibia, human population densities within the range of *Python anchietae* are estimated to be between 0,05 and 0,25 persons/km sq. (A. Jarvis, in litt). Comparable data are not available for Angola, but human densities are believed to be on the same order. In addition, since the specific habitat favoured by the species is unsuitable for cultivation or large-stock farming, the habitat is relatively safe from large scale alteration. Mining, resulting in habitat destruction, and opportunistic collecting and indiscriminate killing may have very localized effects. Approximately 30% of the range of the Namibian population falls within communal areas. The indigenous peoples within this range, Damaras, Namas, Hereros and Himbas are not know to regularly consume this species. Therefore, they would not be specifically hunted for a bushmeat trade or own consumption. Chance encounters would often lead to indiscriminate killing however.

The greater part of the Namibian range falls within the commercial farming community. On some farms, dwarf pythons would be accorded a high degree of protection by the owners. However, on a proportion of farms, there would be no control over indiscriminate killing, or systematic collecting for the pet trade: herders and labourers are rewarded for opportunistically collecting animals. Due to the activity pattern and general secretiveness however, this species is probably safe from systematic collecting.

International trade

There is no legal trade in Namibia; all exports are for scientific and educational purposes only; this accounts for six legitimate exports from Namibia in the past 35 years. Information on illegal trade is primarily anecdotal. Namibia has prosecuted a small number of local cases where specimens were allegedly for export. Information from informants indicates the illegal trade is regular but on the order of less than 5 specimens per year. These estimates have been increasing since 1990 however (Branch & Griffin, 1996). Demand for this species has increased alarmingly. Branch & Griffin (1996) quoted a price of U.S.$5000 per animal. By 1999 specimens were being offered for around U.S.$10000 This has in turn lead to a marked increase in the frequency of foreign applications to collect and export this species, ostensibly for scientific purposes, as well as an increase in illegal collecting (informants information). Foreign collectors have been known to threaten and assault Namibians in order to obtain specimens in their possession. *Python anchietae* is currently one of the highest valued species on the reptile market. This demand is apparently based on the rareness of the species in captivity, and not on any apparent intrinsic value (Branch & Griffin, 1996).

The primary demand is from Germany and the U.S.A. As a former German colony, the Namibian trade with Germany is facilitated by existing family and social ties (Griffin, 2000). Specimens are rumoured to be carried out in hand luggage on airline flights direct to Germany. Anecdotal information suggests a trade route from Namibia (where dwarf pythons are more easily obtained than in war-torn Angola) across the frontier to Angola where they are transshipped (with permits) to the U.S.A. Alternatively, they are shipped (from Angola) to West Africa where they are again transshipped (combined) with legitimate consignments of *Python regius,* which they closely resemble.

CITES records show 19 transactions (involving 28 animals) between the period 1986 and 1996. Only three transactions involve range states (in this case all from Namibia and all legitimate). Some may involve captive bred progeny from legitimate U.S. zoo programmes, but the majority probably involve illegally obtained animals or their progeny.

Conservation measures

Dwarf pythons occur in four proclaimed conservation areas in Namibia; Etosha National Park, Namib-Naukluft Park, Daan Viljoen Game Reserve, and the Von Bach Recreation Resort (Griffin, in prep). In Angola the species occurs in the Iona National Park, and perhaps marginally in several others (IUCN, 1992).

Python anchietae is listed as a "Protected Species" under the Namibian Nature Conservation Ordinance, no. 4 of 1975, which gives it a medium degree of local protection. However, the policy of the Namibian wildlife authority is and always has been to treat this species as deserving of the highest protection status. Dwarf pythons are only legally exported from Namibia for scientific/educational reasons.
Poster and questionnaire programmes have been used to gather data to assess the conservation-status of the species, and to educate the public (Branch & Griffin, 1996: Griffin & Kolberg, 1992; and Kolberg, 1999). The Namibian provisional conservation status is currently regarded as "Insufficiently Known" (Griffin, 2000, and Griffin, in prep). Angola is in a period of political transition, and as such has not focused on specific environmental legislation (IUCN, 1992), and it is not likely that *Python anchietae* is specifically addressed.

Captive breeding

Captive breeding programmes have had variable success. A founder population of 6-7 animals was introduced to the U.S. zoo community in the late 1960's & early 1970's. The provinance of this founder stock is not documented, and may have included Angolan as well as (mostly) Namibian animals (W.J.Haacke, pers.comm.). They and their progeny represent the current entire legitimate holdings in the country now (although most of these animals were also illegally captured and exported at the time). This programme has been relatively successfull, showing a 5-fold increase during the period between 1980-1991 (Slavens, 1980-1991). Gene-related problems, associated with recent breeding attempts, however, suggests that this population is now suffering from inbreeding. (R. Ross, pers.comm). Negotiations are currently underway to revitalize this population with fresh material from Namibia.

Two programmes supported by the Namibian government (in South Africa and in Namibia) have had varying degrees of success. Animals are robust, do well in captivity, copulate, and lay eggs infrequently, but hatching and survival rates are low (Patterson & Erasmus, 1978; Patterson & Smith, 1979; Morgan & Boycott, 1990; Morgan, 1993; Morgan in. litt, and Jauch , in litt). The Namibian programme is the only programme conducted under natural climatic/seasonal/ daylight conditions, and is designed to maximize the ability to extrapolate the observed data to understanding the breeding parameters of wild populations. The potential for captive breeding would seem to be favourable, once a specific protocol is established.

The Namibian government supports these programmes due to the biological information which can be potentially gained in the assessment/management of wild populations. There are no plans, needs or expectations to release captive –bred animals in the wild: all captive-breds are of unknown or mixed origin and the release of these hybrids would deplete the genetic integrity of natural populations. No restocking is envisioned (or warranted) for the foreseeable future.

Current assignment of *Python anchietae* to Appendix II

Namibia is not aware of the historical reasons for the initial listing of *Python anchietae* on Appendix II. We assume it was done with the knowledge and foresight that certain groups of related species were potentially vulnerable to commercial and global trade: for instance, pythons/boas, tortoises, monitor lizards and crocodiles. The safest course of action would have been to automatically include all lower taxa of those groups, on the precautionary principle. Namibian conservation authorities were well aware of this option, and included all Namibian pythons, monitor lizards and tortoises on their early national protected species list , even though there was no indication at the time that there may have been a problematic local trade. It is doubtful that Namibia (then South West Africa) would have had any major input into initial CITES discussions as SWA was administered as a remote territory under South Africa at the time.

Regarding the present listing in Appendix II, it is inferred that the harvesting of specimens from the wild may have a detrimental impact on *Python anchietae* by reducing a population to a level at which its survival would be threatened by other influences, thus meeting the criterium outlined in Annex 2a paragraph Bii) in resolution Conf.9.24. The species probably does not meet the criterium in paragraph A, as unregulated trade is unlikely to have an impact throughout its range (including protected areas, sparsely settled arid and semi-arid areas subject to a variety of land uses and degrees of public access) and is

unlikely to have more than localized impacts in view of the cryptic nature of the species and perceived low densities.

Python anchietae closely resembles *Python regius* (included in Appendix II under the provisions of Article II, paragraph 2(a)) and is not easily distinguishable by a non-expert. This would be an argument for keeping *Python regius* on Appendix II, as Namibia has reason to believe that some *Python anchietae* are smuggled out of Africa by being included in legitimate consignments of *Python regius*, a species of far less commercial value that *Python anchietae*.

Namibia does not regard *Python anchietae* as qualifying for uplisting to Appendix I, i.e. it does not meet the criteria outlined in Annex I of Res.Con.9.24:

Although there are no data on wild populations, or on critical environmental factors/changes, we have no reason to believe that negative changes are presently occurring. Namibia appears to be becoming progressively dryer, and desertification is now considered a national agricultural problem. However, *Python anchietae* seems to be well adapted to arid climates (based on the present known range). The species was only discovered to occur in Namibia in 1910, which indicates that it has, at least in historical times, been rarely encountered; there is no indication that populations or ranges have decreased in Namibia. The fact that *Python anchietae* is extremely rare in the trade (which accounts for demand and value) indicates that few specimens are available to the trade, which suggests that few specimens are being removed from the wild. It is a hardy species which should not be particularly prone to transport mortalities.

The breeding potential of this species seems to be small, although comparable with similar sized boids (Branch & Griffin, 1996). The evolutionary value of this strategy in an unpredictable & arid environment, which is prone to severe and extended droughts, is unknown. This is the basis of Namibia's concern however; the possibility that the species is "normally" on the edge, and could be threatened, at least locally by an imbalance of factors.

Python anchietae has a linear range of approximately 1250 km, from southern Angola to central- western Namibia. The species requires at least a stony substrate, and this potential habitat is mostly continuous along this range. There are no extensive breaks in this potential habitat, and therefore probably in their distribution. Within the Namibian range, records are available along the entire range i.e. no extensive gaps are apparent. Isolated populations do however occur on insulbergs to the east or west of the main range. There seems to be a clinal change in colour and pattern running from south to north, indication genetic change along this cline.

Reccommendation

Branch (1983), concerned with the perceived rareness of *Python anchietae* proposed that the species be elevated from Appendix II to Appendix 1. Later however, Branch & Griffin (1996), showed the species to have a wider distribution and to be not as rare as previously thought and could find no compelling reason to consider the species threatened. Despite the extremely high demand for the species for the pet trade, and the high prices offered, it is not likely that the species will become more than only locally threatened. This is due to a combination of biological, environmental and human demography factors, suggesting that the species cannot be systematically collected or threatened over a significant proportion of it's range.
It is therefore recommended that *Python anchietae* remain listed on Appendix II, in accordance with Article 11, Paragraph 2 (b).

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Review of *Scleropages formosus*

Biological criteria for inclusion of Golden Arowana, *Scleropages formosus* in CITES Appendix I

Biological Criteria		Estimate status of identified species	Supporting statement	Additional statement
A	The wild population is small and is characterised by at least one of the following			
1	An observed, inferred or projected decline in the number of individuals or area and quality of habitat	Yes	Ranges: Riau, Sumatra, Peninsular Malaysia, Kalimantan, Thailand and the Philippines[1]. The red (the most expensive one) used to occur commonly in upper Kapuas, Barito and Mahakam[1]. However recently it only found in upper Kapuas.	Their habitat in Kapuas is threatened by forest conversion. Forest conversion in the upper Kapuas into other purposes e.g. estate, settlements in the last 10 years increased rapidly (> 5% $year^{-1}$)[2]..
2	Each population being very small	Yes	The wild populations, in particular the red one, are fragmented and isolated by settlements, plantations and concessenaires	
3	A majority of individuals, during one or more life-history phases, being concentrated in one sub population	?	?	?
4	Large short-term fluctuations in the number of individuals	?	?	?
5	High vulnerability due to the species biology or behavior including migration	?	?	?
B	The wild population has a restricted area of distribution and is characterized by at least one of the following			
1	Fragmentation or occurrence at very few locations	Yes	The wild populations are fragmented due to many development activities in their habitat	The government has plan to improved the upstream Kapuas into the limited development areas. The only protected area for

				the species habitat in the area is Danau Sentarum where many people also occur.
2	Large fluctuation in the area of distribution or the number of sub-populations	?	?	?
3	High vulnerability due to the species biology or behavior including migration	?	?	?
4	An observed, inferred or projected decline in area distribution or the number of sub-populations or the number of individuals or area and quality of habitat reproductive potential	Yes	The habitat are fragmented and isolated by development areas. Area of distribution less than 500 km^2 and area of occupancy less than 100 km^2	Palm oil plantations, concessionaires, mining and transmigration areas has converted most of the habitat
C	A decline in the number of individuals in the wild which has been either			
1	Observed as ongoing or as having in the past	Yes	Illegal hunting still occur in significant number	Custom office in West Kalimantan has frequently confiscated the trafficker who intended to illegally transport the specimens to Singapore and Serawak, Malaysia
2	Inferred or projected decrease in area or quality of habitat or levels or pattern of exploitation	Yes	See B_1 and B_4	See B_1 and B_4
3	Threats from extrinsic factors such as pathogens	?	?	?
4	Decreasing reproductive potential	?	?	?
D	If the species is not included in Appendix I, it would satisfy with A,B or C a period of five years			
Recommended status for Appendix I		Yes		

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Review of *Probarbus jullieni*
United Kingdom Scientific Authority for Animals

A. Species *Probarbus jullieni*

B. Reviewer United Kingdom CITES Scientific Authority

C. Supporting statement

1. **Taxonomy**

1.1 Class: Osteichthyes

1.2 Order: Cypriniformes

1.3 Family: Cyprinidae

1.4 Scientific name: *Probarbus jullieni* Sauvage 1880

1.5 Common names:

English:	Jullien's golden carp, seven-striped barb
Thai:	Pla Yesok Tong
Malay:	Temoleh
Khmer:	Try Trâsâk
Vietnamese:	Cá trà soc
Lao:	Pa ern daeng

2. **Biological parameters**

2.1 *Distribution*

Southeast Asia, in Cambodia, Lao People's Democratic Republic, Malaysia, Thailand and Vietnam. In particular it is found in the Meklong, Mekong, Chao Phraya, Pahan and Perak basins (see map).

Malaysia
Perak basin and Lake Chenderoh in Perak State and Pahang basin including tributaries Juala Tahan and Sungei Semantan in Pahang State (Mohsin and Ambah 1983) (Bain and Humphrey 1982).

Cambodia
Commonly recorded from the Mekong river, the Great Lake and Tonlé Sap (its main western tributary) (Kottelat 1985, So Nam & Nao Thuk, *in litt.* 2000)

Vietnam
Present in the Mekong (Bain and Humphrey 1982) as far downsteam as Quatre-Bras (Saigon) (Rainboth *et al.* 1976 quoted in Roberts 1992).

Thailand
Occurred in the basins of: Chao Phraya (including its tributaries the Nan and Pasak); Meklong (and its western branch the Kwae Noi) and Mekong (including the lower reaches

of its tributary the Mun). The species was introduced to the Ubolratana Reservoir in the 1970s (Panaputanon 1982).

Lao P.D.R
Occurred in the Mekong as far upsteam as Luang Prabang (Bain and Humphrey 1982).

2.2 *Habitat availability*

The species occurs in large rivers with clear water and sandy or gravel bottoms (Rainboth, 1996). Diet consists mostly of snails, clams, aquatic insects and aquatic plants (Ukkatewewat 1979). A decline in the quality and availability of habitat is reported due to dam construction and pollution, and due to the loss of spawning grounds and the clearance of flooded forest which serve as nursery and feeding grounds (So Nam & Nao Thuk, *in litt.* 2000).

2.3 *Population status*

The global status of *Probarbus julieni* is assessed as **endangered** (A1a,c) in the 1996 *IUCN Red List of Threatened Animals* based on an estimated decline of >50% based on direct observations, a decline in the area and extent of occurrence and a decline in the quality of habitat.

Malaysia

In 1968 the total population was put at 'fewer than 500' (Miller 1977) with the Perak basin population extinct, possibly caused by the construction of the Chenderoh Dam in 1930 halting upstream migration for spawning. The species remained common below the dam until about 1955 but had become rare by 1965 (Alfred 1965). The species was however still present in the Chenderoh in 1972 (Ng quoted in Roberts 1992) and there were reports of fish for sale in a market at Gerik near the Perak river (Broad *in litt.*1994). In March 1993, 15 specimens were captured from the Perak river and transported to Penang (Baird 1994). The species is now being bred in captivity by the Peninsula Malaysia Fisheries Department (Samsudin 1993). Extensive fish collecting on the Pahang river in 1993 did not turn up a single specimen of *P. jullieni*. The species is thus either extirpated or greatly reduced in the wild (Baird 1994)

Cambodia

Probarbus jullieni is commonly distributed in the Cambodia's Mekong River, the Great Lake and Tonle Sap and to their major tributaries. This species migrates upstream from the Great Lake Tonle sap by the end of October, passing through Kompong Cham and Kratie, to Stung Treng in early February with the speed of about 24 km per day (Srun P., 1999). The migration of the species continues possibly entering into the Sekong, Se San and Sre Pork rivers for spawning (Touch, pers. comm.).

In Cambodia (So Nam & Nao Thuk, *in litt.* 2000), this species is still present because there are reports of fish sales in the markets of 6 provinces close to the Great Lake Tonle Sap such as Battambang, Pursat, Siem Reap, Kompong Thom, Kompong Chhnang, and Kandal/Phnom Penh; in Nak Leung/Kandal (Cambodia's lower Mekong River), and in Kompong Cham, Kratie, Stung Treng, Ratanakiri provinces close to the Cambodia's upper Mekong River. Srun Phallavan (1999) reported that this species is not present at Sa Ang/Kandal on the Bassac River.

In Cambodia, the population of this species has declined during the past 3 decades possibly caused by destruction of its spawning grounds on the Cambodia's upper Mekong River

(areas around Stung Treng and Kratie), and nursing and feeding grounds on the seasonal flood plain; probably by construction of many dams halting upstream migration for spawning; and by illegal fishing activities using destructive fishing gears operated along the Great Lake, Tonle Sap and the Mekong River (So Nam & Nao Thuk, *in litt.* 2000).

This species is not now being bred in captivity at any Aquaculture Research Stations of the Department of Fisheries, but the collection of juveniles is done by most of the Aquaculture Research Stations and the fish are kept in earthern ponds for future breeding programs (So Nam & Nao Thuk, *in litt.* 2000). The Department of Fisheries has a clear policy to develop technology of indigenous fish species breeding for supporting and expanding aquaculture development activities in Cambodia.

Vietnam

No information located.

Thailand

Described as "especially common" over what amounts to all its major river distribution in Thailand (Anon 1991) and extremely abundant in the Mekong basin for its entire length in Thailand. (Roberts 1989).

The population in the Meklong has declined due to pollution and probably also dam construction (Roberts 1989) and is said to have been extirpated from the Meklong by effluent from sugar refinery waste but then re-introduced (Bain and Humphrey (1982). Almost certainly now extinct in the main river of the Chao Phraya and its tributary the Pasak, may still be present in another tributary the Nan but perhaps only persisting through regular introduction of fry (Roberts 1992). The population in the Mekong, although supported by re-introductions in some placed may still be healthy. However, it is now seldom if ever caught in its tributary the Mun river (Roberts 1992).

A total of 228,002 were released into the Ubolratana Reservoir between 1971-1978. Specimens were recaptured daily in 1980 and 1981 (Panaputanon 1982). It was not clear if the species was breeding at this site.

The Thai Department of Fisheries succeeded in artificial breeding of the species from wild spawners in 1974 and breeding in captivity since 1990. (Suraswadi 1993). Captive breeding occurs at fisheries stations along the Mekong river and at Kanjanabin Freshwater Fishery Station, using both natural and F1 broodstock (Apichart Termvidchakorn, *in litt.*, 2000). The hatchery, near Nongkhai produced about 2 million fry per year (Bain and Humphrey 1982) up until 1990 at least (Roberts 1992). The fry have been released into the Mekong, Meklong and Chao Phraya basins and this may account for the abundance or even existence of the species in many localities in these basins (Roberts 1992).

Lao P.D.R

Relatively scarce (Davidson 1975). In Hang Khone, southern Lao PDR, *P. jullieni* accounted for over 60% of the catch by weight in 1993-94 (Baird, 1994); this rose to >80% including *P. labeamajor*.

2.4 *Population trends*

In Hang Khone, southern Lao PDR, in the 1970s and early 1980s, large mesh gillnets were used to target large 20-60kg *Probarbus* (Baird 1994), however, fish greater than 15gk are now never caught. Baird (1994) reports that the size of fish caught at this location appear to be decreasing each year. Despite increased fishing effort, catches are now just 10-20% of what they were in the mid-1970s. Similar trends and dramatic declines are reported for

other fisheries in southern Lao PDR (Baird 1994) – such declines are attributed to the demand for the fish in trade and increasing use of gillnets.

In Cambodia (So Nam & Nao Thuk, *in litt.* 2000) before the 1960s, the population was higher, with average catch of few hundred tones annually, and with the size varied from 15 to 60 kg. However, fish greater than 10 kg are now never caught. The size of this species appears to be decreasing each year. Despite increasing fishing effort, catches are now just 15-20% of what they were in the 1960s. Similar trends and dramatic declines are reported for Tonle Sap Dai (bag nets) fishery (4-30 km Northern Phnom Penh); mobile gear fishery at Kompong Luong (Kandal province), Nak Leung (lower Mekong, about 60 km South East Phnom Penh), Kompong Cham and Kratie Stung Treng (upper Mekong, North East Cambodia), and Sa Ang on the Bassac river (Southern Phnom Penh). In 1999, 340 *Probarbus jullieni* were caught at the above sites (no catch was seen at Sa Ang, Baasac River). The trends and drastical declines are similarly reported for fisheries in 6 provinces close to the Great Lake Tonle sap, with the total catch of 44 tones in 1995 declining to 8-19 tones in 1996-1997 (Deap et al., 1998).

In Cambodia (So Nam & Nao Thuk, *in litt.* 2000), the population of this fish species is reduced by 70-90%. In some parts of Cambodia, especially the Bassac River, the fish is now extremely rare or extirpated.

Over all its range, Baird (1994) suggested that populations of this once abundant fish are reduced by up to 80-90%. In addition, the average size of fish caught is decreasing and populations are increasingly dominated by younger / smaller fish. In some parts of the range, the fish is now extremely rare or extirpated.

2.5 *Threats*

Dam construction preventing upstream migration may well be the most serious threat to this species (Pantula 1973), one population in Malaysia having already been seriously affected by this. Industrial pollution is also a major threat having been the reported cause of extinction in the Chao Phraya basin (Bain and Humphrey 1982). The species is also vulnerable to overfishing (for food) and it has been suggested that fishing of very large adults should be regulated (Roberts 1989).

3. Utilization and trade

3.1 *National utilisation*

P. jullieni is one of the largest cyprinid fish in south-east Asia growing to over 70kg in weight and a length of up to 1.5m. It is an important and favoured food fish, the eggs are also eaten and are highly prized (Anon 1991, Davidson 1975). A spawning 30kg *P. jullieni* usually contains up to 5-6kg of eggs (Baird, 1994). In the vicinity of the Pa Mong Dam site on the Mekong river in Thailand, it is the third most abundant food fish caught (Sidthimunka 1970). It commands premium prices (Smith 1945, Davidson 1975). Specimens have also been seen for sale in local markets in Malaysia (Mohsin and Ambak 1983) and Laos (British Museum, personal communication). In Cambodia, it is mostly caught and sold in Stung Treng and Kratie provinces close to the upper Mekong River; the cost varies from Riel 3,000 to 7,500 (Srun P., 1999). Specimens have been seen at the Department of Fisheries and at other Fisheries Research Stations (So Nam & Nao Thuk, *in litt.* 2000).

In Cambodia, there is no captive breeding program of *Probarbus jullieni*. However, many fish have been collected from the wild and kept in earthern ponds at several Fisheries Research Stations for future use in artificial breeding program (So Nam & Nao Thuk, *in litt.* 2000).

3.2 *Legal international trade*

None known. Most international trade seems to be illegal (see below) There is a very limited demand in the ornamental fish trade. A combination of their unattractive appearance - juveniles have been described as possibly one of the least attractive fishes in the world (Taylor 1983) and their large potential size, makes them unpopular. It seems likely that what demand there is may be generated by their rarity in trade because of the CITES listing.

3.3 *Illegal trade*

There is reported to be a substantial illegal trade in *Probarbus* between Laos and Thailand (TRAFFIC Southeast Asia 1993, Baird 1994). Through most of the 1980s, there was virtually no trade in fish between Lao PDR, Cambodia and Thailand. Trade began to grow between Lao PDR and Thailand in the late 1980s,despite a ban on fish exports from Lao PDR, with trade centred on the largest and most valuable fish, including *Probarbus* (Baird 1994). Trade in Cambodian fish passing through Lao PDR to Thailand has been banned since 1994. However, 17 days observation at Wern Bek in Thailand recorded 4,659 kg of *P. jullieni* entering from Lao PDR. Baird (1994) also estimated that 20-25,000 kg of *P. jullieni* were imported into Thailand from southern Lao PDR during the 1993 spawning season (with perhaps a further 2-5,000 kg outside the spawning season). The total value of the trade may have been up to $60-75,000. Baird (1994) also reported an estimated 15,000 kg were imported into Lao PDR from Cambodia (subsequently to be re-exported).

Although there is little demand for live specimens of this fish, specimens have been offered from Thailand in the past. Seven were illegally imported to the UK in 1991, these have now been placed in a zoo aquarium. Specimens have also been imported into the USA (Taylor 1987).

CITES Annual reports show only 3 (illegal) transactions in the period 1976 to date:

- 25 imported from Thailand to the USA in 1988
- 2 bodies and one live fish imported from Hong Kong to the USA in 1989 (all were seized by the USA).

3.4 *Actual or potential trade impacts*

The high price paid for the flesh of this species means that there is trade pressure on this species which is of a cross-border nature. The trade reported above between Lao PDR and Thailand has been suggested by Baird (1994) to be responsible for increased fishing effort, and declining stocks, to meet the demand for these fish in Thailand.

3.5 *Captive breeding (outside country of origin)*

No information available.

4. **Conservation and management**

4.1 Legal status

4.1.1. National

Malaysia: No information available.
Cambodia: This species is listed in the Cambodia's Fisheries Laws (1987) of the Article 18 of the protected species. It is forbidden from catching, selling or

transporting in both open and closed fishing seasons (So Nam & Nao Thuk, *in litt.* 2000). The introduction of this species from the hatchery has not been undertaken, but by law that was enacted since the 1940s all fishers have to release all stages of this species back into the natural water body when they have been caught.
Vietnam:
Thailand:
Lao P.D.R: Listed in Schedule II of the Government's lost of protected species. Thus specimens may be caught outside the spawning season but may not be sold or exchanged (TRAFFIC Southeast Asia 1993).

4.1.1 International

This species has been listed in Appendix I of CITES since the Convention entered into force on 1 July 1975.

4.2 *Species management*

4.2.1 Population monitoring

4.2.2. Habitat conservation

4.2.3. Management measures.

Cambodia. Collection of data on this species is made from different types of fishery systems and fishing gears at various sites on the Great Lake Tonle Sap, Mekong River and Bassac River in order to assess stocks, including parameters such as weight and length frequencies and gonadal development (So Nam, 2000). This is a simple and cost effective management measure which can conserve and manage this species for sustainable utilization (So Nam & Nao Thuk, *in litt.* 2000).

4.3 Control measures

4.3.1 International trade

4.3.2 Domestic measures

5. **Information on similar species**

The species is superficially similar to many cyprinid fish but cannot be confused with any other CITES listed fish. Roberts (1992) described two new species from the Mekong: *Probarbus labeamajor* found within a linear range of 900 km between Nakorn Phanom in Thailand and Sambor in Cambodia and *Probarbus labeaninor* from the vicinity of Mukdahan in Thailand.

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Review of the Order Antipatharia (black corals)

United States of America
U.S. Fish and Wildlife Service, Division of Scientific Authority
and
National Marine Fisheries Service, Office of Protected Resources)

Executive Summary
Black corals are colonial cnidarians in the order Antipatharia that are most closely related to gorgonians and stony corals. There are over 200 described species. They are found throughout the world's oceans, but are most common in tropical deep water habitats from 30-80 m depth. Although the taxon is widespread, species have a patchy distribution and generally occur at a low abundance. All species are characterized by slow growth relative to other branching corals, delayed first reproduction, limited larval dispersal and low rates of recruitment, low natural adult mortality, and long life.

Black coral is commercially harvested primarily for the jewelry trade. More recently, a small trade in live specimens for aquarium organisms has been reported. Colonies are selectively harvested from up to 75m depth using SCUBA; advanced diving techniques including re-breathers, mixed gases and remotely operated vehicles (ROVs) allow selective harvesting from deeper water, but tangle net dredges have also been employed for non-selective harvest. International trade in black coral, according to the CITES trade database, has averaged 430,000 items per year since 1983, with the maximum trade in 1994, and 320,000 items traded in 1998. The world's largest supplier of worked black coral is Taiwan (>90% of the total), with most raw coral reported to be harvested in and exported by the Philippines (Frances Oishi, Hawaii Division of Aquatic Resources, pers. comm). The U.S. is the major importer of worked black coral, followed by Japan. The current wholesale value of unworked black coral is about USD$25 per pound. In 1996, 473,000 black coral pieces imported into the U.S. were reported to be worth USD$447,000; jewelry retails for USD$25-200 per item.

Black corals may be globally threatened as a result of overharvesting for the jewelry trade in many parts of the world, however data on status and trends is limited. Modern collecting pressure, including advanced diving technology, and the absence of regulations (or lack of enforcement of regulations) in several countries where harvest occurs may be negatively impacting populations. Habitat destruction is another key problem affecting black coral populations. These species may be vulnerable to overexploitation due to certain life history characteristics such as a slow rate of growth (relative to other branching corals), delayed reproduction and limited dispersal capabilities.

Seven of 48 range Parties responded to our questionnaire (15% response); these included Colombia, Cote D'Ivoire (partial response), Sri Lanka, United Kingdom (via Cayman Islands and Gibraltar), Bahamas, Dominican Republic, and Indonesia. India provided a brief text response, and Peru indicated a response is forthcoming. Three of the responding Parties recommended elevation to Appendix I, four recommended retention in Appendix II, and one did not comment on the listing. The criteria of Conf. 9.24 provide sufficient guidance for evaluating the status of Antipatharia relative to listing in the CITES appendices. Available information on industry processing losses, growing demand in international trade, and the taxon's life history characteristics indicate that an Appendix II listing is appropriate, given the criteria of Conf. 9.24.

Taxonomy

Phylum Cnidaria
Class Anthozoa
Subclass Hexacorallia (Zoantharia)
Order Antipatharia

Black corals are colonial cnidarians (coelenterates) in the Order Antipatharia. There are over 200 described species (Opresko, 1972). Overall, 11 genera have been reported in trade, seven of which are reported

only to the level of genus; for the other four genera, 13 species are listed in the CITES trade database (see Table 1 of Appendix). There are also six genera, *Allopathes*, *Antipathella, Hillopathes, Parantipathes, Taxipathes* and *Tropidopathes* that have not been reported in international trade. Identification of worked black coral to the level of genus is difficult. The order was listed in Appendix II in 1981.

Review and Discussion

I. Distribution

Globally: Antipatharians are cosmopolitan in distribution, ranging from below low tide to depths of 4000-6000 meters. In general, most species and the greatest abundance of individuals occur in tropical seas from 30-80 m depth. Although black corals are widespread, wild populations have a patchy or fragmented distribution, and colony density is generally low. The two most common species harvested for international trade (*Cirripathes anguina* and *Antipathes densa*) are found throughout much of the Indo-Pacific.

Questionnaire responses:

Please indicate which of the following best describes the status of black coral in your country:

- **The wild population has a widespread and continuous distribution (Bahamas)**
- **The wild population is widespread, but has a patchy or fragmented distribution (Indonesia, Cayman Islands, Colombia, United States)**
- **The wild population has a restricted area of distribution. (Gibraltar, Sri Lanka, Dominican Republic, Cote D'Ivoire)**
- **Do not know (India, Dominican Republic)**

Country comments:

Cayman Islands: The corals are spread throughout the Cayman Islands with the abundance of different species varying from area to area depending on environmental conditions.

Cote D'Ivoire: So far, no sound study has been carried out. The only information available is a field report done by the Ivorian Department of Wildlife (Direction de la Protectio de la Nature) in May 1999.

Gibraltar: Very little is known, but populations are small and isolated.

India: There is hardly any scientific [work] conducted on Antipatharia in Indian reefs. Though there are evidences of black coral jewelry trade from Gulf of Mannar region, no status and distribution work has been carried [out] in this region. So far distribution of black coral in Andaman and Nicobar is known from a few islands. During the survey of coral reefs in M.G. Marine National Park [sic]. Wandoor and other Islands in Andaman and Nicobar Islands conducted by Wildlife Institute of India during 1998-2000, following observations were made of the general given below [sic]:

Genera	Island	Depth (m)
Antipathes	Alexandra	18
Hillopathes	Alexandra, Redskin	23 and 27
Stichopathes	Redskin	25
Taxipathes	Redskin, Havelock	32 and 28

Status of Antipatharians therefore, is scantily known from Indian reefs.

United States: In Hawaii, 14 species of black coral have been identified, of which 9 species are found only below 100 m depth. The two dominant species (*A. dichotoma* and *A. grandis)* are highly aggregated on vertical drop-offs or undercut terraces, and are most abundant in the channel between Maui and Lanai (total area = 1.7 km^2) at 30-85 m depth; smaller beds exists off Kauai (area = 0.4 km^2) and the southwest coast of Hawaii. The lower depth limit of *A. dichotoma* and *A. grandis* coincides with the top of the

thermocline in the high Hawaiian islands (Grigg, 1993). Colonies prefers rough or uneven limestone substrates, and are rare on smooth surfaces and basaltic substrates (Grigg, 1965).

Although several Atlantic species have been found only in the Caribbean or in the Gulf of Mexico, others occur throughout the western Atlantic, some are found throughout the Caribbean and the east coast of South America, one species may occur in the Atlantic and Indo-Pacific, and at least one occurs throughout the western Atlantic province and the Mediterranean Sea (Opresko, 1972). In the Gulf of Mexico, 28 species of Antipatharians have been identified, of which 93% are distributed throughout the western Atlantic (Cairns, et al., 1993). Deep banks on the continental shelf of the northwest Gulf of Mexico between 56-100 m depth have a transitional *Antipatharian* zone that separates areas dominated by reef building corals from deeper, turbid soft bottom communities; this zone is dominated by *Cirrhipathes* spp. and *Antipathes* spp. (Rezak et al., 1990). One species found on these deep banks, *Leiopathes glaberrima* is reported to be of commercial value for jewelry.

II. Population size and trends

Globally: Colonies occur at a relatively low density in areas where competition with other benthic organisms is minimal, and populations are believed to be recruitment-limited (Grigg, 1988).

Questionnaire responses:

1. Please indicate which of the following best describes the status of black coral in your country (may choose more than one):

- **The wild population is large. (United States, Bahamas)**
- **The wild population is small. (Cayman Islands, Colombia, Indonesia)**
- **Sub-populations are very small. (Sri Lanka, Gibraltar, Dominican Rep.)**
- **The majority of individuals, during one or more life history phases, are concentrated in one sub-population.**
- **Do not know (India, Dominican Republic, Côte D'Ivoire)**

Country comments:

Bahamas: Limited distribution (depth)

Cayman Islands: Because of the country's small area, it has no large populations of any animals. And so, though black corals are not uncommon in the Cayman Islands, their absolute numbers cannot be considered large.

Colombia:

Worldwide, coral ecosystems confront a large demand for their parts, fauna, and flora, which in addition to climatic changes , coastal pollution processes, accumulation of pollutants on reefs, and disruption of the ecosystem's food web due to overfishing, make their situation more critical each passing day. The populations of black coral are locally abundant in the region of Santa Marta and Baru Island in Cartagena, which are places with rich waters that favor the development of plankton feeders, such as black coral and octocorals (Sanchez 1999). The waters in these areas are turbid and favor the growth of black corals in relatively shallow waters (approx. 10 m) (Opresko and Sanchez 1997). Oceanic waters typical of coral reefs, such as the San Andres and Providencia Archipelago , show black coral at depths greater than 20m and in lesser abundance.

United States: In Hawaii, black corals are most abundant from 30-85 m depth, and species found in deeper water are less abundant. The average density of the most abundant species, *A. dichotoma,* was estimated at 0.05 colonies/m^2 in 1975; this species occupied an area of 1.68 million square meters within the Au'au Channel, with an estimated standing crop of 84,000 colonies (Grigg, 1977). The second most abundant species, *A. grandis* occurs at a density of about 5% that of *A. dichotoma*. In deep water within the Makapuu bed the most common black coral species, *Leiopathes glaberrima* occurred at a density of 0.002-0.003 colonies per square meter (Grigg, 1988)

2. If available, please provide details of programs in your country for the monitoring of black coral (such programs may be conducted by the government, non-governmental organizations, or scientific institutions).

Sri Lanka: The surveys carried out by NARA (National Aquatic Resource Agency) and Prof. Suki Ekaratne of University with the Department of Wildlife Conservation evaluate the status of corals including black corals.
Côte D'Ivoire: Respondent said such information was in preparation.
Colombia: Although we have not carried out monitoring programs as part of a conservation strategy for black coral, we have conducted and continue to conduct basic studies as part of theses on local black coral populations in Gayra Bay [Magdalena Department], which is a natural national park.
Gibraltar: Not known.
Dominican Republic: None.
Cayman Islands: Unfortunately, there are currently no research programs aimed specifically at black corals. As such, analysis can only be based on anecdotal evidence by researchers and other persons who have been observing the reef system over the last several years.
Bahamas: Do not exist.
Indonesia: The population is stable. The monitoring programs may [be] conducted by government and scientific institutions in conjunction with coral reef monitoring programs.
United States: There are no consistent, comprehensive survey programs for black coral in the United States. Sporadic research surveys have been conducted in the waters of Hawaii by personnel at the University of Hawaii (Grigg, 1998), and future work is planned there using submersibles to observe deeper beds (Richard Grigg, University of Hawaii, pers. comm.).

3. Which of the following best describes the status of black coral in your country? (choose only one):
- **– Number of individuals in the wild has increased.**
- **– Number of individuals in the wild has remained stable. (Bahamas, Indonesia, United States).**
- **– Number of individuals in the wild has decreased. (Sri Lanka, Colombia, Dominican Rep., Côte D'Ivoire)**
- **– Do not know. (India, Gibraltar, Cayman Islands, Dominican Republic)**

Country comments:
United States: The best information on population stability comes from two research surveys (1975 and 1998) conducted on the most heavily exploited black coral beds in the United States. The age frequency distribution and the abundance of colonies was not significantly different between the surveys, except for colonies that exceeded 20 years of age; the proportion of 20+ year olds declined from10.8% of the population in 1975 to 8.6% in 1998 (Grigg, 1998). In addition, 97% of the population in 1998 consisted of colonies that were less than 23 years of age, indicating that the bed consists almost entirely of colonies that had recruited since the area was last examined in 1975. These results suggest that the population is fairly stable, steady recruitment has continued to occur, and harvest pressure had not exceeded the mean sustainable yield (Grigg, 1998).
Bahamas: No harvest or trade in black coral in the Bahamas. Law restricts local harvest of black coral. Harvesting can only take place via licence granted by Minister. No licences have been granted.
Cayman Islands: It is believed, from non-systematic observation, that the numbers of black corals in Cayman waters has remained fairly constant in the last 10+ years. However, because of the lack of rigorous, long-term studies, this cannot be stated conclusively.

4. If the wild population has declined, such trend has been either:
- **– observed as ongoing or as having occurred in the past (but with a potential to resume)(Dominican Republic, Colombia); or**
- **– inferred or projected on the basis of the following:**
- **– decrease in area or quality of habitat (Dominican Republic, Côte D'Ivoire, Colombia)**
- **– levels or patterns of exploitation (Dominican Republic, Côte D'Ivoire)**
- **– threats from extrinsic factors such as the effects of pathogens, competitors, parasites, predators, hybridization, introduced species, and the effects of toxins and pollutants.(Sri Lanka, Côte D'Ivoire, Colombia)**
- **– decreasing reproductive potential**

III. Threats

Globally: Populations of black coral are impacted by harvest pressure, bycatch associated with trawling and other fishing activities, and habitat destruction. Species are particularly vulnerable to overexploitation because of their patchy distribution and potentially limited larval dispersal, slow growth rate (relative to other branching corals), and delayed reproduction. In addition, decades of accumulated standing stock can be collected during short intensive periods of fishing. Current U.S. industry data indicates that processing techniques for black coral jewelry are only about 1% efficient (i.e., it takes 100 grams of raw coral to make 1 gram of jewelry); thus, only moderate demand for black coral jewelry requires significant levels of harvest.

Natural mortality also impacts populations. Smothering by sediments, abrasion and overgrowth by encrusting organisms is a major source of mortality (Grigg, 1993). Colonies also die when they break off at their base as a result of bioerosion or physical disturbance. Diseased tissue has been observed infrequently (R. Grigg, Univ. of Hawaii, pers. comm). A few predators of Antipatharians have been identified, including cyclopoid copepods (family Vahiniidae) and a coralliophilid gastropod (*Rhizochilus antipathicus*).

Questionnaire responses

1. The wild population of black coral is characterized by the following (may choose more than one):
- **– fragmentation or occurrence at very few locations (Gibraltar, Sri Lanka, Indonesia, Dominican Republic, United States)**
- **– large fluctuations in the area of distribution or the number of sub-populations. (Colombia)**
- **– high vulnerability due to the species' biology or behavior, including:**
- **– migratory species**
- **– has low fecundity**
- **– high juvenile mortality**
- **– slow growth (Cayman Islands, United States)**
- **– delayed reproduction (United States)**
- **– habitat specialization (Sri Lanka)**
- **– other - Potential for poaching (Cayman Islands)**
- **– an observed, inferred, or projected decrease in any one of the following:**
- **– area of distribution**
- **– number of sub-populations**
- **– number of individuals (Dominican Republic)**
- **– area or quality of habitat (Sri Lanka, Dominican Republic, Colombia)**
- **– reproductive potential**

Questionnaire responses:

Bahamas: Population stable due to the protection of the species by fisheries legislation. Area of distribution limited by depth.

Cayman Islands: The Cayman Islands have a relatively narrow shelf area (including surrounding underwater banks). Because of this limited area, all of the local living marine resources are highly vulnerable to any threatened reduction in population size as, even if such reductions were relatively localized within Cayman waters, there would only be a small pool of survivors from which recruitment could be drawn.

United States: In state waters of Hawaii, harvest of black coral in Au'au Channel off Maui does not appear to have negatively impacted populations (Grigg, 1998), but in more accessible areas, such as "stone wall" off Lahaina, intense harvest occurred in the 1970s, and these populations have not recovered to their pre-harvest abundance (Honolulu Star, Oct. 28, 1999).

2. Unless trade in black coral is regulated, this taxon is likely to satisfy one or more of the criteria listed in #1 above within a period of five years.
- **– Yes (Sri Lanka, Cayman Islands, Bahamas, Indonesia, Colombia)**
- **– No (Gibraltar, United States)**

Questionnaire responses:
Cayman Islands:

As there is a market for black coral, if prohibitions on harvesting were removed, the possibility exists that a fishery for the corals could develop. Because of the relatively small shelf area of the Cayman Islands, the corals could be at great risk to localized overexploitation around our reef-track. However, it could not be said that such population reductions would occur nor if they are even likely, given the level of environmental education and sensitivity in the Cayman Islands.

The Cayman Islands populations, though apparently healthy, are not believed to be large enough to sustain any disorganized, systematic, long-term harvesting without crashing, It could, perhaps, support an organized, heavily regulated, limited fishery. But the returns from an ecologically sustainable fishery would be very, very small.

Bahamas: No harvest or trade in black coral in the Bahamas. Law restricts local harvest of black coral. Harvesting can only take place via licence granted by Minister. No licences have been granted. Trade in local harvest of black coral is very little to nonexistent. However, trade in imported specimen[s] is substantial.

Colombia:
Given that it has been demonstrated that the climatic change will adversely affect coastal ecosystems (marine phanerogams, mangroves, corals, coastal lagoons, etc.), it is risky to speak of "sustainable exploitation of corals". On this topic and the Colombian Caribbean and Pacific populations, studies are being conducted to determine if coral reefs could be used as indicators of climatic changes [University of Florida]. The concept "authorized trade" of live coral, colonies or polyps should not be authorized without prior evaluations about their biological status and permissible levels of harvesting. The uncontrolled demand generated by "marine aquarists" pressures taxa whose sustainability has not been proven scientifically. If the demand for "marine aquariums" continues increasing without the establishment of regulations by individual countries, it will be difficult to guarantee the sustainability of many marine populations. Our country does not have trade in black coral. There is local consumption for making handcrafts. The artisans prefer the horny axial skeleton of gorgonian octocorals to satisfy handicraft and souvenir markets in coastal and insular regions.

United States: The inclusion of the entire order Antipatharia (approximately 200 species) in Appendix II makes it difficult to make generalizations about the impacts of delisting and question #1. Ostensibly, some deep-water species could remain unaffected by unregulated international trade, while taxa more accessible to harvesters could be decimated. The similarity of appearance of specimens in trade, the demand for black coral products, and the taxon's general life history characteristics all provide ample reason to retain Antipatharia in Appendix II (see Section IV, question 5 below).

3. Harvesting of wild specimens of black coral for international trade has or may have a detrimental impact on the species.

- **Yes (All respondents)**
- **No**

Questionnaire responses:
Cayman Islands: Harvesting of any species, whether wild-caught or farm-raised, for any form of trade may have a detrimental impact on the species. Black coral appears to be capable of sustaining a limited, highly regulated, international trade in wild specimens.

United States:
In state waters of Hawaii, harvest of black coral in Au'au Channel off Maui does not appear to have negatively impacted populations, but in more accessible areas, such as "stone wall" off Lahaina, intense harvest occurred in the 1970s, and these populations have not recovered to their pre-harvest abundance. In order to ensure that harvesting is sustainable and it does not significantly limit recruitment, conservation strategies should include a determination of optimal harvest yields based on measures of abundance, growth, natural mortality and recruitment. Among the guidelines should be a minimum allowable size of harvest to allow a sufficient time between age (size) at first reproduction and age (size) at first capture, and an annual quota.

IV. Legislation

Globally: Black corals were proposed for listing in Appendix II at COP III (1981) by the United Kingdom on behalf of the Virgin Islands. Black coral began to be heavily collected in the 1970s for tourist souvenirs and the Virgin Islands were concerned that Caribbean populations were being overexploited. See Table 4 in the Appendix to this report for a summary of available information on regulations by country.

1. Is black coral protected or managed by national laws?

- **Yes (Cayman Islands, Colombia, Dominican Republic, Bahamas, Sri Lanka, Indonesia, United States)**
- **No (Gibraltar)**

2. If yes, please provide information (as detailed as possible) relating to the conservation and management of black coral in your country.

Indonesia: Black coral is first protected in Indonesia under the Ministry of Agriculture Decree No. 12/Kpts/II/1987 dated 12 January 1987. The protected status has then been updated into the Indonesia Government regulation No. 7 year 1999 dated 27 January 1999; concerning the Preservation of Flora and Fauna.

Sri Lanka: The black corals (Order Antipatharia) and several other corals are protected under the Fauna and Flora Protection Ordinance (Act No: 2 of 1937) in Sri Lanka. Under this act commercial exploitation is prohibited and exportation is allowed only for research purposes.

Bahamas: All coral species are protected under Ch. 225 Fisheries Resources Jurisdiction and Conservation Regulations (1986) section 12 which states: "No person shall uproot, destroy, or without the written permission of the Minister, take or sell any hard or soft coral."

Cayman Islands:
In the Cayman Islands, it is illegal to take any corals without Government permission. It is also illegal to take any marine life while on SCUBA. There has been no permission given, nor any intention to give permission to commercial operators for the harvest of any coral species within the Cayman Islands. It is our opinion that a healthy reef system, with all of its attendant species, better lends itself to other, more economically feasible uses than coral harvesting. Our management for corals is a strictly no-take policy. The government has also taken the position not to allow the export of Cayman Islands corals, no matter the method used to obtain them, to preclude the temptation to "find" coral that was not deliberately taken from the sea.

United States:
In Hawaii, the estimated maximum sustainable yield (MSY) of black coral is 11,000 pounds (5,000 kg) for the stock in the Au'au channel and 2,750 pounds (1,250 kg) for Kauai; current harvest levels are approaching, but not exceeding the estimated annual MSY. For *A. dichotoma*, black coral colonies mature at 10-12 years, which corresponds to a 1.25-1.5 cm base diameter and a height of approximately 64-80 cm. Grigg (1977) recommended a minimum size limit of 1.2 m in height and a basal diameter of 2.5 cm to ensure that immature colonies are not harvested, and to maximize mean sustainable yield (MSY). Although this was not adopted by Hawaii, fishers voluntarily complied with the recommended minimum harvest size throughout the 1980s and 1990s (Grigg, 1993). In 1999, the State of Hawaii adopted 1" (2.54 cm) as the minimum basal diameter for harvest for new fishers entering the fishery, but the existing licensed fishers are allowed to harvest black coral with a basal diameter of 3/4"(1.9 cm). In addition to the protection from harvest offered to small colonies, improvements in the efficiency of cutting and polishing of black coral has led to a several hundred percent decline in the amount of coral consumed to produce the same value of finished product (Grigg, 1998). Other conservation strategies include a suggestion to prohibit harvest of coral from depths where conventional SCUBA becomes unsafe (e.g., 80 m) (Grigg, pers. comm). This measure would protect deeper beds which can then act as sources of recruitment to harvested zones. In addition to the protection offered to small colonies, improvements in the efficiency of cutting and polishing of black coral has led to a drastic decline in the amount of coral

consumed to produce the same value of finished product. Nonetheless, efficiency in processing still remains at only about 1% (i.e., it takes 100 grams of raw coral to make 1 gram of jewelry).

Colombia: Colombian law prohibits the extraction, harvest and commercialization of corals of any type (live or dead) as well as all other associated invertebrates and plants. The importation of non-indigenous live material, that is, foreign species, requires possession of a permit issued by the Ministry of the Environment, which is issued after conducting an environmental impact assessment.

3. Aside from CITES, is black coral protected or managed by other international treaties or laws?
- **Yes (Cayman Islands, United States, Colombia)**
- **No (Sri Lanka, Indonesia)**

4. If yes, please provide detailed information relating to the conservation and management of black coral on the international level.

Colombia:
The Convention for the Protection of the Marine Environment in the Greater Caribbean Region . It constitutes the main regional legal recourse for all activities conducted within the frame of the Greater Caribbean Action Plan. It was adopted in Cartagena (Colombia) on 24 March 1983 with the objective of protecting the marine environment and coastal areas of the greater Caribbean region, and requires the protection and preservation of rare ecosystems, as well as habitats of diminished, threatened, and endangered species, or areas specially protected. The Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region - SPAW. It is a supplement to the Convention of Cartagena of 24 March 1983. It was developed in June 1990 and adopted in two stages, its text on 18 January 1990 and its three initial annexes on 11 June 1990. Under Article 21, a Scientific and Technical Advisory Committee [SYTAC] was established. Species listed as protected under Annex II include all marine turtles and 109 other species. Annex III includes all species of the orders Gorgonacea, Scleractinia (including the Milleporidae and Stylasteridae), three vascular plant species, marine algae, and 30 other animal species. One should take into account that, if one compares SPAW and CITES, there are several species listed in both treaties. Then, it is important to coordinate actions to achieve mutual support in the implementation of the regulatory mechanisms set by both treaties for regulation of trade in coral and other species associated in this ecosystem.

Cayman Islands and the United States: All Anthozoa of the order Antipatharia are listed in Annex III of the *Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.*

5. In our view, the current listing of the species in Appendix II is:
- **appropriate, based on Resolution Conf. 9.24. (Cayman Islands, United States, Colombia, Bahamas, Indonesia)**
- **inappropriate, based on Resolution Conf. 9.24.**
- **species should be in Appendix I (Dominican Republic, Sri Lanka, Gibraltar)**
- **species should not be listed in the CITES Appendices.**

Recommendations of responding Parties:
Cayman Islands: The total wild population of Antipatharia is not small (Conf. 9.24 Annex 1.A) nor does it have a restricted area of distribution (Conf. 9.24 Annex 1.B). While it may meet Annex 1.C (reduction in population) in some restricted areas this argues for greater internal controls on harvesting by range states rather than a transfer from Appendix II to Appendix I. The Cayman Islands supports the regulation and management of black coral utilization throughout its range to ensure a sustainable use of this resource for years to come.

Colombia: It is appropriate, but countries should have stricter domestic measures that allow use of the species based on a strict evaluation of their potential in the ecosystems where they occur.

United States: The criteria of Conf. 9.24 provide sufficient guidance for evaluating the status of Antipatharia relative to listing in the CITES appendices. The wild population is widespread (cosmopolitan) in its distribution, and regional subpopulations are probably healthy in remote areas or depths inaccessible to harvesters. Reliable quantitative information on trends in population size, harvest, or habitat quality is sparse (as evidenced by the current review). Nonetheless, available information on industry processing losses, growing demand in international trade, and the taxon's life history characteristics indicate that an Appendix II listing is appropriate, given the criteria of Conf. 9.24, Annexes 2a and 2b.

VI. Trade

Globally: A small fishery for black coral exists in all oceans, primarily for jewelry use. Black coral is highly prized in the jewelry trade because it can be polished to an onyx-like luster. Black coral listed in the CITES trade database consists primarily of worked jewelry reported by number of pieces, with a small portion of raw coral traded by weight and <1% traded live. Overall, 11 genera have been reported; for four genera, trade has been reported in 13 species (see Table 1 in Appendix). Over 90% of all records are Antipatharia spp., *Antipathes* spp. and *Cirrhipathes* spp., with *Cirrhipathes anguina* and *Antipathes densa* most commonly in trade: *Cirrhipathes* is considered of inferior quality, however it is the most widespread and abundant species. Between 1982-1998 a total of 72 metric tonnes and 7,400,000 pieces of black coral were recorded as being traded, with most exported from Taiwan, the Philippines, and the Dominican Republic. The U.S. is the major importer of worked coral, followed by Japan. Submersibles and mixed-gas SCUBA are becoming increasingly accessible to the maritime industry. If these gear types become popular, previously inaccessible deep beds of Antipatharians could become vulnerable to overharvest in the international market for black corals.

Questionnaire responses:

1. **Is black coral traded domestically?**
   - **Yes (Sri Lanka, Dominican Republic, Cayman Islands, Colombia, United States)**
   - **No (Indonesia, Gibraltar, Bahamas,)**

2. **If traded domestically, please describe:**
   a. **Purposes of trade**
   b. **Trade levels and/or trends**
   c. **Impact of trade on wild populations**

Cayman Islands: Imported black coral is traded locally as jewelry (either imported as jewelry or imported unworked and made into jewelry by local artisans). The level of local trade has increased as the population of the Cayman Islands has grown and become more affluent. It is, however, minor compared to the amount intended for sale to tourists (nominally domestic trade, but normally considered international trade since the specimen eventually leaves the jurisdiction). The tourist-directed trade of black coral jewelry has been increasing steadily and dramatically for the last 20 years. This trade, and the possible threat of local harvesting, has had the effect of aiding in passing legislation to protect all corals in the Cayman Islands from harvesting (see above).

Dominican Republic: Purposes of trade are tourist souvenirs and jewelry. Trade levels and trends, as well as the impact on wild populations, are unknown.

United States:

The best available information on the commercial harvest of black coral is from Hawaii. Of 14 species known to occur in Hawaii, 12 are found below 100 m depth and only three, all shallow water species, are large enough to be of commercial value for coral jewelry (Devaney and Eldridge, 1977). Commercial beds of black coral were discovered off Hawaii (Lahaina, Maui) in 1958 at 30-75 m depth along a drop-off known as "stone wall". Maui Divers, Inc., established a small black coral jewelry industry in 1960, and as much as 10,000 kg were harvested annually from this bed during the 1960s and 1970s. During the late 1970s and early 1980s the demand for black coral in Hawaii was greatly reduced, but since 1986 the demand has steadily increased, in part because of its designation as Hawaii's state gem (Grigg, 1993). Currently, there are five commercial fishers that are licensed to harvest black coral in Hawaii. Fishers selectively harvest colonies using SCUBA with axes, hammers and saws (Grigg, 1993); about 90% of the catch consists of *Antipatharia dichotoma*, 9% is *A. grandis* and 1% is *A. ulex*. Between 1981-1990 the

state of Hawaii reported that landings of black coral amounted to 13,706 pounds, with an annual take of 158-4,351 lbs (Oishi, 1990). In 1993, the annual reported take was 1,013 pounds; however, Maui divers, who purchases over 80% of the total annual harvest, indicated that they purchased 8,200 pounds from fishers in 1993. Most coral was collected in Au'au Channel off Maui; there has been little or no fishing pressure over the last 18 years on beds off Kauai or the remote bed off southwest Hawaii (Grigg, 1998). Recently, private entrepreneurs have begun deploying submersibles in the waters around Hawaii; these parties may eventually apply for permits to use this equipment in the U.S. black coral fishery. Dr. Richard Grigg (University of Hawaii, pers. comm.) has estimated that the optimum sustainable yield (OSY) from the Au' Au Channel bed is 3,750 kg (8,250 lb.) at the current minimum base diameter of 1.9 cm (0.75 inches). The United States Scientific Authority monitors the volumes purchased by U.S. jewelry exporters from domestic black coral harvesters. This will permit the Scientific Authority to limit exports if domestic harvest approaches or exceeds OSY.

Colombia: There is no exportation of black coral from Colombia. It is locally used for making handicrafts and souvenirs in coastal areas by indigenous communities such as the Wayuú in the Guajira peninsula.

3. What is the source of specimens in trade? Please indicate the total number or percentage of specimens in trade from the following sources:

100% removed as adults from the wild (Sri Lanka, Colombia, Dominican Republic, Cayman Islands, United States*)

– ranched

– bred in captivity

*It should be noted that all wild-caught specimens of black coral may not be adult (sexually mature) colonies.

VII. Literature or other references on which the above information is based

Cayman Islands

Cayman Islands Laws (Marine Conservation Law)

Personal observations by members of the Department and personal communications with other researchers, observers and members of the public engaged in the black coral trade.

Colombia

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