ANALYSES

IUCN/TRAFFIC Analyses of the Proposals to Amend the CITES Appendices at the 15th Meeting of the Conference of the Parties

Doha, Qatar
13–25 March 2010

Prepared by IUCN Species Programme and Species Survival Commission and TRAFFIC

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Monaco, Government of Monaco

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Sweden, Naturvårdsverket - Swedish Environmental Protection Agency

Belgium, DG Animaux, Végétaux et Alimentation

Denmark, Danish Forest and Nature Agency

Netherlands, Ministry of Agriculture, Nature and Food Quality

Swiss Confederation, Federal Department of Economic Affairs (FDEA), Veterinary Office

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IUCN (International Union for Conservation of Nature) works to assist societies in conserving the integrity and diversity of nature and ensuring that any use of natural resources is ecologically sustainable and equitable. The Union brings together States, government agencies and a diverse range of non-governmental organizations in a unique global partnership, with more than 1000 members and almost 11 000 volunteer scientists in more than 160 countries. It helps the world find pragmatic solutions to our most pressing environment and development challenges, supporting scientific research, managing field projects and bringing governments, non-government organizations, United Nations agencies, companies and local communities together to develop and implement policy, laws and best practice. IUCN builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.

The IUCN Species Survival Commission (SSC), created in 1949, is the largest of IUCN's six volunteer commissions. With around 8000 scientists, field researchers, government officials and conservation leaders, the SSC membership is an unmatched source of information about biodiversity conservation. SSC members provide technical and scientific advice to conservation activities throughout the world and to governments, international conventions and conservation organizations. Through the Species Programme, they provide the best available information critical to the development of conservation products and tools such as the *IUCN Red List of Threatened Species*. SSC works primarily through its 120 Specialist Groups, which focus on a wide range of plants and animals, or on issues such as sustainable use and invasive species.

TRAFFIC the wildlife trade monitoring network, works to ensure that wildlife trade is not a threat to the conservation of nature. TRAFFIC is a joint programme of IUCN and WWF, the global conservation organization.

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INTRODUCTION

If CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is to remain a credible instrument for conserving species affected by trade, the decisions of the Parties must be based on the best available scientific and technical information. Recognizing this, IUCN and TRAFFIC have undertaken to provide technical reviews of the proposals to amend the CITES Appendices. The IUCN Species Programme has collected information on the status and biology of species from its Species Survival Commission Specialist Group network and broader scientific community. TRAFFIC has focussed on the analysis of the trade, using components of the proposals in addition to drawing on its own information sources and expert networks. The resulting document brings together a broad range of expertise, which we are confident will be of assistance in the discussions of the proposals.

The *Analyses* - as these technical reviews are known - aim to provide as objective an assessment as possible of each amendment proposal against the requirements of the Convention as laid out in the listing criteria elaborated in *Resolution Conf. 9.24 (Rev. CoP14)* and other Resolutions and Decisions. The review of each proposal consists of a summary section and more detailed supporting text. The summary section presents a synthesis of available information and, in a separate paragraph, a specific analysis of whether or not the proposal might be considered to meet the pertinent criteria in *Resolution Conf. 9.24 (Rev. CoP14)*. The more detailed supporting text is presented in table form. These tables are designed to focus attention on the biological and trade criteria and the precautionary measures of *Resolution Conf. 9.24 (Rev. CoP14).* Text in the left hand side includes selected information drawn from the supporting statement and pertinent to a particular criterion. Text in the right hand side consists of comments, observations and additional information obtained in the review process.

The approach taken for preparation of the Analyses followed that used successfully in preparation of the Analyses for CoP14. Following the deadline for Parties' submission of amendment proposals (14th October 2009), the review team compiled available information to prepare a first draft of the analyses. These drafts, together with a series of additional questions and clarifications were then sent to a variety of reviewers for comment following which reviewers' responses were compiled into the final document.

To satisfy the needs of the Parties for information well before CoP15, the reviews were completed and made available on the internet on 12th January 2010. The Summary and Analysis sections are being printed and distributed widely to reach as broad a target audience as possible. The full Analyses are available on the internet (http://www.iucn.org/about/work/programmes/species/our_work/species_trade_use/iucn___traffic_analyses_of_the_proposals/ or www.traffic.org/cop15) and will also be distributed on CD.

These analyses aim to highlight relevant information on which the Parties can base their judgements, not to be exhaustive. Clearly there may be omissions and differences of interpretation in a document compiled on a wide range of species in such a short time. We have nevertheless tried to ensure that the document is factual and objective. It can be challenging to reflect reviewers' responses in a balanced manner, particularly when strong views are held and the information presented is of variable quality. As such, it is not always possible to provide a consensus picture and the compilers take full responsibility for any misrepresentation.

A summary of the CITES listing criteria and the IUCN Red List Categories and Criteria are provided as annexes to this document. It should be emphasized that the numerical guidelines in *Resolution Conf 9.24 (Rev. CoP14)*, Annex 5 are not thresholds and may not be appropriate for all species. References to source material are provided wherever possible; in some cases, these sources have been consulted directly; in others, they have been cited by reviewers to support their statements. Where information is not referenced, it should be assumed that the source is IUCN or TRAFFIC. The assessments expressed in this publication do not necessarily reflect those of the reviewers. CITES trade data refer to data from CITES Annual Reports as provided by the Parties and available from the CITES trade database, which is managed by UNEP-WCMC. Where information has been provided from a particular country's official trade statistics, this has been specified.

ACKNOWLEDGEMENTS AND CREDITS

Many individuals and institutions contributed to the review of the CITES amendment proposals and compilation of the present Analyses. Those to whom we would first like to extend our thanks are the experts that provided species information, many of them members of the IUCN Species Survival Commission Specialist Groups, as well as the many other scientists and experts from other institutions who, although not formally linked with SSC, have volunteered their time and expertise to this process.

The staff members of TRAFFIC who assisted in the review of proposals and compiled trade and use accounts, deserve recognition for the contribution they have made to this document. Particular thanks to David Newton who provided input to the analyses of proposals for flora. We would also like to thank the French translators Daniele and Richard Devitre and the Spanish translator Wendy Byrnes.

The Analyses team was made up of: Thomasina Oldfield from IUCN/TRAFFIC, Gemma Goodman from TRAFFIC, Martin Jenkins, Carol Inskipp, Helen Scales and Tim Inskipp (Consultants). IUCN provided valuable input, including: Jane Smart, Sue Mainka, Simon Stuart (SSC Chair) and Dena Cator. Dena Cator also took responsibility for fundraising and we would also like to extend our thanks to the CITES Secretariat who provided fundraising assistance. Julie Gray and Kim Lochen at TRAFFIC provided much assistance with copy editing and formatting. Kim Lochen and Richard Thomas at TRAFFIC assisted with cover design and Steven Broad provided much support and valuable input throughout the Analyses.

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Proponent: Switzerland, as Depositary Government, at the request of the Animals Committee

Summary: The addition of an annotation to the listing of Grey Wolf *Canis lupus* in the CITES Appendices is necessary to exclude from the provisions of the Convention two subspecies that are domestic forms, i.e. Dingo *Canis lupus dingo* and Domestic Dog *Canis lupus familiaris*, which it is evident were never intended to be covered by the listing. Although pure-bred wild populations of Dingo occur in Australia and Thailand and probably elsewhere in Asia and Australasia, all populations are believed descended from domestic animals. The Dingo is assessed as Vulnerable by IUCN. There are many (>60: see below) synonyms for the names of the subspecies given.

Analysis: The suggested annotation appears to be adequate to exclude domestic forms of *Canis lupus* from the provisions of CITES. If possible, reference should be made in the annotation to the synonyms for the two subspecies proposed for exclusion.

Supporting Statement (SS)	Additional information
	Taxonomy
The former standard reference for mammals, Wilson and Reeder (1993): *Mammal Species of the World: a Taxonomic and Geographic Reference*. Second edition. xviii + 1207 pp., Washington (Smithsonian Institution Press), already treated *Canis familiaris* as part of the species *Canis lupus*. However, this had not been recognised until the adoption of the current mammal reference, which not only considers *Canis familiaris* but, in addition, the Dingo as well, as subspecies of *Canis lupus*. It is quite obvious that neither of these have ever been considered as being covered by the listing of *Canis lupus* in the Appendices (see also Notification to the Parties No. 2008/051). Therefore, the Animals Committee recommended at its 24th meeting to add a respective annotation to the listing of *Canis lupus.*	*In the entry for* Canis lupus *Linnaeus, 1758 in the third edition of Wilson and Reeder (2005), under the heading 'SYNONYMS, the names* **dingo** *Meyer, 1793 [domestic dog] and* **familiaris** *Linnaeus, 1758 [domestic dog] are given in bold as they are recognized as valid subspecies of* Canis lupus. *However, these two accepted names are both followed by a number of other names, which are not accepted as valid subspecies and are understood to be junior synonyms of the names that they follow. In the case of* **dingo** *there are 10 synonyms listed, and in the case of* **familiaris** *there are 57 synonyms listed [note that* major *Gmelin, 1792 is listed twice, presumably in error]. These names do not need to be listed in the proposal but it should be understood that they relate to the subspecies to be excluded from the provisions of the Convention.*
	Range
	Canis lupus dingo: *Pure Dingoes are known to occur in Australia and Thailand. Based on external phenotypic characters, they may also occur in Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines and Viet Nam (IUCN Red List, 2009).* Canis lupus familiaris: *cosmopolitan.*

Supporting Statement (SS)	Additional information
IUCN Global Category	
	Canis lupus dingo: *Vulnerable A2e ver 3.1 (Assessed 2008.)*
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
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Deletion of Bobcat *Lynx rufus* from Appendix II

Proponent: United States of America

Summary: The Bobcat *Lynx rufus* is a medium-sized, spotted cat and is the most widely distributed native felid in North America, ranging from British Columbia, Canada to Oaxaca, Mexico. Its range is approximately 8.7 million km^2, of which 71% is in the USA, 20% in Mexico and 9% in Canada. The estimated population in the USA in 2008 was 1.4–2.6 million, a considerable increase since the previous estimate in 1981. In Canada, the status of the Bobcat is considered secure, with stable or increasing population trends in range provinces. Recent studies in Mexico revealed that the Bobcat was widespread with moderate densities varying from 0.05 to 0.53 per km^2; however, historical data are not sufficient to assess how Mexico's populations have changed over time. Overall, the Bobcat population appears to be healthy and significantly greater than in the early 1980s.The species is currently classified as Least Concern (assessed in 2008) in *The IUCN Red List of Threatened Species*. The Bobcat is widely harvested for its fur, used domestically and traded internationally. Management programmes in the USA and Canada are considered highly advanced for commercial exploitation of feline fur-bearers and result in sustainable harvests.

All Felidae spp. have been listed in the CITES Appendices since 1977. CITES taxonomy currently recognizes four members of the genus *Lynx: L. canadensis, L. lynx, L. pardinus* and *L. rufus. L. pardinus*, considered to be Critically Endangered, occurs in Portugal and Spain and was transferred to Appendix I in 1990. The other Lynx species are in Appendix II. *L. canadensis* and *L. lynx* are both currently classified as Least Concern by IUCN. *L. lynx* is widespread in Eurasia, occurring in around 50 range States. *L. canadensis* is widespread and abundant over most of its range in Canada and the USA.

In 1983, the Parties agreed not to remove the Bobcat from Appendix II for reasons of similarity of appearance to other spotted cats that were deemed threatened by trade. A proposal to delete *Lynx rufus* from Appendix II was considered again at CoP14, but was again rejected on the basis of continuing concerns about potential look-alike problems. There was concern about potential confusion of skins in trade with those of other *Lynx* species and also with the skins of other species, including a number of Latin American spotted cats such as the Margay *Leopardus wiedii* and Ocelot *L. pardalis*, both included in Appendix I.

CITES trade data indicate that between 1980 and 2008 reported trade in skins of *Lynx* spp. was dominated by *L. rufus*. For the period 2002–2008, trade data indicate gross exports of just under 350 000 skins of *L. rufus* and around 90 000 skins of *L. canadensis*. Recorded trade in other *Lynx* species was very small by comparison: 515 skins of *L. lynx* and one skin of *L. pardinus*. During the same period, the CITES trade database records just under 1000 confiscated and seized whole skins of *L. rufus* along with 37 skins of *L. lynx*, eight skins of *L. canadensis* and one skin of *L. pardinus*. These low figures suggest the illegal trade in *Lynx* spp. is not a major problem, although it is not possible to determine how representative these data are of total illegal trade. A 2007 TRAFFIC North America survey of the fur industry found that European and Asian markets seemed to prefer *L. rufus* and *L. canadensis* to other Lynx species. Recent demand from Asian countries with strong economies, such as China, has pushed up pelt prices of *L. rufus*.

Between 2002 and 2006, 95% of all legal trade in skin-related items of Bobcat was in full pelts, which the proponent states can be identified easily. The TRAFFIC survey found that, in the opinion of fur industry experts, distinguishing *L. rufus* parts, pieces and derivatives from those of *L. canadensis* (which shares part of its range with *L. rufus)* was not difficult, and could be accomplished with limited experience and/or training. However, this opinion is disputed. Views of enforcement authorities are not known.

Recently, a web-based and hard copy *Lynx* identification manual has been prepared by the US Fish and Wildlife Service (USFWS) to aid CITES authorities

and other enforcement officials in distinguishing full skins and skins lacking a head and tail of *L. rufus* and *Lynx* spp. At the time of writing, the guide is not generally available; however it has been reviewed by State law enforcement inspectors at USA ports. The USFWS also sent the guide out for review to counterparts in the European Union (EU), Canada and Mexico in December 2009, and will be sending it to a broader audience in January 2010. A preliminary review of the manual by felid specialists indicates that it does not address all aspects of the look-alike issue, as it does not present the coat pattern variation seen in *L. pardinus* and *L. lynx.* In addition, the manual does not cover spotted cats other than *Lynx* species, notably some medium-sized cats from Latin America, Africa and Eurasia.

In 2008, a meeting of Management Authorities and enforcement authorities of *Lynx* range States was held to discuss the degree of illegal trade in *Lynx* spp. and *L. rufus* look-alike concerns. In most cases, range States present reported that illegal poaching of *L. lynx* and *L. pardinus* was related to the protection of livestock and game animals. No documented incidents were reported of *L. lynx* or Appendix-I *L. pardinus* being illegally traded as *L. rufus.* However some *Lynx* range States were unrepresented at the meeting. It was acknowledged that much more information was needed on trade in *Lynx* species between the Russian Federation and China as well as other Asian range States of *Lynx lynx*, including enforcement problems encountered.

The proponent considers that the ready availability of legally acquired *L. rufus* in markets is a safeguard against the illegal take and trade of other *Lynx* species. In addition, the US survey of range countries for the Review of the Appendices by the Animals Committee showed that trade in *L. lynx* was well controlled.

Analysis: The Bobcat is a widespread species with a large global population, currently classified as Least Concern by IUCN. There is considerable trade in Bobcat fur, but management programmes in the two main range States are believed to result in sustainable harvests. It therefore appears unlikely that deletion from Appendix II will result in the species qualifying for inclusion in the Appendices under Annex 2a of *Resolution Conf. 9.24 (Rev. CoP14)* in the near future.

However, although a new *Lynx* identification manual has been produced by the USFWS, the look-alike issue with other spotted cat species included in the Appendices appears still not to have been fully resolved. *L. rufus* therefore still appears to meet Criterion A of Annex 2 b of *Resolution Conf. 9.24 (Rev. CoP14*), which provides for inclusion in Appendix II for look-alike reasons.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Canada, Mexico and the USA	
IUCN Global Category	
Lynx rufus is not listed in the *2003 IUCN Red List of Threatened Species*.	*Least Concern (Assessed 2008, Criteria version 3.1) (IUCN, 2009). Previously assessed as Least Concern in 2002.*

Biological and trade criteria for retention in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

Lynx rufus was included in Appendix II in 1977 along with all Felidae species that had not already been listed. In 1983, it was agreed at the meeting of the Conference of the Parties that its continued listing was based solely on Article II, paragraph 2 (b) of the Convention text, to ensure effective control of trade in other felids. Monitoring of wild *L. rufus* populations since 1977 continues to show that the species is not threatened, and that harvest and trade are well regulated.

A 2008 survey of *Lynx rufus* showed that its total North American range was approximately 8 708 888 km^2, including 6 186 819 km^2 (71% of range) in the USA, 1702 545 km^2 (20% of range) in Mexico, and 819 524 km^2 (9% of range) in Canada.

Breitenmoser and Breitenmoser (2009) recognize that Bobcat populations throughout the USA have increased and are far from being threatened; however they point out that only 27 States were able to present population estimations.

A 2008 survey in the USA showed that the population had grown considerably since 1981, from an estimated 725 000–1 017 000 Bobcats to 1 419 333–2 638 738 in 2008. In Canada, the status of Bobcat is considered secure, i.e. relatively widespread or abundant and with stable or increasing population trends (in Canadian range provinces). Recent studies in Mexico revealed that *L. rufus* was widespread with moderate densities ranging from 0.05 to 0.53/km^2 and within the range of results reported in the USA, 0.09–1.53/km^2. However, historical data are not sufficient to assess how Mexico's populations have changed over time. The current status of the *L. rufus* population and distribution in North America appears to be healthy and significantly greater than the early 1980s.

In the USA, harvesting levels have varied due to changes in pelt value and fur harvest intensity for other species. Hunting is regulated at the state level on the basis of adaptive management programmes. Managers generally consider 20% of the population per annum to be the maximum sustainable harvest rate.

In Canada Bobcats are legally harvested in seven provinces resulting in 1 500 to 2 000 pelts per year, the majority from Nova Scotia (65%-70%). The harvest is almost exclusively for pelt collection for the fur trade. There is also a small amount of trade in other Bobcat parts. The trade is controlled by provincial regulation. Canadian protections for Bobcat under provincial/territorial wildlife acts would remain in place if the species was de-listed from CITES. Canada is confident that current practices guard against potential threats from trade demand, and that the species in Canada is not impacted adversely by trade.

In Mexico, harvesting of *Lynx rufus* has been approved only for game hunting

purposes and exports are mainly of trophies. *L. rufus* skins from Mexico are generally considered by the industry to be of low value and are not commercially in demand. Between 2005 and 2009, a total of 26 *L. rufus* were exported from Mexico, primarily as hunting trophies to the USA. The harvest is regulated nationally. It must be demonstrated that harvest rates are less than the natural renewal rate of the wild population affected.

According to data in the CITES trade database, from 2002 to 2006, approximately 380 158 *Lynx* spp items were legally traded, of which 74% were *L. rufus*. The percentages are based on numbers of items and where skin items were recorded by weight or length, these units were converted to numbers of items, using the method described by TRAFFIC North America in Cooper and Shadbolt (2007). The USA exported or re-exported 61% of *L. rufus* items, followed by Canada (30%), and the remaining 9% by other countries, including Mexico (less than 0.05%). Full pelts accounted for 92% of all *L. rufus* items in legal trade between 2002 and 2006. Considering only the skin-related items (e.g. garments, leather products, plates, skins and skin pieces), skins accounted for 95% of legal trade in these *L. rufus* items. According to TRAFFIC North America, skins comprised 96% of *L. rufus* items legally exported from the USA from 2000 to 2004.

The proponent notes that a survey of North American and European fur representatives that deal with *Lynx* spp (Cooper and Shadbolt, 2007) suggested that international, European and Asian markets all seemed to prefer both *L. rufus* and *L. canadensis* over other *Lynx* species.

Fur industry representatives report that if *Lynx rufus* were removed from the Appendices, market demand might increase or remain the same, but would be unlikely to decrease.

The proponent believes that the ready availability of legally acquired *Lynx rufus* in the market is a safeguard against the illegal take and trade of other *Lynx* species. The survey of range countries, conducted by the USA for the Review of the Appendices by the Animals Committee, as well as the trade data, show that trade in *L. lynx* and *L. pardinus* is well controlled, especially by range countries.

In converting skin pieces to numbers of whole skins, the number of skin pieces and scraps that is traded as non-full skins, which may be more difficult to identify to the species level, is underestimated.

At the wholesale/manufacturing level, over the past five years the demand for both L. canadensis *and* L. rufus *has increased, but demand for* L. rufus *has increased the most. The increase in the number of* L. rufus *traded between 1998 and 2006, suggests there was a growing market for products made from the species during the period (Cooper and Shadbolt, 2007).*

Retention in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

At the meeting of the Conference of the Parties in 1983, it was agreed that the continued listing of Bobcat was based solely on Article II, paragraph 2 (b) of the Convention text, to ensure effective control of other felids. Several species have been identified as similar in appearance to *Lynx rufus,* including *L. canadensis, L. pardinus* and *L. lynx.* Characteristics of the pelage and skull can be used to distinguish *L. rufus* clearly from other members of the genus *Lynx.*

According to data in the CITES trade database, between 2002 and 2008 gross trade exports of skins of Lynx rufus *were 347 543 (80% of total), followed by* L. canadensis *89 850 (20% of total). Trade in other* Lynx *species was very small by comparison: 515 skins of* L. lynx *and one skin for* L. pardinus. L. pardinus *was transferred to Appendix I in 1990; all commercial trade in this species is illegal. The largest figure for confiscated and seized whole skins between 2002 and 2008 was also for* L. rufus (*993 skins), followed by* L. lynx (*37 skins),* L. canadensis (*eight skins) and one skin of* L. pardinus.

However, a survey of North American and European fur industry representatives found they were of the opinion that distinguishing *Lynx rufus* parts, pieces, and derivatives from those of *L. canadensis* was not difficult and could be accomplished with limited experience and/or training.

Although the USFWS Division of Scientific Authority's consultation with the USFWS National Fish and Wildlife Forensics Laboratory has revealed that some pieces of *Lynx rufus* skins cannot be distinguished from those of the other *Lynx* spp., according to data provided by the CITES trade database, between 2002 and 2006, the majority of trade (89%) in *Lynx* spp. items consisted of skins. Since skins are almost always auctioned as dry skins (prior to tanning) with fur out and are almost always complete, including the ears and tail, the skins should not present a look-alike problem because *L. rufus* can be reliably distinguished from other *Lynx* spp. by the ears and tail.

Trade data indicate that trade in *Lynx* spp. skulls is not significant.

Between 1980 and 2004, a total of 3568 *Lynx* spp. items was recorded as confiscated or seized, based on information in the CITES trade database. This is an average of only 143 items per year and represents only 0.2% of the total (legal and illegal) trade during the period. Of these confiscated or seized items, 87% were of *Lynx rufus.* Eighty-five per cent of these items were skins and 93% of the skins were from *L. rufus.* In 2005 and 2006, according to the CITES trade database, 193 items of *Lynx* spp. exported were confiscated or seized. Of these items, 93% were skins, all of which were of *L. rufus* exported from the USA. This small volume of confiscated or seized *Lynx* spp. items does not suggest a major problem with illegal trade in this genus.

To facilitate species identification, the USFWS has produced a web-based *Lynx* identification manual designed for use by CITES authorities and other enforcement officials. The manual has been designed as an aid in distinguishing full skins and skins lacking a head and tail of *Lynx rufus* and *Lynx* spp. and will also be available in a hard-copy format.

Although the majority of trade (by number of items) is in skins, significant trade in skin pieces and scraps has also been recorded in the CITES trade database. Table 1 shows the countries with the highest recorded gross exports of skin pieces and scraps according to the database since 1998.

Taxon	Country	Total 1998–2007	Av 1998–2007	2008
L. C	CA	4793	479.3	189
L. R.	US*	2394 kg	239.4 kg	0
L. R	CA	1970	197	224
L. R.	US	682	68.2	13
L. C.	GR	178	17.8	10
L. R.	GR	169	16.9	212
L. C.	HK	121	12.1	2
L. C.	IT	120	12	0
L. R.	IT	118	11.8	3
L. C.	US	67	6.7	2
L. R.	GR	0	0	31kg
L. R.	GR	0	0	160 m

*Table 1: Gross exports of skin pieces and scraps between 1998 and 2008 reported as number of items, except for US * exports combining kg of skin pieces and scraps, and GR re-exports in kg and m, as stated under 2008. L.C.* = L. canadensis, *L. R.* = L. rufus. *2008 figures may be incomplete. Country codes used are ISO codes.*
Source: CITES trade database.

Trade has also been reported in garments, by range States and non-range States, of Lynx rufus*,* L. canadensis *and* L. lynx, *nearly all reported as of wild origin with the country of origin also reported.*

The illegal trade data in the CITES trade database are not likely to be complete and will not represent all CITES seizures internationally. It is not possible to determine how representative these data are of the actual total global illegal trade in Lynx *owing to the unregulated and unrecorded nature of illegal trade (Cooper and Shadbolt, 2007).*

According to Cooper and Shadbolt (2007), the results of their study cannot be used to predict whether the illegal trade in Lynx *or any other cat species, will increase if* L. rufus *is removed from the CITES Appendices.*

The proponent considers it is highly unlikely that pieces of *Lynx lynx* or *L. pardinus* could enter illegal trade in quantities significant enough to impact populations.

Following a recommendation made in a Felidae working group of the Animals Committee and adopted by that Committee, a meeting was held in Brussels of the management and enforcement authorities of *Lynx* spp. range countries, in October 2008, to discuss possible problems of illegal trade of these species. Case studies of illegal trade in *L. lynx* and *L. pardinus* were also discussed. The primary impetus of the meeting was to address the look-alike issue with *Lynx* and to discern if the concerns about *L. lynx* and *L. pardinus* potentially entering in trade as *L. rufus* were actual or hypothetical. Discussions revealed that in most cases the illegal poaching of *L. lynx* and *L. pardinus* was related to predator control to protect livestock and game animals. No documented incidents were reported of *L. lynx* or *L. pardinus* being traded as *L. rufus.*

Cooper and Shadbolt (2007) found that, at the wholesale/manufacturing level, over the the past five years, the demand for L. rufus *had increased. At the retail level in North America, the demand varied. The demand for one* Lynx *species probably does influence the demand for another (Cooper and Shadbolt, 2007).*

Lynx rufus *pelts can also be confused with the skins of a number of small Latin American spotted cats such as the Margay* Leopardus wiedii *and Ocelot* L. pardalis *(IUCN/TRAFFIC, 2007).*

The view has been expressed that the removal of Bobcat from the Appendices could potentially increase poaching and illegal trade in some small Latin American spotted cat species (Anon., 2006). Breitenmoser and Breitenmoser (2009) believe that one problematic aspect to consider is the potential risk for the illegal trade in other spotted cats beyond the genus Lynx, *if the Bobcat were removed from Appendix II. Although agreeing that distinguishing Bobcat and Canadian Lynx was "not difficult", Breitenmoser and Breitenmoser (2009) still challenge the statement that it "can be accomplished with limited experience and/or training".*

The recently prepared US online Lynx *identification guide distinguishes between pelts (including heads and tails) of Bobcat and other* Lynx *species. The guide has been reviewed by State law enforcement inspectors at US ports. The USFWS also sent the guide out for review to counterparts in the EU, Canada and Mexico in December 2009, and will be sending it to a broader audience in January 2010 (Cogliano, USFWS, 2009). The manual is not yet available online but will presumably be located with their other mammal identification guides at: http://www.lab.fws.gov/idnotes.php#Mammals*

According to Breitenmoser and Breitenmoser (2009), the online guide needs to be considerably improved and completed to reduce the risk of wrong identification. The draft version does not present the coat pattern variation of the species Lynx pardinus *and* L. lynx*. For* L. pardinus *and* L. lynx*, only one coat pattern type is shown in the manual for each species but there are at least four different coat patterns* for L. lynx *and more than one type for* L. pardinus*. Other criteria mentioned, such as length of the tufts or white underside of the tail are not always easy to judge and can easily be modified on any cat pelt.*

A meeting was held in Brussels in 2008 between management and enforcement authorities of Lynx *spp. range countries (Belgium, Canada, Czech Republic, Estonia, Finland, Latvia, Montenegro, Poland, Portugal, Romania, Slovak Republic, Sweden, USA). The meeting highlighted that more information from* Lynx *range States not participating in the meeting was required. At the meeting an overview was presented of poaching and seizures of* L. lynx *and* L. pardinus *in the EU, based on information submitted by 14 EU Member States for the meeting. While discussions of countries participating in the meeting suggested that poaching of* L. lynx *was mostly for predator control and domestic animal protection, and that the fur was a "byproduct," it was not known whether similar conclusions applied to* Lynx r*ange States not present in the*

	meeting. It was acknowledged that much more information would be needed on trade in Lynx *species between the Russian Federation and China as well as other Asian range States of* Lynx lynx*, including enforcement problems encountered. The meeting report states that the USA is committed to continuing discussions with the EU and the Russian Federation on the possible illegal trade in* Lynx lynx *furs (CITES Scientific Authority of USA, 2009).* *Discussions at the 2008 meeting of Management and enforcement authorities of some* Lynx *range countries also revealed that incidents/seizures were reported where* L. lynx *were illegally harvested because of predator concerns or imported illegally from the Russian Federation to EU countries (CITES Scientific Authority of USA, 2009). Breitenmoser and Breitenmoser (2009) fear not so much the risk of unintentional wrong identification (which most likely will happen on a level that does not threaten any species), but the possibility of intentional wrong declaration of cats that are relatively similar to Bobcats. With an increase in the demand from Asia and rising pelt prices, the risk of similar looking pelts showing up on markets is considerable. This problem has not been addressed in the proposal at all.*
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	
Threats	
There are no widespread threats to *Lynx. rufus* in the USA or Canada. In Mexico some regions have undergone drastic change in vegetation, which has affected the conservation status of several species. *L. rufus* is still present in some regions with strong human influence, such as localized areas near Mexico City. Recent population studies do not support including Bobcat in the list of "Species at Risk" in Mexico.	*In Mexico, threats to* Lynx rufus *are related to hunting by farmers because of alleged predation of livestock and habitat destruction. During the recent survey of the species in Mexico, populations found in the centre of the country were low compared with those reported at sites in the north. One possible reason for this is habitat destruction, since central Mexico has large areas of fragmented habitat and high anthropogenic presence (CITES Scientific Authority of Mexico, 2009).*
Conservation, management and legislation	
Lynx rufus management programmes in the USA and Canada are considered the most advanced for commercial exploitation of feline furbearers. The management programmes ensure long-term sustainable use of the species and support its conservation. Details are provided in the supporting statement. In Mexico, Bobcat harvesting is regulated by the *General Law of Wildlife* and the *General Law of Ecological Balance and Environmental Protection*. Both these laws establish that, prior to harvesting, it must be demonstrated that harvest rates are less than the natural renewal rate of the wild population affected. In general, the harvest	*Nowell and Jackson (1996) considered that North American management practices had probably resulted in sustainable harvests, i.e. they have prevented widespread and prolonged over-harvest. Under such a management regime, the long-term viability (of Bobcat) is unlikely to be impaired, and the commercial use of Bobcat can thus be considered sustainable.* *In the case of fur-bearing species in Canada, national co-ordination and communication occurs via the Canadian Furbearer Management Committee, which includes representatives of managers of fur-bearing species from all jurisdictions. In*

rate is about one specimen per 4000 ha. Harvesting of the species has been approved only for game hunting purposes. The same legislation established measures for controlling problematic Bobcat individuals, and specimens are generally captured and relocated for recovery, research or environmental education purposes.	*addition, the Fur Institute of Canada, of which all provinces/territories are members, acts as a national umbrella organization for the fur industry across Canada (Canadian Wildlife Service, 2009).* *In all jurisdictions in Canada the management is through a combination of area-based systems (regions, management units, zones) and time-based systems (seasons) which are regulated by local conditions and can include quotas as necessary. Provincial and territorial governments' management of harvest is conducted with a goal towards long-term population sustainability (Canadian Wildlife Service, 2009).*

Captive breeding/artificial propagation

In the USA, some States allow and regulate captive breeding of Bobcats for commercial purposes, but the current international pelt trade is dominated by wild fur harvests from North American countries.	

Other comments

Reviewers:
C. Breitenmoser, U. Breitenmoser, TRAFFIC North America, TRAFFIC Europe.

Transfer of Polar Bear *Ursus maritimus* from Appendix II to Appendix I

Proponent: United States of America

Summary: The Polar Bear *Ursus maritimus* is the largest living member of the bear family or Ursidae. It occurs at high latitudes in Canada, Greenland/Denmark, Norway (specifically Svalbard area), the Russian Federation and the USA (Alaska), with vagrants recorded in Iceland. Polar Bears are strongly associated with marine environments where there is sea ice for all or part of the year, particularly in coastal regions, but also in the central Arctic basin in regions of permanent pack ice. Preferred habitat is ice that is periodically active, where wind and sea currents cause movements and fracturing of the ice followed by refreezing. It is in such areas that Polar Bears can most successfully hunt. Polar Bears feed primarily on seals, particularly Ringed Seals *Pusa hispida*, Bearded Seals *Erignathus barbatus*, other seals, and walruses *Odobenus rosmarus,* and also scavenge on the carcasses of whales. They will infrequently take terrestrial mammals, birds and vegetation when other food is unavailable but such foods are thought to be energetically insignificant. Polar Bears that have continuous access to sea ice are able to hunt throughout the year. However, in those areas where the sea ice melts completely each summer, Polar Bears spend several months on land relying largely on stored fat reserves until the return of the sea ice. Mating occurs in March to May, but implantation is delayed and birth is generally thought to occur from late November to mid-January. The average litter size is somewhere between one and two. Cubs are dependent upon mothers until 2.5 years of age. Age of first reproduction is normally five to six years for females. Generation time is approximately 15 years, but may range from around 10 years to around 15 years, depending on conditions.

The Polar Bear population is generally divided into 19 subpopulations, or stocks, of very unequal size. However, genetic differences between different subpopulations are small and there is considerable overlap between them. The current overall estimate (2009), taken by summing estimates for different subpopulations, is of a global population of 20 000–25 000. Around 65% of the population either occurs entirely in Canada or is in populations that are shared by Canada and adjacent territories (Alaska and Greenland).

Various attempts were made from the 1950s to the 1970s to produce global population estimates by extrapolating from surveys or den counts in limited parts of the range. These produced estimates ranging from 5000 to 20 000 bears, but are not considered reliable. Because of the lack of reliable historical data it is not possible to determine quantitative trends in overall population size from historical to present level. However, it is suspected that protective measures introduced in various parts of the range, notably in Norway and the then USSR in the 1950s and 1970s, allowed the Polar Bear population to increase slowly, at least in these areas.

The population is now believed to be slowly declining. An assessment by the IUCN/SSC Polar Bear Specialist Group (PBSG) in 2009 concluded that one of the subpopulations was increasing, three were stable and eight were declining. Data were insufficient to provide any assessment of current trend for the remaining seven subpopulations. A similar exercise in 2005 concluded that two populations were increasing, five were stable, and five declining, with insufficient data to provide trends for the remaining subpopulations. On the basis of the 2005 assessment, the Polar Bear has been classified by IUCN as Vulnerable based on a suspected population reduction of greater than 30% within three generations (taken as 45 years), owing to decline in area of occupancy, extent of occurrence and habitat quality.

The projected declines in extent and quality of habitat are based on observed and predicted changes in sea ice as a result of climate change. Recent modelling of the trends for sea ice extent, thickness and timing of coverage predicts dramatic reductions in coverage over the next 50–100 years. Observations have shown marked decreases in the extent of summer sea ice coverage in the past 10 years compared to long-term averages. Future changes in sea ice, however, are not expected to be uniform across the Polar Bear's range nor to follow a straightforward trajectory in time. Moreover, to date a direct relation between such changes and the population size of Polar Bears has been demonstrated for only the Western Hudson Bay subpopulation (though such effects are expected in the near future for other populations). Other factors that may have an impact on recruitment or survival of Polar Bears include toxic contaminants, shipping, recreational viewing, oil and gas exploration, development and over-harvest. None of these other factors is believed to be a major threat to the population as a

whole at present and only climate-related loss of sea ice is identified as a population level threat.

Polar Bears are subject to a range of management measures. At the international level, all range States (including Denmark on behalf of Greenland) are members of the Agreement on Conservation of Polar Bears, which came into force in 1976. The members held their second meeting in 2009 (the first was in 1981) and agreed to hold meetings every two years thereafter. There is also a series of bilateral agreements concerning shared Polar Bear populations. Polar Bears are legally hunted under various restrictions in Canada, Greenland and Alaska (USA). Numbers taken are regulated by quota in some areas and not in others. In Norway and the western Russian Federation no hunting is allowed except for that of problem animals and defence kills. Some hunting by native people in the Chukotka (Chukchi) region of the Russian Federation is theoretically allowed under the Agreement between the USA and the Russian Federation on the Conservation and Management of the Alaska-Chukotka Polar Bear Population, which came into force in 2007. However, as of December 2009 no quota had been established and no hunting allowed.

Currently, overall legal annual harvest is between 500 and 700 bears and is generally thought to be sustainable, but harvest levels of two subpopulations shared by Canada and Greenland—one small (Kane Basin) and one large (Baffin Bay)—are believed to be unsustainable, and illegal hunting in the Chukotka region, coupled with habitat reduction, is believed to be leading to a decline in the Chukchi Sea subpopulation. Some 60–70% of the harvest is of males.

Polar Bear products are in trade. The range of different products and units of measure used in records makes it difficult to relate trade data to a number of Polar Bears in trade. However, export of products from Canada (where most Polar Bear products in trade originate) for the period 2004–2008 is believed to represent roughly 300 Polar Bears per year. In the period 1992–2006, an average of just under 200 whole skins a year was recorded as exported by Canada. Greenland introduced a voluntary temporary ban on export of Polar Bear products in 2007.

Analysis: Regarding the biological criteria for inclusion in Appendix I set out in *Resolution Conf. 9.24 (Rev. CoP14)*, the global population of Polar Bears would not appear to be small, following the guidelines for the definition of a small population set out in Annex 5 to the Resolution, which suggests a figure of less than 5000 is an appropriate guideline of what might constitute a small wild population. The Polar Bear's area of distribution extends over several million square kilometers and is clearly not restricted.

The Polar Bear's population has not undergone a marked decline in the recent past, nor is there any evidence that the current Polar Bear population represents a marked decline from a (hypothesized) historical baseline. There is general agreement that the Polar Bear population is currently declining, but the rate of decline is slow, as evinced by the lack of change in overall population estimates in the past decade, and therefore does not appear to meet the definition of a marked ongoing decline as elaborated in Annexes 1 and 5 to *Resolution Conf. 9.24 (Rev. CoP14)*.

Annex 1 of *Resolution Conf. 9.24 (Rev. CoP14)* also refers to a marked decline in the population size in the wild projected on the basis of any one of a number of factors. Annex 5 of the Resolution notes that projection involves extrapolation to infer likely future values. Any future changes in the Polar Bear population remain conjectural. The current best estimate, and the basis for the current IUCN Red List categorization of the species as Vulnerable, suggests a decline in the next three generations (taken as 45 years) of more than 30% but less than 50% (as the latter in this case would have led to a categorization of Endangered under criterion A2 of the IUCN Red List Categories and Criteria ver 3.1).

The numerical guidelines in Annex 5 to *Resolution Conf. 9.24 (Rev. CoP14)* do not explicitly address projected future declines, but suggest a general guideline for a marked recent rate of decline as 50% or more over 10 years or three generations, whichever is the longer. Assuming this guideline figure can be applied to conjectured future declines, it would appear on current knowledge that the Polar Bear does not meet any of the biological criteria for inclusion in Appendix I.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Canada, Greenland (Denmark), Norway, Russian Federation, USA	
IUCN Global Category	
Vulnerable A3c	*Assessed 2008. Categories and Criteria ver. 3.1.*

Biological criteria for inclusion in Appendix I

A) Small wild population

(i) Population or habitat decline; (ii) small sub-populations; (iii) concentrated geographically during one or more life-history phases; (iv) large population fluctuations; (v) high vulnerability

20 000–25 000 in 18 putative populations, with a 19th population possibly occurring in the central polar basin.	*Considerable overlap between putative populations exists and the genetic differences between them are small (Schliebe* et al., *downloaded Nov 2009).* *The IUCN/SSC PBSG (2009) noted: 'the total number of Polar Bears is still thought to be between 20 000 and 25 000. However, the mixed quality of information on the different subpopulations means there is much room for error in establishing that range.'*

B) Restricted area of distribution

(i) Fragmented or localized population; (ii) large fluctuations in distribution or sub-populations; (iii) high vulnerability; (iv) decrease in distribution, population, area or quality of habitat, or recruitment

Distributed throughout the circumpolar basin.	*In Canada, extent of occurrence estimated at 8.7 million km^2 and area of occupancy at 5.6 million km^2 (COSEWIC, 2008).*

Supporting Statement (SS)	Additional information
C) Decline in number of wild individuals **(i) Ongoing or historic decline; (ii) inferred or projected decline owing to decreasing area or quality of habitat, levels of exploitation, high vulnerability, or decreasing recruitment**	
Overall population size estimate has varied little in the past 15 years, although because of the extreme nature of the environmental conditions where the Polar Bear occurs, it is very difficult to characterize accurately the population or trends. Field studies over the past 30+ years indicate that the number of Polar Bears is decreasing throughout their range. The IUCN/SSC PBSG met in 2005 and evaluated the status of the Polar Bear. At that time two populations of 19 were categorized as increasing, five as stable, five as declining, six as data-deficient and one unknown. In 2009 the IUCN/SSC PBSG concluded that one of 19 subpopulations was currently increasing, three were stable and eight were declining. Data were insufficient to provide an assessment of the current trend for the remaining seven subpopulations. Polar Bears are completely dependent on sea ice which has been reduced by 8% in the past 30 years, while summer sea ice has been reduced by 15–20%. An additional decline of 10–50% of annual average sea ice extent is predicted by 2100. A half dozen climate models, the best at predicting observed changes in sea ice to date, predict the complete loss of summer sea ice in the Arctic in about 30 years. Many experts have concluded that Polar Bears will not survive in many subpopulations owing to the changes in the distribution, duration, and structure of sea ice.	*Overall population estimates have remained relatively unchanged for over 30 years. The IUCN Mammal Red Data Book (Thornback and Jenkins, 1982) gave a range of 18 500 to 27 000 in total and quoted an estimate from 1972 of around 20 000, derived by summing regional estimates. Trend at the time of writing was believed stable or increasing.* *It is difficult to assess global population levels earlier than this because the quality of information was generally poor. Various attempts were made, based on surveys of more or less limited areas, including: extrapolation from aerial surveys along the coast of Alaska in the 1950s, leading to a global estimate of 17 000–19 000 bears; extrapolation from aerial surveys in the Russian Arctic in the 1960s leading to a global estimate of 11 000–14 000; extrapolation from den counts in Russia resulting in a global estimate of 5000–10 000 in the 1960s (Uspenski, 1979).* *The current IUCN Red List Assessment (Schliebe* et al.*, downloaded Nov 2009, based on an assessment made in 2005) notes the overall population trend as declining and states: "There is little doubt that Polar Bears will have a lesser area of occupancy (AOO), extent of occurrence (EOO) and habitat quality in the future. However, no direct relation exists between these measures and the abundance of Polar Bears. While some have speculated that Polar Bears might become extinct within 100 years from now, which would indicate a population decrease of >50% in 45 years based on a precautionary approach due to data uncertainty, a more realistic evaluation of the risk involved in the assessment makes it fair to suspect population reduction of >30%." Polar Bear generation time is generally taken as 15 years but lower values have been observed.*
Trade criteria for inclusion in Appendix I	
The species is or may be affected by trade	
Polar Bear products are in trade but the range of different products and units of measure used in records make it difficult to relate trade data to an actual number of Polar Bears in trade. However, export of products from Canada (where most Polar Bear products in trade originate) for the period 2004–2008 is believed to represent roughly 300 Polar Bears per year. In the period 1992–2006, an average of just under 200 whole skins a year was recorded as exported by Canada. Greenland introduced a voluntary temporary ban on the export of Polar Bear products in 2007. More detailed information is provided in the supporting statement.	

Supporting Statement (SS)	Additional information
Other information	
	Threats
Habitat loss (see above). The available scientific and commercial information indicates that harvest, increased bear–human interaction levels, defence-of-life take, illegal take, and take associated with live-capture programmes for scientific research are occurring for several populations. Loss of habitat will be likely to exacerbate the effects of use and trade in several populations. In addition, Polar Bear mortality from harvest and negative bear–human interactions may in the future approach unsustainable levels for several populations, especially those experiencing nutritional stress or declining population numbers as a consequence of habitat change. The available scientific information indicates that disease and predation (including intra-specific predation) do not threaten the species throughout its range but may become more important in future as the effects of global warming are felt. Contaminant concentrations are not presently thought to have population level effects on most Polar Bear populations. Increased exposure to contaminants, however, has the potential to operate in concert with other factors to lower recruitment and survival rates.	*The IUCN/SSC PBSG (2009) stated: 'the greatest challenge to conservation of Polar Bears is ecological change in the Arctic resulting from climatic warming. Declines in the extent of the sea ice have accelerated since the last meeting of the group in 2005, with unprecedented sea ice retreats in 2007 and 2008." The Group confirmed its earlier conclusion that unabated global warming will ultimately threaten Polar Bears everywhere. The IUCN/SSC PBSG also recognized that threats to Polar Bears will occur at different rates and times across their range although warming-induced habitat degradation and loss are already negatively affecting Polar Bears in some parts of their range. Subpopulations of Polar Bears face different combinations of human threats. The PBSG recommends that jurisdictions take into account the variation in threats facing Polar Bears.'* *In Canada, where four of 13 subpopulations were reported in 2008 to be declining, these declines were ascribed to over-harvest in two cases (Baffin Bay, Kane Basin) and climate change in two cases (Western Hudson Bay, Southern Beaufort Sea) (COSEWIC, 2008).* *The PBSG noted that the population of Polar Bears in Baffin Bay, shared between Greenland and Canada, may simultaneously be suffering from significant habitat change and substantial over-harvest, while at the same time interpretations by scientists and local hunters disagree regarding population status. Similarly, the Chukchi Sea Polar Bear population, which is shared by the Russian Federation and the USA is likely to be declining as a result of illegal harvest in the Russian Federation and one of the highest rates of sea ice loss in the Arctic. Consistent with its past efforts to co-ordinate research and management among jurisdictions, the PBSG recommended that the Polar Bear populations in Baffin Bay and the Chukchi Sea be reassessed and that harvests be brought into balance with the current sustainable yield (IUCN/SSC PBSG, 2009).* *Polar Bear harvest is male-biased (60–70% of the take) (IUCN/SSC PBSG, 2009). Some concern has been expressed that excessive take of males could lead to an impairment in recruitment owing to an Allee effect (Molnár* et al.*, 2008), although such impairment has yet to be demonstrated in a wild population of Polar Bears.*
	Conservation, management and legislation
Detailed information is provided in the supporting statement.	*The following information (much of which is also in the supporting statement), is derived from the website of the IUCN/SSC PBSG.*

Supporting Statement (SS)	Additional information
	*Within **Canada**, the authority for the management of Polar Bears lies with the seven provincial and territorial jurisdictions in which they occur. While the governments of the Provinces and Territories have the authority for management, the decision-making process for some is shared with Aboriginal management boards (e.g. Nunavut Wildlife Management Board) as part of the settlement of land claims. In most Canadian jurisdictions, hunting seasons, quotas, and protection of family groups have been legislated; however, only Manitoba prohibits the hunting of Polar Bears. Although Ontario and Québec have no enforced quotas, only native people may hunt Polar Bears. Over 80% of the hunting of Polar Bears in Canada occurs in Nunavut and the Northwest Territories, where management agreements and/or memoranda of understanding have been developed with local communities to ensure that all human-caused mortality is sustainable. Programmes to monitor and analyse the annual human-caused mortality of Polar Bears are in place in all jurisdictions. Recently the government of Nunavut reduced the harvest quota in Western Hudson Bay because of a documented population decline (IUCN/SSC PBSG, 2009).* *Harvest of Polar Bears in **Greenland** was undertaken without quotas until 2006, when the Government of Greenland introduced quotas. National regulations for Polar Bear management are fixed by law in* Executive Order no. 21 of 22 September 2005 on the Protection and Hunting of Polar Bears. *The Government of Greenland sets annual quotas taking into account: International agreements, biological advice provided by Greenland Institute of Natural Resources, harvest statistics, and consultations with the Hunting Council. The quota is divided between relevant municipalities by the Agency of Fisheries, Hunting and Agriculture in consultation with the Hunting Council, and they are set for three years. During the three years of regulations, the quotas have been reduced to ensure sustainable harvest. In 1985, Greenland obtained authority to issue CITES permits. In early 2007, the CITES Management Authority obtained a negative non-detrimental finding for Polar Bear, as a result of which Greenland introduced a voluntary temporary ban on export of Polar Bear products. In October 2009, the governments of Greenland, Nunavut and Canada signed a memorandum of understanding with the purpose of ensuring conservation and sustainable management of the Kane Basin and Baffin Bay populations that are shared between Canada and Greenland.* *Polar Bears are fully protected in **Norway** and can only be killed in self-defence.* *The Polar Bear was totally protected in **Russia** (USSR) in 1957. The only permitted take of Polar Bears is catching cubs for public zoos and circuses. An Agreement between the Government of the USA and the Government of the Russian Federation on the conservation and management of the Alaska-Chukotka Polar Bear population was signed in 2000. The Agreement came into force in September 2007. According to the Agreement, native renewal of limited subsistent take of Polar Bears by native*

Supporting Statement (SS)	Additional information
	people of Chukotka (Russia) is possible. However, at present a quota has not been fixed (which is obligatory for such hunting according to the Agreement) and hunting has not yet started. *Under the 1972* Marine Mammal Protection Act of 1972 *(MMPA) hunting of Polar Bears in the **USA** is prohibited except by coastal-dwelling Alaska Natives for subsistence and handicraft purposes, provided the take is not wasteful. Under the MMPA, harvest quotas are not set unless Polar Bear populations are defined as "depleted" (below optimum sustainable population level). The U.S. Fish and Wildlife Service has primary responsibility for harvest management, and works co-operatively with Alaska Native user groups (e.g. the Alaska Nanuuq Commission, North Slope Borough) to address harvest issues co-operatively under existing user group agreements. In addition, international co-ordination is required for harvest management since both the southern Beaufort Sea stock (SBS) and the Chukchi/Bering seas stock (CS) are shared with Canada and the Russian Federation, respectively. In 1988, the Inupiat of Alaska and Inuvialuit of Canada developed and implemented an Inupiat-Inuvialuit (I-I) conservation agreement for the SBS population. The Agreement was re-negotiated, and signed again in 1999. It establishes sustainable harvest limits and allocates quotas (which are reviewed annually) between the jurisdictions. It is not legally binding but has resulted in greater involvement by user groups in harvest management and conservation, as well as in generally sustainable harvest levels, although the reduction in estimated size of the SBS population is likely to require reduction of existing harvest levels in the future.*

Similar species

Captive breeding/artificial propagation

Other comments

Reviewers:
J. Aars, E. Born, A. Derocher, M.E. Obbard,I. Stirling, Ø. Wiig

Remove the following paragraph from the annotation regarding the populations of *Loxodonta africana* of Botswana, Namibia, South Africa and Zimbabwe:

5 h) ***no further proposals to allow trade in elephant ivory from populations already in Appendix II shall be submitted to the Conference of the Parties for the period from CoP14 and ending nine years from the date of the single sale of ivory that is to take place in accordance with provisions in paragraphs g) i), g) ii), g) iii), g) vi) and g) vii). In addition such further proposals shall be dealt with in accordance with Decisions 14.77 and 14.78.***

Include an annotation regarding all populations of *Loxodonta africana*, as follows:

"No further proposals concerning trade in African elephant ivory, including proposals to downlist elephant populations from Appendix I to Appendix II, shall be submitted to the Conference of the Parties for the period from CoP14 and ending twenty years from the date of the single sale of ivory that took place in November 2008. Following this twenty year resting period, any elephant proposals shall be dealt with in accordance with Decisions 14.77 and 14.78."

Remove paragraph (f) in the annotation to the CITES Appendices governing the elephant populations of Namibia and Zimbabwe:

trade in individually marked and certified ekipas incorporated in finished jewellery for non-commercial purposes for Namibia and ivory carvings for non-commercial purposes for Zimbabwe.

Proponents: Congo, Ghana, Kenya, Liberia, Mali, Rwanda and Sierra Leone

Background: The African Elephant *Loxodonta africana* was included in Appendix II in 1977 and transferred to Appendix I in 1989. The populations of Botswana, Namibia and Zimbabwe were transferred to Appendix II in 1997, and the population of South Africa in 2000. These transfers were subject to detailed annotations that were further modified during subsequent meetings of the Conference of the Parties. The current annotation was agreed at CoP14. With regard to trade in raw ivory, it allowed those African Elephant range States whose populations are already included in Appendix II to dispose of agreed quantities of stockpiled ivory in a one-off sale, under a series of restrictions. One of these was that those range States (Botswana, Namibia, South Africa and Zimbabwe) should not submit further proposals to allow trade in elephant ivory for a period of nine years after the single sale of their ivory stockpiles. This restriction does not apply to other African Elephant range States, which all have their elephant populations in Appendix I and can therefore submit proposals concerning trade in African Elephant ivory.

Further background to the African Elephant under CITES prior to CoP14 is provided in the following link:
http://intranet.iucn.org/webfiles/doc/SSC/CoP14/AnalysesEN/intro_elephant_analyses.pdf

Discussion: The two parts of the proposal will be dealt with separately under **1.** and **2.** below.

1. Replacement of the existing paragraph h) of annotation 5, regarding the one-off sale of ivory with a general statement regarding the future submission of African Elephant proposals

There are two major issues with this part of the proposal. The first concerns whether it is appropriately dealt with as a proposed amendment to the Appendices;

the second is whether it would be practical in whatever form it were considered.

Appropriateness as an annotation under *Resolution Conf. 11.21 (Rev. CoP14)*
The Appendices comprise lists of species the trade in specimens of which is regulated under the Convention. Many of the entries in the Appendices are annotated to specify or clarify the type of specimen actually regulated, this being allowed in some cases under the Convention. At CoP11 and again at CoP14, the Parties considered the use of annotations in the Appendices, producing *Resolution Conf 11.21 (Rev. CoP14)*. They recognized two kinds of annotations: reference annotations and substantive annotations.

Reference annotations are for information purposes only and include those relating to nomenclature and whether a species is possibly extinct or not.

Substantive annotations are considered to be integral parts of the species listing. There are two kinds. One specifies the inclusion or exclusion of designated geographically separate populations, subspecies, species, groups of species, or higher taxa, which may include export quotas. The other specifies the types of specimen or export quota. No other kind of annotation is recognized, nor is it easy to see how any other kind of substantive annotation could be regarded as consistent with the provisions of the Convention as they currently stand.

The proposed paragraph in proposal Prop 6 is a statement about the future submission of proposals to amend the Appendices. It does not specify the inclusion or exclusion of any species or population, nor does it specify types of specimen or export quota. It would appear that, following *Resolution Conf. 11.21 (Rev. CoP14*), the proposed paragraph cannot constitute an annotation to the Appendices and cannot meaningfully be assessed as such.

The wording proposed is similar in form to the already existing wording of paragraph h) of annotation 5, agreed at CoP14. This paragraph would also appear not to be in conformity with *Resolution Conf 11.21 (Rev. CoP14)*.

Practicality of implementation
The Parties could, in theory, agree to the substance of this proposal in a Resolution or Decision, rather than as an annotation to the Appendices. Even if they were to do so, it is difficult to see how this would prevent a Party submitting a relevant proposal under the terms of Articles XV and XVI of the Convention text at any time, should it decide to do so. Unless the text of the Convention were amended (as is allowed by Article XVII), it would appear that the Secretariat and the Parties would then be obliged to follow the procedures set out in the appropriate Articles to consider, and if necessary vote, on the proposal.

Moreover, were the substance of this proposal to be accepted as a Decision, a Resolution or an annotation to the Appendices, any Party could submit a revised version for consideration at any meeting of the CoP (or, if an annotation, at any time), creating a challenge to its sustained implementation. This proposal is itself intended to replace an annotation that was agreed at CoP14 to stand for nine years from the time of sale of the ivory referred to in paragraph g) of annotation 5 (i.e. until Nov 2017, as the sale took place in Nov 2008), demonstrating the difficulty of sustaining an agreement of this kind.

2. Remove paragraph (f) in the annotation to the CITES Appendices governing the elephant populations of Namibia and Zimbabwe: trade in individually marked and certified ekipas incorporated in finished jewellery for non-commercial purposes for Namibia and ivory carvings for non-commercial purposes for Zimbabwe.

Paragraph (f) of existing annotation 5 governing the African Elephant populations of Botswana, Namibia, South Africa and Zimbabwe in Appendix II allows non-commercial trade in some kinds of worked ivory from Namibia and Zimbabwe. Under the proposal, these kinds of worked ivory would become treated as if they were specimens of species included in Appendix I.

The penultimate paragraph of existing annotation 5 states:

> *"On a proposal from the Secretariat, the Standing Committee can decide to cause this trade to cease partially or completely in the event of non-compliance by exporting or importing countries, or in the case of proven detrimental impacts of the trade on other elephant populations".*

Namibia

Information in the supporting statement indicates that Namibia suspended all trade in *ekipas* (more correctly *omakipa*) as of 1 September 2008, "*until a new law was passed, regulating domestic trade in ivory, including registration of ivory importers, traders and carvers, and certification of ekipas*".

The supporting statement does not provide any documentation concerning illegal trade in *ekipas*, nor has the CITES Secretariat raised any issues with respect to ivory trade in Namibia in its documentation on ivory trade to the Standing Committee since CoP14.

Zimbabwe

The Secretariat has yet to make a formal proposal to the Standing Committee concerning non-compliance with provisions of the annotation, but it has raised serious concerns at the 58th meeting of the Standing Committee in June 2009, in document SC58 Doc. 36.2 about the trade in worked ivory in Zimbabwe. In that document, the Secretariat reported that it:

> *"had reason to question whether the controls are being implemented adequately, as it is aware of at least two incidents where raw ivory has been exported, accompanied by the export permits that traders are authorized to issue for trade in ivory carvings. This demonstrates not only fraud on the part of traders but also that export permits and ivory are not being examined by Customs officers at the time of export, which is a mandatory requirement in Zimbabwe's control system. The primary concern of the Secretariat is, however, that there seems little or no evidence that the prosecution or judicial authorities in Zimbabwe are responding in a meaningful manner to such cases. The Secretariat is aware of a major case that has apparently never reached conclusion in court and several others where those responsible for illegal trade have been identified, yet no one appears to have been penalized. The Secretariat suspects that the current lack of penalization of illegal activities offers no deterrent whatsoever to unscrupulous persons".*

The CITES Secretariat is continuing to engage with Zimbabwe on this matter and has indicated that another report will be directed to the Standing Committee (Milliken, 2010).

In document CoP15 Doc. 44.1 Monitoring of Illegal Trade in Ivory and Other Elephant Specimens, the Secretariat further reports that it "*has also engaged on a regular basis with Zimbabwe, which seems to have been plagued by some licensed domestic traders who fraudulently exploited the legal domestic market*".

Zimbabwe has suspended ivory auctions with all licensed traders, cutting off the only sanctioned supply of ivory to local manufacturers, and is engaged in a process to review its regulatory framework for trade in worked ivory in the country. It is believed that domestic trade in ivory will remain suspended until the CITES Secretariat is satisfied that the situation is under control (Milliken, 2010).

Reviewers:

H. Dublin, TRAFFIC East/Southern Africa.

Deletion of Mariana Mallard *Anas oustaleti* from Appendix I

Proponent: Switzerland, as Depositary Government, at the request of the Animals Committee

Summary: The Marianas Mallard "*Anas oustaleti*" is a form of duck once found in the Mariana Islands of Guam (USA), Tinian and Saipan (both part of the Commonwealth of the Northern Mariana Islands). It is now considered to be extinct. Its taxonomic status is a matter of debate. It may have been a form of *Anas platyrhynchos* (Mallard) or (generally regarded as more likely) a hybrid of Mallard and some other species, probably the Pacific Black Duck *Anas superciliosa*. It is not recognised as a species in the current CITES standard reference for birds, nor is it considered a true species by BirdLife International, the Red List Authority for Birds, and is not included in the IUCN Red List of Threatened Species.

The Marianas Mallard was a relatively large duck of variable appearance found in freshwater marshes and swamps on Guam, Tinian and Saipan. Its total population is thought always to have been small, because of very limited habitat availability. It was affected by habitat loss and overhunting and was last seen in the wild in 1979. No birds were sighted during extensive surveys in the 1980s and the last known specimen died in captivity in 1981 after failed attempts at captive breeding. Researchers and managers of Guam and the Commonwealth of the Northern Mariana Islands agree that the Marianas Mallard has gone extinct, as does the US Fish and Wildlife Service (USFWS) who removed "*A. oustaleti"* from their Endangered Species Act (ESA) in 2004 for this reason.

The only records of trade in "*Anas oustaleti"* in the CITES trade database are of one specimen exported from Canada to the USA in 1993, and of 10 feathers exported from the USA to Canada in 2005. These two exports were undoubtedly of dead biological specimens and both post date the last sightings of the duck in the wild. It is unlikely that the Marianas Mallard would be subject to trade in the highly unlikely event of its rediscovery and no evidence has been found to suggest that it has been illegally traded.

The proponent seeks to delete "*Anas oustaleti"* from Appendix I on the basis that it satisfies the "possibly extinct" criterion set out in Annex 5 of *Resolution Conf. 9.24 (Rev. CoP14*, which states "a species is 'possibly extinct' when exhaustive surveys in known and/or suspected habitats, and at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual".

Analysis: It appears that "*Anas oustaleti*" meets the criterion for "possibly extinct" as no specimen has been seen in the wild since 1979 and surveys have been carried out over an appropriate time-frame for its life cycle and life form, as required by *Resolution Conf. 9.24 (Rev. CoP14)* Annex 5. Annex 4D specifies that species that are regarded as '"possibly extinct" should not be deleted from Appendix I if they "may be affected by trade in the event of their rediscovery". There is no evidence that the duck would be affected by trade in the highly unlikely event of its rediscovery, so it would appear that this precautionary measure is satisfied.

Under *Resolution Conf. 9.24 (Rev. CoP14)*, for a hybrid to be eligible for inclusion in the Appendices, it must form a distinct and stable population in the wild (paragraph g under "RESOLVES"). Assuming that the Marianas Mallard was in fact a hybrid, its variable appearance would indicate that it did not form a stable population in the wild. It would appear therefore that it has (or had) no place in the Appendices irrespective of its demise.

Supporting Statement (SS)	Additional information
Taxonomy	
Synonym: *Anas platyrhynchos oustaleti*	
Anas oustaleti was first described by Salvadori (1894) based on six specimens, which were collected from Guam in 1887 and 1888.	"Anas oustaleti" *was first reported in 1856 by Bonaparte based on one specimen and later described by Salvadori in 1894 (Yamashina, 1948).*
Anas oustaleti was believed to be a subspecies that originated as a hybrid between *Anas platyrhynchos* (Mallard) and *Anas superciliosa* (Grey Duck). These two species have also been reported to hybridize in New Zealand.	*There has been debate and confusion over the taxonomy. Some ornithologists believe "*Anas oustaleti" *is a hybrid while others think it is a subspecies of* A. platyrhynchos *(Livezey, 1991).*
Integrated Taxonomic Information System (ITIS) consider *Anas oustaleti* as an invalid name and note it as a hybrid of the above-named species.	*Reichel and Lemke (1994) noted that in 1944 "*Anas oustaleti" *was generally considered a species but more recently had been considered a subspecies of* A. platyrhynchos *that originated as a hybrid from* A. superciliosa *and* A. platyrhynchos.
At the14th meeting of the Conference of the Parties (CoP14) the taxonomic and nomenclatural references listed in the Annex to *Resolution Conf. 12.11 (Rev. CoP14)* were adopted as the official standard references for species included in the CITES Appendices. In June 2008, the Management Authority of the USA wrote to the Secretariat regarding some inconsistencies between nomenclature in the CITES Appendices and the taxonomic and nomenclatural references adopted at CoP14. It indicated that *Anas oustaleti* was not found in the reference for birds.	The Howard and Moore Complete Checklist of the Birds of the World *(Dickinson, 2003), the current CITES standard reference for birds, does not recognize "*Anas oustaleti" *as a species, nor do BirdLife International who regard it as a hybrid of* A. platyrhynchos *and* A. superciliosa *and therefore do not include it in their global checklist of birds (Butchart, 2009). Sibley and Monroe (1990) cited Johnsgard (1979: 470) as the basis for regarding "*A. oustaleti" *as probably a hybrid and added that hybridization of* A. superciliosa *with introduced* A. platyrhynchos was extensive in New Zealand. *Yamashina (1948) considered "*A. oustaleti" *a hybrid swarm of* A. platyrhynchos *and* A. poecilorhyncha *(including* superciliosa*).*
	Wiles (2009) notes that the fact that the literature indicates that Mariana Mallards were variable in appearance would seem to make the term "stabilized" inappropriate. The ducks formed their own breeding population in the southern Marianas and thus were not first generation hybrid birds in the traditional sense that a hybrid results from the crossing of genetically different parents.
Range	
Endemic to the Mariana Archipelago and has been recorded in the Territory of Guam (USA) and in the Commonwealth of the Northern Mariana Islands (CNMI;USA).	
IUCN Global Category	
Not included in the *IUCN Red List of Threatened Species.*	*"*Anas oustaleti*" has not been assessed by the* IUCN Red List of Threatened Species *as it is not considered a species by BirdLife International, the Red List Authority for Birds (Butchart, 2009).*

Biological criteria for inclusion in Appendix I

A) Small wild population

(i) Population or habitat decline; (ii) small sub-populations; (iii) concentrated geographically during one or more life-history phases; (iv) large population fluctuations; (v) high vulnerability

Anas oustaleti is or was endemic to the Mariana Archipelago and has been recorded in the Territory of Guam and in the Commonwealth of the Northern Mariana Islands (CNMI). Confirmed habitats include: the islands of Guam, Tinian, and Saipan. There have been two unconfirmed sightings of "unidentified ducks" on Rota island and remains of an *Anas* sp. were found during an excavation on Rota.

Historically populations of *Anas oustaleti* have been reported to be small. Accounts have suggested that the Mariana Mallard was relatively more abundant on Tinian, followed by Saipan, and least abundant on Guam. The last recorded sighting of the Mariana Mallard on Guam was in 1967, despite wetland surveys carried out from the late 1960s to the 1980s.

In the 1940s, two flocks of 50–60 *Anas oustaleti* were recorded at two locations in Tinian, the largest-ever documented sighting. However, an estimate in 1945 suggested just 12 specimens remained on Tinian. The small populations on Tinian and Saipan were thought to persist until the late 1970s. A study in 1978–1979 estimated the total population of "*A. oustaleti"* to be 20. In 1979, the population appeared to have dropped to fewer than 12 and since 1979 there have been no confirmed sightings.

Wetland habitats were surveyed intermittently, 1982–1984, with no records of *Anas oustaleti*. Extensive and systematic surveys of the CNMI were also conducted 1983–1989 on wetland habitats, with no sightings or vocalizations recorded, leading to the conclusion that "*A. oustaleti"* had gone extinct. More recently surveys focusing on other species have revealed no sightings of "*A. oustaleti"*.

Anas oustaleti was removed from the USA's ESA List of Endangered and Threatened Wildlife on 23 February 2004 because it was considered extinct by numerous scientists. Researchers and managers of Guam and the CNMI also believe that "*A. oustaleti"* is now extinct. 'The supporting statement concludes "In summary, all available information indicates that the Mariana Mallard is extinct".

*As no permanent wetlands or ephemeral wetlands (of >0.2ha) occur on Rota it is unlikely that "*Anas oustaleti*" ever resided or reproduced on Rota (Reichel & Lemke, 1994).*

B) Restricted area of distribution

(i) Fragmented or localized population; (ii) large fluctuations in distribution or sub-populations; (iii) high vulnerability; (iv) decrease in distribution, population, area or quality of habitat, or recruitment

Anas oustaleti was never considered abundant, owing to its restricted habitat availability. The ducks were found at small freshwater marshes and swamps. In the past 50–100 years, these have declined greatly and become subject to

Island species tend to suffer particularly high rates of decline because of their vulnerability to introduced predators and diseases, their often small population size, small geographic range and low fecundity (Purvis et al*., 2000).*

fragmentation owing to conversion into rice paddies, use for discharging sugar mill wastes and drainage/filling of lakes as a result of urban development.	*Reichel and Lemke (1994) observed that the reduction and fragmentation of wetland habitats probably allowed easier access to the habitats of "*A. oustaleti" *and therefore increased hunting.*

C) Decline in number of wild individuals

(i) Ongoing or historic decline; (ii) inferred or projected decline on the basis of decreasing area or quality of habitat, levels of exploitation, high vulnerability, or decreasing recruitment

(i) Numbers of wild specimens have seemingly decreased to the point of extinction. For information on (ii), see B) above. Levels of decline were intensified by overhunting.	

Trade criteria for inclusion in Appendix I

The species is or may be affected by trade

During the period 1975–2007, one specimen in 1993 and a single shipment of 10 feathers in 2005 were recorded in international trade. These two imports are not likely to have involved live specimens of the bird.	*The specimen reported as imported to the USA from Canada in 1993 was of unknown source and for unspecified purpose. The 10 feathers reported as exported from the USA to Canada in 2005 were recorded to be of ranched origin and exported for commercial purposes (CITES trade database).* *It is possible that the 10 feathers were obtained from the specimen imported into the USA in 1993, or that both records were the result of misidentification.*

Other information

Threats

Habitat loss was regarded as the primary cause of the suspected extinction of *Anas oustaleti*. Since colonization of the Mariana Islands, threats have included introduced predators such as rats and cats, although predation and disease have not been identified as key contributors to the decline of *Anas oustaleti*. *Anas oustaleti* was subject to overhunting for food. Despite no hunting having been permitted on Tinian and despite "*A. oustaleti*" having been listed as endangered by the Trust Territories and the Services, lack of enforcement meant hunting persisted.	*According to the Fish and Wildlife Information Exchange Division (1996), habitat loss through land development projects such as the building of airports, military bases, roads, tourist facilities and housing developments—noticeably, the destruction of a marsh in Saipan previously home to a breeding population of "*A. oustaleti"*—are thought to have had a negative impact on the population of "*A. oustaleti" *on Saipan and Guam.* *According to Reichel & Lemke (1994), potential predators were cats, rats, dogs, pigs, freshwater eels and monitor lizards.* *Residents of Saipan reported considerable hunting of ducks by residents and migrants (Pratt* et al*, 1979).*

Conservation, management and legislation

Anas oustaleti was listed in CITES Appendix I at the Plenipotentiary Conference in 1975.	"Anas oustaleti" *was protected by the* Lacey Act*, making it unlawful to import, export, sell, receive, acquire or purchase any wild specimen, alive or dead and including parts and derivatives (Fish and Wildlife Information Exchange Division, 1996).*

Anas oustaleti was listed as endangered by the Governments of Guam, the Trust Territory of the Pacific Islands in 1976 and by the USFWS in 1977. Extensive surveys were carried out to establish the likelihood of extant specimens throughout the 1980s. It was removed from the USFWS list of endangered species in 2004 as it was considered extinct.	

Similar species

There are a number of similar-looking species, including: Laysan Duck or Laysan Teal *Anas laysanensis*, Grey Duck *Anas superciliosa*, Mallard *Anas platyrhynchos* and Meller's Duck *Anas melleri*.	Anas laysanensis *is included in Appendix I.*

Artificial Propagation/Captive breeding

An attempt to save *A. oustaleti* from extinction was made in 1979 when a pair of birds was taken into captivity for reproduction purposes. This was unsuccessful and the last captive specimen died in 1981.	*No records were found to suggest "*Anas oustaleti" *had been successfully bred in captivity.*

Other comments

At the 24th meeting of the Animals Committee in 2009, the Committee discussed a proposal to delete *Anas oustaleti* from Appendix I because it was believed to be extinct. The Committee agreed that a proposal to delete this taxon from the Appendices would be prepared.	

Reviewers:
S. Butchart, T. Inskipp, TRAFFIC International, G. Wiles, G. Young.

Transfer of Morelet's Crocodile *Crocodylus moreletii* from Appendix I to Appendix II with a zero quota for wild individuals

Proponents: Mexico and Belize

Summary: Morelet's Crocodile *Crocodylus moreletii* is a small to medium-sized crocodilian that occurs in freshwater lagoons, swamps, streams and backwaters in forested areas or those with dense waterside vegetation in Belize, Guatemala and Mexico. It normally first breeds at between six and eight years of age and at a length of 1.5 m, although younger, smaller individuals may also sometimes breed. Clutch size averages 35. Longevity is thought to be 30 years or more. It has been included in Appendix I since 1975.

The species may form essentially one population, although this remains unproven. Its potential area of distribution covers some 450 000 km^2, of which around 400 000 km^2 is in Mexico. Analysis of maps and remote sensing data indicates around 50 000 km of riverbank and shoreline of permanent lakes within the range in Mexico. Around half of the range in Mexico has original vegetation cover, within which there is an estimated 25 000 km of riverbank and lake shore that is believed to constitute optimal habitat for the species. There is less information on the rest of the range but estimates of available habitat are of around 3300 km in Belize and 7000 km in Guatemala. However, in Belize only parts of the country have been adequately surveyed, and in Guatemala surveys have also been inadequate. Habitat degradation is believed to have seriously affected two thirds of suitable habitat in Guatemala.

By the 1970s, the population of Morelet's Crocodile was evidently severely reduced, the decline being chiefly ascribed to hunting for hides and meat. Commercial hunting of the species was banned in Mexico in 1970 and the species has been protected in Belize since 1981, and in Guatemala at least since 1999. Populations, at least those in Mexico, are now believed to have recovered considerably. The total population is estimated by the proponent to be around 100 000, of which around 20 000 are adults; these estimates being based in part on surveys carried out in Mexico between 2000 and 2004. The IUCN Red List assessment in 2000 estimated the mature population at more than 10 000 individuals at that time. The species continues to be affected by habitat degradation, native predator species, and hybridization with *Crocodylus acutus,* but at least in Mexico these are not believed to constitute major threats at present. The species is currently categorized as Lower Risk/Conservation Dependent by IUCN.

The vast majority of recorded international trade in the past 10 years has originated in Mexico, from where export of around 1200 per year skins of captive origin has been reported between 2001-2007. Currently, commercial exploitation of Morelet's Crocodile in Mexico can legally only involve animals born and raised in captivity (closed-cycle operations, and beyond the second generation) of Wildlife Management Units known as UMAs. Mexico has registered three commercial captive breeding facilities for this species in line with *Resolution Conf. 12.10 (Rev. CoP14)* and uses the universal system for the identification of crocodilian skins under CITES (*Resolution Conf. 11.12*). The farms have a large population of the species, with closed-cycle breeding, which appears to satisfy the market demand nationally and internationally. Since 2000, the national harvest authorized in Mexico amounts to fewer than 2000 skins a year. The total potential production is reported to be around 16 500, which could provide about 10 100 skins per year. There has been limited export from Belize of specimens for scientific purposes. Reported seizures of illegally traded specimens have been at a low level.

Mexico is in the process of developing comprehensive monitoring and management systems for the species; however, the situation in Belize and Guatemala is not as clear.

The species can generally be distinguished in trade from other similar species by morphological features of the skin; however, it is not yet clear whether hybrids with *C. acutus* can be distinguished from pure *C. moreletii*.

The proponent seeks to transfer *Crocodylus moreletii* from Appendix I to Appendix II with a zero quota for wild specimens.

Analysis: *Crocodylus moreletii* has a total population estimate of 10 000–20 000 mature individuals. It has a large potential area of distribution, within which there is at least 25 000 km believed to constitute optimal habitat. There has been no recent marked decline in numbers, nor is any such decline projected; indeed, the population is believed to have increased considerably in the past 30–40 years. The species would therefore appear no longer to meet the biological criteria for inclusion in Appendix I.

Annex 4 of *Resolution Conf. 9.24 (Rev. CoP14)* sets out precautionary measures for the transfer of species from Appendix I to Appendix II. The current proposal is for a zero export quota for wild specimens, so that the measures set out in paragraph A 2 c and attendant paragraphs in Annex 4 apply. Under these, effective enforcement controls must be in place. Mexico has been legally exporting specimens of captive-bred *Crocodylus moreleti* for some years and has a series of controls in place, including the universal tagging system for the export of crocodilian hides under CITES. Controls in Belize and Guatemala are less clear. However, little illegal trade has been recorded from any range State in recent years. Under Annex 4 of *Resolution Conf. 9.24 (Rev. CoP14)* any future change from the zero quota for wild specimens would require a proposal to be submitted to the Conference of the Parties.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Belize, Guatemala, Mexico	
IUCN Global Category	
Lower Risk/Conservation Dependent (Assessed 2000, Criteria version 2.3)	

Biological criteria for inclusion in Appendix I

A) Small wild population

(i) Population or habitat decline; (ii) small sub-populations; (iii) concentrated geographically during one or more life-history phases; (iv) large population fluctuations; (v) high vulnerability

The IUCN/SSC Crocodile Specialist Group found the species was present in more than 40 localities in the Gulf of Mexico. Surveys and observations indicated moderate densities, the presence of the species in all historic localities, and more than 10 000 mature individuals in the wild.	*The Red List assessment and the information in the SS referring to surveys and population estimates are not applicable to Guatemala, where there have been no recent comprehensive surveys and severe and increasing habitat degradation would seriously affect any population estimates (Castañeda, 2009).*
Surveys and observations have indicated moderate densities and presence of the species in all historic localities. The index of abundance for *Crocodylus moreletii* in Mexico is 3.16 individuals per km. Although not a strict or direct comparison, the magnitude of the index for the species in Mexico is similar to that estimated for Belize (2.63 individuals per km) and Guatemala (2.078 individuals per km). The relative abundance indices were compared with the length of optimum habitat in	*In Belize, Stafford* et al. *(2003) reported numerous individuals, representing a wide range of size classes in the Macal River watershed in 2000 and 2001. Dever* et al. *(2002) studied population genetics for the species in Belize. Their findings suggested a relatively high level of migration among populations and were consistent with an isolation-by-distance model of gene flow.*

Supporting Statement (SS)	Additional information
Mexico (25 227 km). For Guatemala, this information was inferred from the literature (6994.5 km) and for Belize, from geography (3347 km). For Mexico, estimates of the potential number of adult *C. moreletii* in the wild were made by extrapolating from the percentage of adults observed in Project CoPan samples (surveys carried out between 2000 and 2004) (63 localities, 19% of individuals belonged to Class IV, size >1 500 m, i.e. breeding adults). That restriction was applied generally to the percentage of the adult population with an estimated range in the case of Guatemala and Belize. The results indicate an overall estimate of 102 434 individuals of all ages in the wild for the entire range of the species, of which 19 462 individuals were adults.	
B) Restricted area of distribution	
(i) Fragmented or localized population; (ii) large fluctuations in distribution or sub-populations; (iii) high vulnerability; (iv) decrease in distribution, population, area or quality of habitat, or recruitment	
For Mexico, the potential range is estimated at 396 455 km². With the addition of the Peten region of Guatemala and Belize, the total potential area for *C. moreletii* includes about 450 000 km².	
C) Decline in number of wild individuals	
(i) Ongoing or historic decline; (ii) inferred or projected decline as a result of decreasing area or quality of habitat, levels of exploitation, high vulnerability, or decreasing recruitment.	
	There seems to be little information about the historical status of the species. For many years after its original description it was overlooked, treated as indistinguishable from Crocodylus acutus*, until its rediscovery in Belize and confirmation of its validity as a species by Schmidt (1924). Populations were greatly reduced in many areas owing to uncontrolled hide hunting, which took place principally in the 1940s and 1950s (Ross, 1998). In the 1920s, an average of 1000 hides were sold per day at a market in Villahermosa, Tabasco, Mexico (Alvarez del Toro, 1974).*
In Mexico, during the Spanish conquest in the 16th century, there was a massive clearing of forests to farm cattle and intensify agriculture in the Gulf Coast. In the past 60 years, there has been an increase in infrastructure in areas of the range of *Crocodylus moreletii*. Since 1988, the decree of *Ley General de Equilibrio Ecológica y Protección al Ambiente* (LGEEPA) established restrictions on land use change, and any new project must meet strict protocols for environmental impact assessment in order to be approved. The Project CoPan recorded suitable habitat for crocodiles in 35 (55%) of 63 locations in different parts of its range in Mexico, and 15 of them (24%) even proved excellent. Based on these data, a correlation analysis showed that, apparently, there is no strict relationship between habitat quality and the observed number of crocodiles, as there was continued presence of the species even in areas with poor or intermediate habitat quality, and in areas subject to	*In Mexico, Powell (1973) reported populations as being much depleted in Tamaulipas and Veracruz. Campbell (1972) estimated a minimum population of 200 in the Lago de Catamaco area in Veracruz. Groombridge (1982) noted that the species was regarded as depleted and locally extinct (e.g. in the Los Tuxtlas region of Veracruz), but that breeding populations still occurred. Small- to medium-sized animals were not uncommon in parts, but large animals were very scarce. Small remnant populations in Veracruz were reported by Pérez-Higareda (1979). More recent reports suggested that populations were recovering to some degree and viable populations were found in several reservoirs in north-eastern Mexico. The populations in Tabasco and Campeche were thought to be severely threatened, but others in southern Chiapas and Quintana Roo were reportedly not endangered (Thorbjarnarson, 1992). A more recent summary of the species's status in Mexico was provided by Sánchez and*

Supporting Statement (SS)	Additional information
disturbance. Since the completion of the Project CoPan, there have been several local studies that suggest that the presence and abundance of the species is stable. The species is currently present throughout its natural range at reasonably high levels of abundance. This is true even for those areas of the country (Tabasco and Veracruz) where historical over-exploitation of the species is known to have occurred. The information obtained by the project in Mexico, along with data from literature pertaining to Belize and Guatemala, was used to develop a Population Viability Analysis (PVA), which indicated an 86% chance of survival of the species after 500 years.	*Álvarez-Romero (2006), which indicated that populations were generally in a satisfactory condition. Cedeño-Vázquez* et al. *(2006) recorded 23 and 16 individuals (7.7 and 5.3 crocodiles per km) in two nights in central Campeche. Sigler and Domínguez-Laso (2008) noted that knowledge about the distribution of the species had increased dramatically from 25 known localities in 1970 (Casas-Andreu and Guzman-Arroyo, 1970) to 168 in 2008.* *No data are provided on population trends over time, but an extensive monitoring programme is being designed. Data from "local studies" indicating stability in abundance should be presented. Increasing numbers of localities where the species is present is not an appropriate index of population size. With most crocodilians it has been well established that if habitats remain available and hunting pressure is reduced, populations can quickly recover. On the other hand, high hunting pressure, particularly aimed at adults can quickly reduce populations. The PVA analysis is considered to be a useful exercise, but is simply a model that can only be tested in hindsight (Dacey, 2009).*
In Belize, it seems the whole country has optimum habitat for *C. moreletii* and the type of economic development to date has not resulted in significant alterations to the species' habitat.	*In Belize, Powell (1971) reported that this species was severely depleted. More recently, Abercrombie* et al*. (1980) surveyed much of the northern half of Belize and found crocodiles (believed likely to be* Crocodylus moreletii *rather than* C. acutus*), to be generally depleted, but relatively abundant in several areas; they estimated the total population (greater than nine months of age) to be at least 2200-2500 at that time; however, nothing was known about the population status in the southern half of the country.* *Platt and Thorbjarnarson (2000) reported on spotlight surveys conducted from 1992 to 1997 to determine the population status in northern Belize. A total of 754 crocodiles were observed and 481.9 km surveyed (1.55 individuals per km). Encounter rates were highest in non-alluvial (8.20 per km) and alluvial (6.11 per km) lagoons, and were considerably lower in most rivers and creeks (0.95 per km), and coastal mangrove habitats (0.24 per km). The population sex ratio was significantly male biased (1 female: 5.3 males), although the reasons for this were unclear. Comparisons with survey data from 1979 to 1980 suggested substantial population recovery had occurred following legal protection in 1981. There were no immediate threats at that time to the continued survival of the species in Belize.*
In northern Guatemala, the Petén region is the most important for the species; since 1961 a programme of increased human settlement has caused environmental changes and increased human/crocodile interactions, causing conflict. It has been estimated that over 50% of potential *Crocodylus moreletii* habitat in Guatemala has been degraded.	*In Guatemala, Thorbjarnarson (1992) noted that prior to Lara (1988), no past survey work had been done. The total population in three lakes in the Petén in 1989 was 75 individuals. The presence of reproductive-sized females and nests suggested that the population, though depleted, was capable of recovery. Sigler (2005) recorded 20 crocodiles in 2001 along 10 km of the Usumacinta River on the Guatemala-Mexico border. Castañeda* et al*. (2000) surveyed the Laguna del Tigre National Park in Petén in* 1999 and *recorded 130 crocodiles along 87.14 km of shoreline. They noted that the densities of* Crocodylus moreletii *recorded along the Xan-Flor de Luna road and in*

Supporting Statement (SS)	Additional information
	Laguna la Pista are the highest yet recorded in Guatemala. However, since then the area, along with most other areas in the country, has been seriously degraded, resulting in probably two thirds of suitable habitat being affected (Castañeda Moya, 2009).
The species is or may be affected by trade	
Currently, all commercial exploitation of Morelet's crocodile in Mexico must compulsorily involve animals hatched and raised in captivity (closed-cycle operations, and beyond the second generation) in Wildlife Management Units known as UMAs.	
The most common parts and derivatives of *C. moreletii* reported in trade are skins, pieces of skin and skin products, but others include specimens, eggs, bodies, scales, skulls and shoes. The main exporting country for the period 2001–2007 was Mexico (8498 skins, 750 pieces of skin, 1193 skin products), followed by Belize with 116 bodies, 766 eggs and 3124 scientific specimens. The major importing countries were Japan (6170 skins), Italy (1219), Republic of Korea (560), France (375) and Spain (162). In the period between 2000 and 2009, 119 CITES export permits were issued in Mexico for a total of 12,276 skins, and it is estimated that the potential annual export from Mexico would be 2500 skins.	*Almost all trade referred to in the SS for the species was reported in the CITES trade database with source code D for Appendix-I animals bred in captivity for commercial purposes.*
There were few reported illegal movements of parts and derivatives of *Crocodylus moreletii* between 1975 and 2007 for Mexico (308 leather products and 419 pairs of shoes), Guatemala (27 pairs of shoes) and Belize (31 eggs), with the only importer being the USA. There were reports of illegal killing of *C. moreletii* in Guatemala in 1998 but the number involved was lower than 25 years previously.	

Precautionary measures

Species likely to be in demand for trade, but its management is such that the CoP will be satisfied with:

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

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

Mexico is working to design and implement a monitoring programme for populations and habitats of *Crocodylus moreletii* nationwide, taking account of the possibility that Belize and Guatemala might get involved. The programme seeks to track the experiences and outcomes of the Project CoPan and the suggestions of the CITES Animals Committee (at its 23rd meeting), in order to obtain better information on status and trends, relevant populations of the species and its habitat. The programme was developed within the "Estrategia Trinacional Belice-Guatemala-México para la Conservación y Uso Sustentable del cocodrilo de Morelet (*Crocodylus moreletii*)".	*The proposed tri-national strategy for managing the species is significant, and should include enforcement efforts to ensure no* Crocodylus moreletii *are transferred illegally across the borders between the three range States (Dacey, 2009).*

Supporting Statement (SS)	Additional information
Phase I of the project, currently under way, seeks to develop a preliminary design of the programme, taking account of the relevant areas in the range of the species, which ideally could be implemented by the three countries, based on the Project CoPan information and further research. The design will be reviewed and evaluated in a workshop (planned for January 2010). So far, the preliminary design proposes a biannual monitoring scheme, involving regular sampling throughout the range of the species. Once published, Phase II of the programme will consist of the implementation of agreed actions. The information collected in the latter will be tested periodically to produce population estimates and trends, considering the short, medium and long term.	
Currently, Mexico has no facilities to undertake wild ranching. The only establishments authorized and operating are those where the animals are raised in captivity in a closed cycle, and proved to have occurred beyond the second generation (F2). Such establishments are part of a formal system (SUMA) for Management Units for the Conservation of Wildlife (UMA), which also kept open the possibility of sustainable economic development to discourage the capture of wild individuals (e.g. ecotourism).	*Under the zero quota proposed, no wild specimens of* Crocodylus moreletii *would be exported. No use of the wild resource is indicated, and the proponent would need to return to the Parties in the future if changes are proposed to the zero quota (i.e. use programmes are implemented) (Dacey, 2009).*
Mexico has implemented several programmes to prevent and combat illegal exploitation of this species. As mentioned, with the SUMA, which is based on six basic elements: 1) register with the Department of Wildlife (DGVS-SEMARNAT, CITES Management Authority), 2) proper management of habitat, 3) monitoring of wild populations of the species in use, 4) controlled use (reports and periodic inventories of each UMA), 5) management plan approved and registered with the DGVS, and 6) certificate of production and methods of marking/labelling. SEMARNAT makes technical supervision visits to the UMA at random or if it detects inconsistencies in the management plan, population studies, surveys, inventories and periodic reports.	
For *Crocodylus moreletii* there are three tagging systems in Mexico, registered with the DGVS through inventories for the UMA. The first is inter-digital staples. The second is based on the traditional marking of scales on the tail (which is still only used by certain establishments). The third is the universal tagging system defined by CITES for export of hides.	
Regular reports from the UMA should consist of an inventory of the captive population of species subject to management (high, low), socioeconomic data for the activities they perform, and implications, contingencies and achievements based on indicators of success. This information would allow monitoring of the UMA to determine its continuity (record keeping), and assess the impact on managed populations and their habitat.	

Supporting Statement (SS)	Additional information
Management plans should include a safety programme and contingencies that describe the strategies to follow to establish measures of restoration, protection and management of specimens in case of environmental contingencies affecting the UMA (species and habitat). About 50 UMAs that handle Morelet's Crocodile have been recorded in Mexico since the 1980s, of which approximately 19 remain active today and three are registered with CITES. Mexican breeders of *C. moreletii*, with more than 15 years of experience, have indicated that no specimens on farms registered with CITES are hybrids. However, in the light of recent research in the Yucatan Peninsula, genetic studies will be undertaken on captive and wild populations to determine the possible presence of hybridization.	*No details of management in Belize or Guatemala have been provided in SS.* *Windsor* et al. *(2002) provided information on a management plan for crocodiles in Belize and Dever* et al. *(2002) thought that their work on population genetics would be useful in optimizing future management plans.*

Other information

Threats

The main threat to the species is habitat degradation, especially the reduction in prey availability and possible contamination of water bodies. Current estimates indicate that the threat is moderate in Mexico and Belize, and slightly more intense in northern Peten, Guatemala. Recently, studies performed at the molecular level have detected hybridization between *Crocodylus moreletii* and *C. acutus* in natural wild populations in the Yucatan Peninsula (mainly in coastal areas), and data suggest that some level of hybridization has always occurred, at least periodically in areas where they are sympatric. Hybridization in the wild was initially detected in Belize. The extent of hybridization is not known; however, evidence suggests that it may be more common than expected. Preliminary data suggest the establishment of feral populations of *Crocodylus moreletii* on the Mexican Pacific coast, where naturally only *C. acutus* occurs, possibly from escapes from *ex situ* breeding farms. Mexico is working to diagnose the presence and potential threat of hybridization of these species on the Pacific coast. It aims to create identification materials (morphological and molecular) and to study the population dynamics of *C. acutus*. This effort will include monitoring and removal of individuals of *C. moreletii* and hybrids, for which field teams will be trained in standardizing sampling methods and the taking of morphological data. Evidence suggests that natural factors do not pose a threat to the continuity of the species in the long term.	*Platt* et al. *(2008) found that in Belize nest losses were primarily because of flooding and Raccoon* Procyon lotor *predation.*

Supporting Statement (SS)	Additional information
Potential human influences on *Crocodylus moreletii* could be, in descending order of importance: the infrastructure construction of wetlands, construction and operation of power plants, and the operation of chemical and processing industries, where proper waste disposal is unavailable. Interactions between crocodiles and humans in Mexico occur primarily with *Crocodylus acutus* and there are few official reports involving *C. moreletii*. In the period 2001–2009 some interactions were reported, but generally the problem animals are quickly captured and relocated or transferred to Centers for Research and Conservation of Wildlife (CIVS) or UMAs for reproductive purposes or for exhibition.	
Conservation, management and legislation	
Apart from CITES, the only international legislation protecting *Crocodylus moreletii* is the US Endangered Species Act, which in 1970 listed the species as Endangered. In May 2005, Mexico handed over a proposal to US authorities to reclassify the species in accord with its current conservation status. Mexico declared a permanent closed season for commercial harvest of crocodiles in 1970; this was backed up with monitoring and enforcement in areas where the catch was concentrated, in skin treatment centres, product manufacturing centres, and at borders. In the past 10 years, Mexico has promoted and developed a policy to maintain and create protected areas, under the Natural Protected Areas System (SINAP), which affords protection to the habitat of *Crocodylus moreletii*. In September 1999, COMACROM, a consultative body to the Mexican authorities focussing on programmes targeting conservation and sustainable use of crocodiles in Mexico, was established. It includes scientists, technicians, NGOs, producers, authorities and other relevant personnel In 2000, Mexico implemented the Programa de Conservación de Vida Silvestre y Diversificación Productiva sel Sector Rural, which defines the strategic, legal and administrative framework, according to which any initiative should be linked to the use and conservation of wildlife. In July 2000, the *Ley General de Vida Silvestre* (LGVS) entered into force. The aim is to conserve wildlife and its habitat through protection and optimizing sustainable use, to maintain and promote restoration of its diversity and integrity, and increase the welfare of the inhabitants of the country. In the case of *Crocodylus moreletii*, LGVS only allows the use of exemplary products of controlled captive breeding and must contribute to the development of populations. NOM-059-SEMARNAT-2001 identifies the native species of flora and fauna at risk in	

Supporting Statement (SS)	Additional information
Mexico and currently lists *Crocodylus moreletii* under the category "subject to special protection" (D), including taxa that are not at risk, but are of interest to the country and deserve government protection to ensure their continuity and abundance. In Belize, the *Wildlife Protection Act* prohibits the hunting of wildlife, including *Crocodylus moreletii*. In Guatemala, *Crocodylus moreletii* is in the Listado de Especies de Fauna Silvestre Amenazadas de Extinción (*Resolución No. ALC/032-99* del Consejo Nacional de Áreas Protegidas, CONAP), in Category 2 "En grave peligro", which includes species that are endangered by habitat loss, trade, very small populations and/or endemic species with limited distribution.	*The Act in Belize, originally passed in 1981, was revised in 2000, but the hunting restriction remained unchanged* *http://www.belizelaw.org/lawadmin/PDF%20files/cap220.pdf*
Similar species	
Species in international trade that look similar to Morelet's Crocodile include *Crocodylus acutus*, *C. niloticus*, *C. novaeguineae, C. rhombifer* and *Osteolaemus tetraspis*. However, *C. moreletii* can be distinguished from other Mesoamerican species by the incomplete transverse series of sub-caudal scales. In addition, it features six nuchal scales of similar size, whereas similar species have only four (*O. tetraspis*) or four large and two small (*C. acutus*, *C. niloticus, C. novaeguineae* and *C. rhombifer*).	*Platt and Rainwater (2005) provided a summary of morphological characters useful for distinguishing* Crocodylus moreletii *from* C. *acutus. The supporting statement does not mention the problem of distinguishing hybrid individuals (*C. moreletii *x* C. acutus*). Ray* et al. *(2004) analysed the low levels of nucleotide diversity in* C. moreletii *and evidence of hybridization in* C. acutus*. The identification of specimens of hybrid appearance, as detected in captivity with atypical specimens of* C. acutus *(25%) and* C. moreletii *(3.1%) in Quintana Roo, remained problematical (Villegas, 2005).* *Domínguez-Laso and Monter (2007) developed a method of distinguishing Mexican crocodilian species using Amplified Fragment Length Polymorphism. They found that they could reliably differentiate the Mexican species, as well as the different populations of each, but further work was needed to identify hybrids.*
Artificial Propagation/Captive breeding	
In Mexico, only animals born and reared in captivity (in closed cycle farms and second generation individuals) within the UMAs are allowed in trade. Since 2000, the national harvest authorized in Mexico amounts to fewer than 2000 skins a year. However, the total production potential on farms is around 16 500, which could provide about 10 100 skins per year.	*Mexico has registered three commercial captive breeding facilities for this species in line with* Resolution Conf. 12.10 (Rev. CoP14).
Other comments	

Reviewers:
F. Castañeda**,** Tom Dacey, TRAFFIC North America

Transfer of the Egyptian population of *Crocodylus niloticus* from Appendix I to Appendix II for the purposes of ranching

Proponent: Arab Republic of Egypt

Summary: The Nile Crocodile *Crocodylus niloticus* is the most widely distributed crocodile species in Africa, occurring in almost all sub-Saharan countries. It was included in Appendix I in 1975. Ten countries have made successful proposals to transfer their populations of *C. niloticus* from Appendix I to II for the purposes of ranching: Botswana, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, South Africa, Uganda, Zambia and Zimbabwe. This proposal seeks to transfer the Egyptian population of *C. niloticus* to Appendix II for ranching purposes.

Crocodylus niloticus had virtually disappeared from Egypt by the 1950s, but the construction of the Aswan Dam and the subsequent creation of Lake Nasser led to resurgence of the population. It is now widespread in the lake, where all wild individuals in Egypt are believed to occur. A survey in the period 2008–2009 estimated the crocodile population in the lake as between 6000 and 30 000. Refinement of this estimate is currently a major goal through a newly initiated radio telemetry project. There are no historic survey data available in order to assess population trends; however, anecdotal evidence supports a rising population trend. *C. niloticus* is subject to illegal harvesting for export; this has reportedly been increasing since the start of the 21st century. It is believed that each year over 3000 hatchlings are illegally smuggled out of Egypt and 200–400 subadults and adult crocodiles are killed for their skins. The skins are both exported and used locally in Egypt for leather products. Apart from illegal trade, the only other identified threat to the species may be incidental mortality through drowning in fishing nets, but the impact of this is considered likely to be low.

Under the proposal, ranching will be based on an annual hatchling harvest, with initial quotas set at around 2500. The proponent is requesting an annual export quota of 750 skins from ranched individuals be put into effect, starting 2013. The proponent believes this will allow ample time for approved ranching operations to build a stock. A recently created Crocodile Management Unit (CMU) will oversee *Crocodylus niloticus* management and monitoring. The CMU will also be responsible for outreach activities within local communities and with any parties involved in crocodile use, as well as with local and environmental law enforcement agencies to prevent illegal trade. The supporting statement also includes information on: marking; monitoring; management; reintroduction and trade control procedures; national legislation to protect wild species and habitats and control illegal trade; and ways in which the local crocodile population, other wildlife and human communities will benefit from the ranching programme. Initially no other wild harvest will be approved, although limited trophy hunting will be considered in the future, in conjunction with a nuisance crocodile programme, if this is needed.

Analysis: Because this proposal to transfer a population from Appendix I to Appendix II involves ranching, it should adhere to *Resolution Conf. 11.16 (Rev. CoP14)* as well as *Resolution Conf. 9.24 (Rev. CoP14)*. Under the terms of the first of these, a ranching proposal should be submitted at least 330 days before the meeting at which it is to be considered, to allow the Secretariat to consult with the Animals Committee to ensure that terms in the Resolution are met. This was not done in this case and it is possible therefore that the proposal will not be considered in its present form by the CoP at this meeting. It is possible that the CoP may consider a more restrictive proposal concerning the same population, such as a transfer from Appendix I to Appendix II with a zero export quota for wild specimens, although this is not assured.

Regarding the conditions set out in *Resolution Conf. 11.16 (Rev. CoP14)*, the following observation may be made:

Paragraphs a), b) and c) under “RECOMMENDS”, regarding general provisions for transfer of species from Appendix I to Appendix II for ranching:

a) Biological criteria
Estimates of wild populations are imprecise, but further research is under way. The best available estimates indicate the population is not small under

guidelines in Resolution Conf. 9.24 (Rev. CoP14)*. The population is not believed to be declining and habitat quality is good.*

b i) The programme must be primarily beneficial to the conservation of the local population
Under the proposal, fees collected from the sale of hatchling harvest permits and ranching licences will be recycled to support the CMU and other wildlife research and conservation efforts.

b ii) All products must be adequately identified
The proposed marking programme appears robust.

b iii) Appropriate inventories, harvest level controls and mechanisms for monitoring the wild population
The absence of information on the management and monitoring plan and details of the planned use weaken the proposal. For example, it is unclear why hatchlings rather than eggs are to be collected. It is also unclear how increased negative interaction between local fishermen and crocodiles, or how other extractive uses such as trophy hunting, would be handled through a ranching programme. However, it should be noted that management reportedly only started in 2008.

b iv) Sufficient safeguards must be established to ensure that adequate numbers of animals are returned to the wild if necessary and where appropriate
The proposal states that 10% of ranched individuals will be returned to the wild after they have reached a length of one metre. The necessity and appropriateness of this has been questioned, as it is believed that such action would increase the possibility of introducing diseases to the wild population. A simpler and more appropriate alternative would be to take fewer animals from the wild in the first place.

c i) Details of the marking system must be submitted
The proposed marking programme appears robust (see b ii) although the proponent states the Universal Tagging System will be adopted and used to regulate the trade in line with Resolution Conf. 9.22*, but this should now state in line with* Resolution Conf. 11.12.

c ii) A list of products must be provided
This is included in the proposal (skins for domestic and international trade and domestic trade of meat).

c iii) Marking methods for products and containers entering trade should be described
A description of marking methods is provided. See c i).

c iv) An inventory of current stocks should be provided
There are not known to be currently any stocks of crocodile specimens in Egypt.

Paragraph d) specifically regarding transfer of the population of one Party or a smaller geographically separate population:

d i) Evidence that taking from the wild will have no detrimental impacts on wild populations
Levels of illegal offtake will need to be addressed. Any agreement of managed harvests for export should be clearly linked to measures aimed at reducing the current illegal trade in the species. As a precaution, measures aimed at reducing the illegal trade should be implemented and found to be effective before the planned harvest for ranching is carried out to ensure that harvesting does not have any detrimental impacts on the wild population. The proposed annual export quota of 750 skins may be unrealistic given that no ranching has been carried out to date. Harvest of 2500 hatchlings per year seems high for an annual export quota of 750 skins, unless the surplus skins are destined for the domestic market.

d ii) An assessment of the likely biological and economic success of the ranch
Under the proposal, the CMU will report annually to the CITES Secretariat on the status of the crocodile population used in ranching. Methods for assessing the economic success of the ranch are not included in the proposal.

d iii) Assurance that all stages will be humane
The proposal states that a rigorous code of practice is being drafted, although details are not yet available. Good practice in crocodile ranching in general is well documented.

d iv) Evidence to show that the programme is beneficial to the wild population through reintroduction or in other ways
The proposal states that wildlife research and conservation will benefit, local fishermen will gain direct economic benefits and there is provision for Crocodylus niloticus *reintroduction.*

d v) Assurance that criteria shall continue to be met
The proponent has established a CMU for this purpose.

Although some conditions set out in *Resolution Conf. 11.16 (Rev. CoP14)* are in place, it appears that others have yet to be met fully, there being, for example, still substantial illegal harvest. Although trade in ranched specimens is not proposed until 2013, by which time all necessary conditions may be met, it may be premature to transfer the population for the purposes of ranching at this time.

Supporting Statement (SS)	Additional information
Taxonomy	
	Recent taxonomic investigations suggest that crocodiles in Egypt may be a different species of "Nile Crocodile" (Shirley, 2008).
Range	
Proposal only concerns population of Egypt. Complete range of the species is: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Republic of Congo, Côte d'Ivoire, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Mauritania, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.	
IUCN Global Category	
Listed as Lower Risk/least concern in t*he IUCN Red List of Threatened Species*;	*Assessed using Categories and Criteria ver 2.3. Assessment needs updating.*

Supporting Statement (SS)	Additional information
assessed in 1996.	

Biological criteria for inclusion in Appendix I

A) Small wild population

(i) Population or habitat decline; (ii) small sub-populations; (iii) concentrated geographically during one or more life-history phases; (iv) large population fluctuations; (v) high vulnerability

Surveys of the Lake Nasser *Crocodylus niloticus* population began in July 2008. Using a modified double observer survey model, the detectable crocodile population was estimated at between 3047 and 3500 individuals. This number is thought to be lower than the total population size owing to crocodile submersion bias. Assuming 10–15% detectability, figures for the total crocodile population in Lake Nasser would range from 6094 to 30 470. Refinement of this estimate is currently a major goal through a newly initiated radio telemetry project (i.e. to estimate detectability) and through continued survey and monitoring efforts.

Baha el Din (2006) considers that the total population in Egypt is made up largely of juvenile and immature individuals; the number of breeding adults (sexual maturity is reached at about 10 years of age) is probably considerably fewer than 5000 animals.

In Egypt the species is rather uncommon and localized and is classified as "vulnerable" (Baha el Din, 2006).

The total population is estimated by extrapolation of survey data obtained in 2008. Correction factors to account for sightability during spotlight surveys have yet to be confirmed, and thus estimates vary between 6000 and 30 000 individuals. The proposal indicates ongoing efforts to derive more realistic estimates of the total population through research (telemetry) and ongoing monitoring. Population estimates are typically based on non-hatchlings (includes yearlings) and on this basis the population estimates would be higher (6780 to 33 900 non-hatchlings). If breeding females formed, say, 5% of the population, then it would suggest 339 to 1695 nests per year, provided females nested annually; which may not be the case in most years. Production of 750 skins per year, assuming efficient incubation and raising, would be most likely achievable and sustainable. If adults make up 20–25% of the classified sightings, as is the case in many other African populations, then many more eggs/hatchlings would be potentially available (Webb, 2009).

B) Restricted area of distribution

(i) Fragmented or localized population; (ii) large fluctuations in distribution or sub-populations; (iii) high vulnerability; (iv) decrease in distribution, population, area or quality of habitat, or recruitment

Within Egypt, *Crocodylus niloticus* is limited to Lake Nasser in upper Egypt. Lake Nasser is the largest man-made lake in the world. The lake was created by the construction of the Aswan High Dam, which began in 1959, and water impoundment initiated by 1964. The lake dimensions vary with water levels, but it can reach 35 km in width with a 7844-km maximum shoreline. The entire lake is suitable habitat for crocodile occupancy during one life stage or another; approximately 80% contains suitable nesting habitat.

Recent reports from as far north as Cairo are almost certainly of escapees or releases. The nearest population of the species is in Sudan; here the Sudanese population of Lake Nasser is continuous with the Egypt population in the lake. The next-nearest population is in the White Nile and Sud Wetland.

According to Baha el Din (2006), Lake Nasser probably represents one of the strongholds of the species, at least at the regional level.

In general, the available man-made habitat for Crocodylus niloticus *in Lake Nasser is immense and largely untouched. It is the understanding of some reviewers that some of the areas around Lake Nasser are well protected owing to a military presence. If such areas are not to be harvested as part of a ranching programme, this should be mentioned (Webb, 2009).*

Supporting Statement (SS)	Additional information
C) Decline in number of wild individuals **(i) Ongoing or historic decline; (ii) inferred or projected decline owing to decreasing area or quality of habitat, levels of exploitation, high vulnerability, or decreasing recruitment**	
No historic survey data are available to assess population trends; however, anecdotal evidence supports a rising trend. Prior to the construction of the Aswan High Dam, Nile crocodiles were virtually, if not entirely, extirpated from Egypt. However, since the creation of Lake Nasser, crocodiles are seen regularly and local fishermen are becoming more and more vocal in their complaints about a growing crocodile population. Preliminary results from questionnaires conducted with fishermen have suggested that encounters with *Crocodylus niloticus* from all demographic classes, but especially adults, are on the rise.	*Baha el Din (2006) considers that growing human activity in the Lake Nasser region and claims of attacks on humans and other conflicts with people are likely to lead to significant reduction in the species's population in the coming years.* *Few monitoring data are available. Only 11% of the shoreline of Lake Nasser has so far been monitored, and insufficient monitoring data are available over time to quantify population trends. The high proportion of the population represented as juveniles and sub-adults indicates the population is in a "recovery phase". Nonetheless, experience has shown that ranching can be an extremely robust management tool for recovering populations of crocodilians, and it can be carried out without detrimental impact on the population [see CSG review of ranching programmes carried out for the CITES Secretariat (http://iucncsg.org/ ph1/modules/Publications/reports.html)]. It may be appropriate to set harvest quotas on the basis of population monitoring data, which will be required to establish "non-detriment" under Article IV of the Convention (Webb, 2009)*.
The species is or may be affected by trade	
Illegal trade Preliminary evidence suggests there is a not unsubstantial illegal trade of crocodiles within and out of Egypt. Assessing this trade has been difficult, but it is likely that over 3000 hatchlings are illegally smuggled out of Egypt and 200–400 subadult and adult crocodiles are killed annually for their skins. The skins are both exported and used locally in Egypt for typical leather products. This trade has been difficult to regulate in the past owing to lack of enforcement capacity. However, the recent creation of a dedicated Crocodile Management Unit (CMU) which engages in outreach activities with local and environmental law enforcement agencies will certainly facilitate future efforts. The Unit has already formed a working relationship with the administrative and user groups of Lake Nasser, as well as the enforcement agencies that will be critical in facilitating enforcement of laws in place for protecting and managing the crocodile population. Early in 2010, the Unit will be launching a major education campaign for the stakeholders in crocodile management. In 2004, a similar outreach strategy all but eliminated the trade of hatchling crocodiles for sale as curios and live pets to tourists in the Aswan Bazaar.	*Two figures for the illegal trade are given in the proposal—2500 and over 3000 hatchings.* *After noting that interviews with fishermen detected the presence of an ongoing illegal crocodile harvest (with perhaps as many as 3000 live hatchlings and 200 skins (adults) exported annually), Shirley (2008) recommended that further investigation on illegal trade was warranted.* *The CITES trade database lists gross exports of* Crocodylus niloticus *from Egypt between 1998 and 2008 as two crocodile bodies in 1999 and one in 2001; seven leather product items in 2007, and single skins in 2000 and 2007.* *Baha el Din (2006) considers that the illegal collection pressure for the pet trade and for skins is considerable.* *The current lack of enforcement capacity is evident from the proposal and is a major*

Supporting Statement (SS)	Additional information
The impacts of illegal trade are difficult to assess at this time. However, given the above figures, estimates of population size and fishermen questionnaire results, the proponent assumes that the current illegal trade is causing minimal impact. Two factors make controlling the illegal crocodile trade comparatively simple: one individual is currently responsible for most of this trade and the virtually linear route of trade/transport for goods coming from Upper Egypt (i.e. Lake Nasser–Aswan–Luxor/Cairo) allows for regulation check points. Furthermore, questionnaire results indicate that very few (less than 20%) of the Lake Nasser fishermen are involved with the illegal trade in crocodiles, and of these maybe 10–20% (less than 5% of the total fishing community) consider it to be a regular part of their income. Finally, the proponent considers that the vastness and remoteness of Lake Nasser, the lack of permanent human inhabitants, and the small number of people involved in the crocodile trade, suggest that it will be very difficult for trade to have a significant negative impact. The proponent feels that, once legalized, trade will continue at its current level with the added advantage of a framework for national legislation and control preventing the current, seemingly sustainable trade from becoming detrimental.	*concern. Efforts that have been made to remedy this situation are applauded, but a clearer commitment on enforcement measures to be implemented in connection with the proposed listing would strengthen the proposal. With domestic use of* Crocodylus niloticus *skins (e.g. finished products), there could be avenues through which illegal, wild-caught skins could enter international trade (Webb, 2009). The question, "How will national consumption be regulated, particularly if international tourists are likely consumers?" is posed to the Nature Conservation Sector, Egyptian Environmental Affairs Agency by Webb (2009).*

Precautionary measures

Ranching proposal submitted consistent with applicable Resolutions of the Conference of the Parties.

***Resolution Conf 11.16* Paragraph b: any proposal must satisfy the following criteria**

b i) the programme must be primarily beneficial to the conservation of the local population

The goal is that crocodile use benefits management of *Crocodylus niloticus*. For example, fees collected from the sale of hatchling harvest permits and ranching licences, will be used to support the CMU.	

b ii) all products, including live specimens, must be identified and documented

The plan envisages marking of live specimens and hides, see c i)	*Marking should be in line with* Resolution Conf. 11.12.

b iii) Appropriate inventories, harvest level controls and mechanisms for monitoring the wild population

The crocodile monitoring programme began in 2008, although minor survey efforts were made in 1997 and 2004. Starting in July 2008 the "Crocodile Team" of the Nature Conservation Sector surveyed key areas of the Lake to establish baseline data and indices of population size. Over the following year indices were established for 15 regions around the lake, covering over 11% of the shoreline. Starting in 2010, efforts will consist of six-monthly survey trips to designated sites around the lake to correspond with the annual breeding season.	*No detailed information on the management and monitoring plan nor details of the planned use were provided in the supporting statement. Monitoring and the drawing up of detailed plans for management only started in 2008, however.* *There is a lack of detail on how the ranching programme would be carried out. For example, it is unclear why hatchlings rather than eggs are to be collected. Crocodilian ranching programmes typically involve egg harvesting, which allows for a greater*

Supporting Statement (SS)	Additional information
In August 2009, Egypt established the CMU, consisting of three biologists and natural resource managers trained by specialists from the IUCN/SSC Crocodile Specialist Group in crocodile monitoring and management theory and techniques. The CMU is in the process of drafting a management and monitoring plan. Details of the planned use are not yet fully worked out, and are also awaiting approval for international, commercial trade. Ranching will be the primary focus for use with a limited number of licensed individuals.	*portion of the resource to be available (i.e. before egg predation losses occur). Annual hatchling recruitment can vary greatly from year to year (Webb, 2009).* *M.M. Fouda, Director, Nature Conservation Sector, Egypt indicated in an email to the CSG dated 11 December 2009 that external experts would be involved in the development of a ranching programme (Webb, 2009).* *Transfer to Appendix II in line with* Resolution Conf. 11.16 *may not be adequate to allow hunting of adults. The manner in which the hunting is to be controlled needs to be explained. If high numbers of big crocodiles do occur, and fisheries conflicts are a major issue, a wild hunting programme might be a feasible option to include in the programme (Webb, 2009).*
b iv) adequate numbers must be returned to the wild if necessary	
The ranching programmes will require head-starting and the plan is to reintroduce 10% of individuals to the wild after they have reached a minimum size of one metre.	*Head starting may not be required if monitoring results indicate a high rate of population increase. A decision about whether to release head-started animals should be made on the basis of monitoring results. In addition, head starting increases the possibility of introducing disease to the wild population. It may be more appropriate to reduce harvest rates rather than release captive-raised crocodiles back into the population—this all depends on monitoring results (Webb, 2009).* *The programme does not indicate that the survival rates of the reintroduced individuals would be measured e.g. on the basis of surveys and the tagging programme.* *The 2006 report on the status and ranching of the Nile Crocodile in Kenya found that release to the wild was unpopular with local communities in areas where crocodiles were in conflict with human activities (Anon., 2006a). Presumably, considering the huge size of Lake Nasser (up to 480 km long and up to 35 km wide, with a 7844-km shoreline), finding suitable locations to release crocodiles away from areas which are likely to cause conflict with people, would not pose any difficulties.*
c i) details of its marking system	
The Universal Tagging System will be adopted and used to regulate the trade in line with *Resolution Conf. 9.22*. Using this system, all individual crocodiles on approved ranches will be marked with toe-web tags controlled by the Nature Conservation Sector of the Environmental Affairs Agency. All tags must be available for inspection on carcasses (both ranch mortality and processed) and skins/leathers to ensure the level of harvest and captive maintenance that is approved. Crocodile leathers and products will be checked by local Aswan authorities and double-checked by Cairo Wildlife officers prior to export.	*The CITES Resolution that deals with the tagging of crocodilian skins is* Resolution Conf. 11.12 Universal tagging system for the identification of crocodilian skins*, not* Resolution Conf. 9.22 *as currently indicated. Very specific comments are made on marking; for example toe tags (which can fall off), would not accompany "leathers". Toe tags, together with other forms of tagging (e.g. scute-clipping) would assist with monitoring of ranch/farm stocks (Webb, 2009).*

Supporting Statement (SS)	Additional information
c ii) list of types of products	
Skins for domestic and international trade and domestic trade of meat.	*An annual export quota of 750 skins is sought but the proposal also indicates that "International trade will focus on processed leathers and leather products" (Section 2). "This is confusing" (Webb, 2009).*
c iii) marking methods for products and containers entering trade	
See c i)	
c iv) an inventory of current stocks	
There are currently no stocks of crocodile specimens in Egypt.	
d i) evidence that taking from the wild will have no detrimental impacts on wild populations	
The Nature Conservation Sector through its newly established CMU will monitor the export permits to ensure that crocodile populations are maintained within the framework of the carrying capacity of the ecosystems. The Unit will report to the Nature Conservation Sector regularly and an annual report will be submitted to the CITES Secretariat on the status of the crocodile population both in the wild and used in ranching. Ranching will be likely to be based on an annual harvest of hatchlings from the wild, with initial quotas to be set at estimates of current illegal off-take (+/- 2 500 hatchlings a year). The proponent is requesting an annual export quota of 750 skins from ranched individuals be put into effect starting 2013. The proponent believes this will allow ample time for approved ranching operations to build a stock and ensure that in the intervening time no animals are harvested from the wild to fulfil the quota.	*Any agreement of managed harvests for export should be clearly linked to measures aimed at reducing the current illegal trade in the species. As a precaution, measures aimed at reducing the illegal trade should be implemented and found to be effective before the planned harvest for ranching is carried out to ensure that harvesting does not have any detrimental impacts on the wild population.* *The proposed annual export quota of 750 skins may be unrealistic given that no ranching has been carried out to date. Indeed, the establishment of a quota before any ranching facilities have been established could readily provide avenues for the laundering of wild-collected skins. It may be appropriate to establish export quotas once ranching has started, and to set them on the basis of actual production on ranches. Quotas could be verified by external experts (e.g. the CITES Secretariat, CSG) to allay concerns of potential laundering of wild skins through a ranching programme (Webb, 2009).* *Harvest of 2500 hatchlings per year seems high for an annual export quota of 750 skins, unless the surplus skins are destined for the domestic market (Webb, 2009).*
d ii) an assessment of the likely biological and economic success of the ranch	
See d i). The CMU will report annually to the CITES Secretariat on the status of the crocodile population used in ranching.	*Methods for assessing the economic success of ranching are not included in the proposal.*

Supporting Statement (SS)	Additional information
d iii) assurance that all stages will be humane	
Inspection and regulation of ranching establishments will be co-ordinated through the Nature Conservation Sector and the CMU, who together will draft a plan and implement a rigorous code of practice whereby facilities and procedures are inspected twice annually.	*Although a rigorous code of practice is being drafted, details are not yet available. Good practice in ranching operations and guidelines are well documented, for example the 1990 Kenyan Nile Crocodile management plan. In Kenya, there is currently a strong focus by the Management Authority towards ensuring there is improved compliance and enforcement of the code of practice and production standards (Anon., 2006a).*
d iv) evidence to show that the programme is beneficial	
In addition to benefiting management of *Crocodylus niloticus*, the future goal of use of the species is to benefit other wildlife research and conservation efforts, if possible. In addition, the aim is that crocodile use benefits capacity-building of future natural resource managers (e.g. university students and local primary and secondary students can be involved in head-start and release programmes, and use these activities as research platforms by, for example, monitoring the success of head-started crocodiles post-release). Local Lake Nasser fishermen will receive direct economic benefit from the harvest and sale of hatchling crocodiles. Furthermore, there is provision for reintroduction of 10% of ranched crocodiles.	
d v) assurance that criteria shall continue to be met	
The proponent set up the CMU to ensure that the criteria shall continue to be met. The proposed quota will include information on collection, marking, internal transport and export control of specimens in accordance with the programme established by the CMU. The Unit will provide the necessary information to show that Egypt is effectively implementing CITES Article IV.	*The establishment of a dedicated CMU to oversee management and monitoring is considered an important step (Webb, 2009).* *The CITES reporting requirements for ranching, when a species has been transferred from Appendix I to Appendix II pursuant to a ranching Resolution are given in* Resolution Conf. 11.16.

Other information

Threats	
There is conflict between crocodiles and the Lake Nasser fisheries leading to crocodiles drowning in fishing nets. Although the extent of this conflict is not well documented, it is considered low given the quality and type of gill nets used by the near shore fisheries (fishermen constantly cite crocodiles destroying fishing nets as a major source of conflict). Since the start of the 21st century there has been an increasing illegal trade in crocodiles from Lake Nasser. While quantifying this trade is difficult, the proponent feels it is not detrimental at this time. The proponent believes that the vastness and remoteness of Lake Nasser, the lack of permanent human inhabitants, and the small number of people involved in the crocodile trade,	*According to Baha el Din (2006) growing anthropogenic conflicts, illegal collection pressure for the pet trade and for skins and "sports" hunting is likely to lead to a reduction in the numbers of* Crocodylus niloticus. *It is unclear how increased negative interaction between local fishermen and crocodiles would be handled through a ranching programme. Although other extractive uses, such as trophy hunting, are alluded to in the proposal, they are not discussed in detail as a management component (Webb, 2009).*

Supporting Statement (SS)	Additional information
suggest it will be very difficult for trade to have a significantly negative impact. In contrast to most African populations of the species, Nile Crocodiles in Egypt have not been a mortal threat to people in and around Lake Nasser.	
Conservation, management and legislation	
C. niloticus populations of Botswana, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Namibia, South Africa, Uganda, United Republic of Tanzania, Zambia and Zimbabwe are listed in Appendix II with provision for trading. All other populations, including that in Egypt, are listed under Appendix I.	
C. niloticus is protected outright by Egyptian law and thus no extraction-based utilisation has been approved at present. A few requests for the export of scientific (biological) specimens (e.g. blood and tissue samples) for genetic analyses have recently been approved. A small number of tour operators in the Aswan area regularly take clients on Lake Nasser to view wildlife, including the possibility of seeing crocodiles.	
There are two main relevant laws in Egypt: the second article of *Law 102/1983* concerning Natural Protected Areas and *Law 4/1994* promulgating environment law amended by *Law 9/2009* Article 28a, which forbids the hunting and catching of some wild animals and living aquatic organisms, and the transporting, exporting, importing or trading of them. Article 84a of this law concerns penalties for any violations related to article 28a.	
The proponent suggests that since these laws were established in the time of crocodile extinction and in the light of rebounding populations, the laws should be amended. Egypt's delay in doing so is a result of their *Crocodylus niloticus* population still being listed on Appendix I where changing laws to allow for extraction-based use would be futile if people could not benefit by legally exporting the products.	
The current legislation provides a framework for controlling the illegal trade. However it has been largely ineffective to date. The major problem has been education and co-operation with the law enforcement communities. The government recognizes this issue and through the creation of the CMU has the capacity to overcome it. In addition, the government believes that in implementing new laws that allow for the sustainable use of crocodiles in Egypt, they will be better able to regulate the trade with the assistance of the Universal Tagging System and established quotas, harvest/hunting permits, and facilities licences.	
The proponent states that they have not yet approved any ranching proposals domestically because they are "certain that ranching will result in international trade whether it is legal or not". The proponent has put in place a system for monitoring its	

Supporting Statement (SS)	Additional information
crocodile population and use programmes that will be developed. At the start of their use programme no wild harvest will be approved, although limited trophy hunting in conjunction with a nuisance crocodile programme will be considered, should this become a necessity. The CMU will be responsible for outreach with the local Lake Nasser fishing community, the Nubian people, and any parties involved in the use of crocodiles.	
Similar species	
No other crocodile species or other similar species exist in Egypt.	
Captive breeding	
Currently there exist no captive breeding or artificial propagation efforts for *Crocodylus niloticus* in Egypt. Several entities (private and government) have expressed an interest in this, but no permission has been granted. The government in Egypt feels it is prudent to establish a managed and legal system through which captive situations can sustainably exploit the crocodile resource prior to permitting these activities.	
Other comments	
	In their review of the proposal, the IUCN SSC Crocodile Specialist Group made the following comments: *There is a technical problem with Egypt's proposal.* *1. In seeking a transfer from Appendix I to Appendix II, Egypt has chosen "ranching", in accordance with* Resolution Conf. 9.24 (Rev. CoP14) *Annex 4 (2d), which requires adherence to* Resolution Conf. 11.16. *This is a more restrictive option than if the amendment to the Appendices had been sought under the normal (non-ranching) provisions of Annex 4 of* Resolution Conf. 9.24 (Rev. CoP 14). *2.* Resolution Conf. 11.16 *paragraph e requires that proposals be submitted 330 days before the meeting of the Conference of Parties. As this was not complied with by Egypt, the proposal may be rejected.* *3. The option of amending the proposal, so that it could be assessed as it stands under Annex 4 (non-ranching) of* Resolution Conf. 9.24*, may be complicated, because it could be interpreted as being less restrictive than the original proposal. Hence the proposal may need to be withdrawn, or risk defeat on technical grounds.* *4. A way forward that may be available to Egypt would be to amend the proposal so that it can be considered under Annex 4 (non-ranching) of* Resolution Conf. 9.24*, with a voluntary "zero export quota to remain in place pending a further proposal to be considered by the 16th meeting of the Conference of the Parties". This would be more restrictive than the original proposal because of the zero quota.*

Supporting Statement (SS)	Additional information
	5. If the Parties approved the proposal amended in this way, it would signal to Egypt that the Parties were acknowledging the improved status of the Nile Crocodile populations in Lake Nasser and that they were sympathetic to Egypt's intentions, although no exports would be possible until Egypt prepared a proposal to CoP16 at the earliest to inform the Parties about the actions taken which justified the removal of the "zero quota". Such an approach would be consistent with the present proposal, which does not seek to export any skins or other products until 2013 (Webb, 2009).

Reviewers:
T. Dacey, Crocodile Specialist Group, TRAFFIC North America.

Transfer of the Ornate Spiny-tailed Lizard *Uromastyx ornata* from Appendix II to Appendix I

Proponent: Israel

Summary: The Ornate Spiny-tailed Lizard *Uromastyx ornata* is one of 17 currently recognized species of spiny-tailed or dabb lizards in *Uromastyx*, a genus of agamas found in arid and semi-arid regions from north-west India to north Africa. Until 2004, it was regarded as a subspecies of *U. ocellata,* but is now recognized in CITES taxonomy as a full species. It occurs in Egypt (Sinai Peninsula), Israel, Saudi Arabia and Yemen and may have a disjunct distribution, with one population occurring in the Sinai Peninsula, Israel and adjacent north-west Saudi Arabia and the other some distance to the south in mountainous parts of south-west Saudi Arabia and north-west Yemen. Its distribution in Sinai and Israel is limited, the latter covering an estimated 270 km^2. However, locality data indicate that the southern part of its range extends over several thousand square kilometres.

Uromastyx ornata is a medium-sized and brightly coloured dabb lizard. It is diurnal and primarily herbivorous. Breeding is reportedly seasonal with the eggs produced in May and the young hatching some 60 days later. Reported clutch size in northern populations is seven to 17 eggs; in the southern population four to nine. Individuals are reported to live for approximately 15–20 years in captivity.

There are no overall population estimates available for *Uromastyx ornata*. The only quantitative data in the literature relate to Israel, where estimates of population density are around 15 individuals per km². It has been reported to occur in relatively dense populations in southern Saudi Arabia. *U. ornata* is not currently included in *The IUCN Red List of Threatened Species*, although a preliminary Red List assessment has been conducted, which suggests the species is "moderately abundant in suitable habitat*".*

Uromastyx species are harvested for food, use in traditional medicines and for the international pet trade. Other potential threats to the genus may include habitat loss and deterioration as a result of infrastructure and tourist developments, tourist activities and over-grazing, and the impacts of climate change. The significance of these threats is unknown, but it has been suggested that the habitat of this species is not subject to intensive human use, being generally inhospitable.

The entire genus *Uromastyx* has been included in Appendix II since 1977. Determining historical patterns of trade in *U. ornata* is difficult, because prior to 2004 it was not regarded as a full species and as a result there appears to be some taxonomic confusion in the CITES trade database. Egypt banned the export of *U. ornata* and other reptiles in 1992 and has recorded no significant exports since 1995. Prior to this, Egypt was the primary exporter of wild-taken specimens of *Uromastyx* declared as *U. ornata*. In recent years, the only range State for which there are records of exports of *U. ornata* is Yemen, from which just under 900 specimens were declared as imported to the USA, in 1997 and 1999. Since 2003, there has been a significant increase in the number specimens of *U. ornata* reported in trade as captive-bred. Despite this, *U. ornata* is still relatively difficult to obtain and does not appear to be commonly found in trade. It has been alleged that many specimens advertized as captive-bred may in fact be wild-collected.

Analysis: *Uromastyx ornata* is in trade and there is international demand for the species which could affect wild populations.

Information on the status of the species in the wild is relatively limited. However, locality data indicate that its distribution extends over several thousand square kilometres and is neither highly fragmented nor known to be declining in extent. There are no estimates for global population. However, density estimates from Israel of 15 individuals per square kilometre, with a total range of 270 km² in the country, suggest that Israel's population could number approximately 4000 individuals. The range in Israel comprises only a small proportion of the overall range and, if the species occurs at similar densities

elsewhere, then its overall population is likely to be substantial. The population in Israel is regarded as stable at present and there is no evidence of marked decline in the population elsewhere, nor compelling reasons to suspect such a decline. It seems unlikely, therefore, that the species meets the biological criteria for inclusion in Appendix I.

Supporting Statement (SS)	Additional information
Taxonomy	
Uromastyx ornata Two subspecies have been identified: *U. ornata ornata* and *U. ornata philbyi.*	*Prior to 2004, CITES taxonomy considered* Uromastyx ornata *to be a subspecies of* U. ocellata. *Following adoption in 2004 of Wilms (2001) as the standard reference for the genus,* U. ornata *has been treated as a full species.* Uromastyx philbyi *is listed as a synonym of* U. ornata *in the CITES species database.*
Range	
Egypt, Israel, Saudi Arabia and Yemen.	
IUCN Global Category	
	Not assessed

Biological criteria for inclusion in Appendix I

A) Small wild population

(i) Population or habitat decline; (ii) small sub-populations; (iii) concentrated geographically during one or more life-history phases; (iv) large population fluctuations; (v) high vulnerability

The overall population size of *Uromastyx ornata* is presently unknown. However, estimates of the southern Israeli population are thought to be no more than a few hundred compared to the few thousand specimens estimated in the year 2000. Surveys of *U. ornata* in southern Israel have led to estimates of 15 individuals per km² or 30 per one-kilometre length of wadi. A further survey in Mt. Timna in 1998 found no sightings of *U. ornata* in areas where it had previously been seen, suggesting a decline in numbers. Populations in the Eliat Mountains are also suspected to have declined over the past few years.	*No overall population estimates could be found in the current literature.* *Nemtzov (2008) believes the overall population in Israel to be seemingly small ("a few hundred"), but apparently stable.* *On the basis of there being 15 individuals per km² and Nemtzov's (2008) estimation of* U. Ornata's *range in Israel (270 km²), the population in Israel could number around 4000. However*, U. ornata *are said to select their habitats carefully and are unlikely to be evenly distributed throughout their range (Wilms, 2009).* *Baha el Din (2001) regarded this species as "uncommon but widespread in suitable habitat" within Egypt. The IUCN Preliminary Global Assessment (2004) noted that* U. ornata *was "moderately abundant in suitable habitat" throughout its range.*

Supporting Statement (SS)	Additional information
According to the SS, population surveys in the Eastern Sinai Peninsula (Egypt) have found a reduction in population size in the past 20–30 years. However, no quantifiable data has been provided. These declines are thought to be a result of illegal over-collection, over-grazing and habitat loss, the result of tourist developments and quarrying. *Uromastyx ornata* is believed to have low fecundity (the female lays seven to 17 eggs per clutch), reach sexual maturity relatively late (at approximately four-and-a-half years of age) and, although juvenile survival rates have not been recorded in the wild, they are presumed to be low.	*162 individuals were translocated from the Sinai Peninsula to the Eilat Mountains to boost population numbers, 1980–1981. It was later discovered that the population in the Eilat Mountains was not as depleted as previously thought (Nemtzov, 2008).* *Clutches are produced four to six weeks after mating and clutch size is reportedly seven to 17 eggs for* Uromastyx ornata ornata *and four to nine eggs for* U. ornata philbyi *(Wilms, 2001). According to Wilms (2009), Grenot (1976) estimated that* U. acanthinura *juveniles have a mortality rate of approximately 80% in their first one to two years; Wilms (2009) suggests mortality may be similar in* U. ornata.
B) Restricted area of distribution **(i) Fragmented or localized population; (ii) large fluctuations in distribution or sub-populations; (iii) high vulnerability; (iv) decrease in distribution, population, area or quality of habitat, or recruitment**	
In Israel, this species only occurs in steep, rocky, hot wadis where *Acacia* trees and *Ochradenus baccatus* bushes are present. The proponent noted that the distribution of *Uromastyx ornata* had reduced over time and that wild populations were fragmented and separated by mountain ranges and water bodies. The supporting statement suggests that illegal trade has resulted in fragmented and declining populations.	*Locality data in Wilms (2001) show records of occurrence in the south of Saudi Arabia, where* Uromastyx ornata *is relatively densely populated (Wilms, 2009). The southern range extends into Yemen along a total of around 1000 km of mountain range. Distribution in the north (including Sinai, Israel and north-west Saudi Arabia) appears somewhat more restricted.* *According to Nemtzov (2008)* Uromastyx ornata *occurs throughout approximately 270 km^2 of Israel.*
C) Decline in number of wild individuals **(i) Ongoing or historic decline; (ii) inferred or projected decline owing to decreasing area or quality of habitat, levels of exploitation, high vulnerability, or decreasing recruitment**	
The preliminary global assessment conducted by IUCN (2004), states that *Uromastyx ornata* are "moderately abundant in suitable habitat, but populations appear to significantly fluctuate. The species is declining from heavily disturbed and accessible areas of their range" (IUCN, 2004). Threats to *U. Ornata* listed in the assessment include: over-collection for the international pet trade, habitat loss owing to touristic activities, cutting of acacia, quarrying and military developments. The proponent states that the population status of *Uromaxtyx ornata* in the wild is unknown and undocumented, but that in southern Israel there are probably no more than a few hundred individuals left, as opposed to a few thousand that were believed to be present in 2000.	*IUCN's global Red List assessment has not yet been finalized.* *No information was located on overall population trends in the wild, although Nemtzov (2008) indicates that the population in Israel is probably stable at present.*

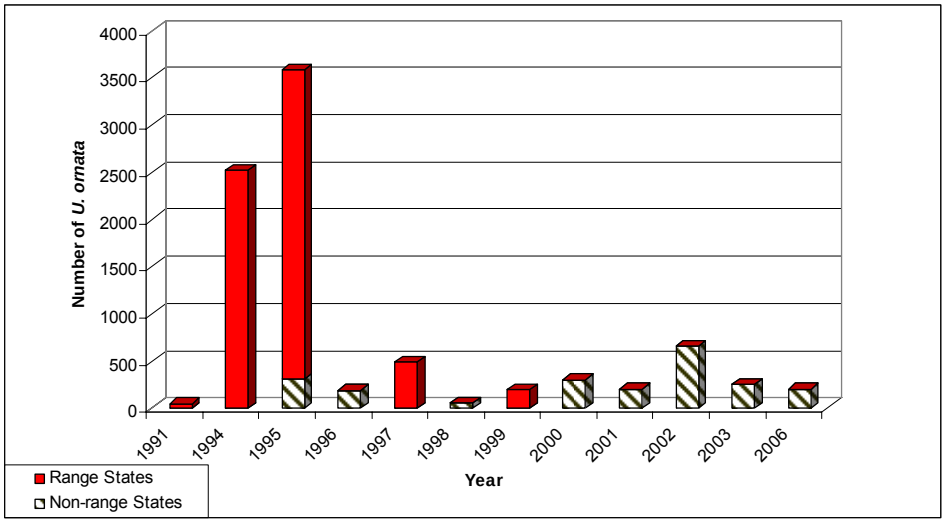
Supporting Statement (SS)	Additional information
The proponent states that environmental factors, such as climate change and over-grazing by domestic livestock are reducing the quality of *Uromastyx ornata* habitat and contributing to population declines. Southern Israel has been experiencing severe droughts for the past nine years, causing a reduction in available vegetation and therefore an inferred reduction in quality of habitat.	*According to Nemtzov (2008), since* Uromastyx ornata *primarily occurs in desert-like environments, which are largely unsuitable for human use, the impact of humans on their habitat is likely to be less severe than for other species. However, according to Wilms (2009), Gallager and Hill (2006) suggested that over 44% of the Arabian Peninsula was heavily over-grazed. This is likely to have a detrimental impact on* U. ornata *and other primarily herbivorous species (Wilms, 2009; Wagner, 2009).*

Trade

The proponent states that *Uromastyx ornata* is in very high demand in the pet trade, especially in North America, Western Europe and Japan, as it is colourful and attractive.	Uromastyx ornata *is regarded as an attractive and desirable pet and a brief Internet search revealed that the species appeared to be in trade, though not on a large scale. A study by Reijngoud (2009) found* U. ornata *for sale at a reptile fair and on the Internet, both inside and outside the European Union (EU); in both instances specimens were advertized as being captive-bred. Wilms (2009) has also observed* U. ornata *for sale at reptile fairs in Germany advertized as captive-bred, but believes most specimens in trade are wild-caught.* *Wilms (2009) was informed by wildlife biologists that* Uromastyx ornata *was illegally collected by traders from Egypt in Saudi Arabia. Wagner (2009) states that although specimens may be advertized as captive-bred, they are often wild-caught.*
There are inconsistencies in the trade data, for example many wild-caught *U. ornata* are reported as being exported from countries that are not range States. Also, the data show that farmed and captive-bred specimens have been imported from countries not reporting any matching exports or having records of importing them to establish captive breeding facilities. The source of many traded specimens is therefore unclear which can, in part, be attributed to taxonomic misidentification. The proponent states that "the death rate for *U. ornata* is apparently as high as 80% during the first two months of captivity".	*The CITES trade database indicates that the number of wild-taken specimens in trade has significantly declined since 1995 (see Figure 1), with Yemen being the only range State to have exported live wild-caught specimens since then (see Figure 1). Prior to this, Egypt was reportedly the largest exporter of* Uromastyx ornata *(93%, excluding re-exports) with almost all of these being (potentially) sourced from the wild. However, it is important to note that* U. ornata *was previously considered a subspecies of* U. ocellata *and that Egypt is a range State for both species. They can be distinguished through their morphological characteristics owing to their distinct coloration and patterns (Baha el Din, 2001).* *It is likely that the decline in trade from Egypt was a result of the Egyptian ban on the export of* Uromastyx ornata*,* U. ocellata*,* U. acanthinura *and* U. aegyptius *and other reptiles, put in place in 1992 and more recently effectively enforced. According to reported imports, since 1995 there have been only two illegal export consignments of* U. ornata *from Egypt, one of which was a re-export from Sudan, which is not a range State. However, these exports were reported prior to* U. ornata *being considered a separate species in 2004 and, as* U. ornata *and* U. ocellata *both occur in Egypt, it is possible that there was taxonomic confusion.*

Supporting Statement (SS)	Additional information

Figure 1: Number of live, wild* Uromastyx ornata *reported as imports from range States and non-range States, excluding re-exports (CITES trade database, 2009)



As suggested in the supporting statement, there are some discrepancies in the CITES trade database. Wild specimens have been reported as being exported from countries which are non-range States, even after U. ornata *was recognized as a separate species from* U. ocellata *in 2004, e.g. 200 in 2006 (shown in Figure 1). Approximately 25% of all* U. ornata *reported in trade by the importing country has been exported from* U. ocellata *range States, suggesting the data may be misleading in part as a result of taxonomic confusion.*

In addition, considerable trade in captive-bred specimens has been reported from the Ukraine, although it was not until 2000 that Ukraine started to report the import of wild specimens of Uromastyx ornata *(460 wild specimens were imported 2000–2001). The wild* U. ornata *imported to Ukraine were supposedly imported from Sudan; this is a range State of* U. ocellata *but not* U. ornata*. Ukraine was also reported exporting captive-bred and F1 generation specimens during this time (2000–2001). It is important to note that while Ukraine only became a Party to CITES in 2000, no other exports of wild-taken* U. ornata *or* U.ocellata *to Ukraine were reported in the CITES trade database.*

IUCN's preliminary global Red List assessment of Uromastyx ornata *(2004) states that it is occasionally available in the pet trade in North America. Knapp (2004) reported that levels of illegal trade for* Uromastyx *were relatively low and fluctuated over time. However, this may reflect deficiencies in data rather than true levels of*

Supporting Statement (SS)	Additional information
	illegal trade. Nemtzov (2008) noted "No illegal collection in Israel has been recorded'.
Uromastyx are used for traditional medicines and their skin and meat are sold in some North African and Near Eastern countries. However it is not known if *U. ornata* is used in this way.	*Jenkins and Broad (1994) found that the only significant recorded trade in* Uromastyx *skins within 10 years was 40 000 skins imported into Spain from Benin in 1986.This is thought to have been a misdeclaration. The only trade in skins recorded in the CITES trade database is of one* U. hardwickii *skin exported from Pakistan to the USA in 1986, suggesting there is not a strong international demand for* Uromastyx *skins.* *The supporting statement suggests that* Uromastyx ornata *may be used for meat by North African or Near Eastern Countries, but the CITES trade data show only 500 specimens imported to this region (specifically to Jordan) since 1999.* *It could not be clearly established whether* U. ornata *was traded internationally for medicinal purposes, although legal trade seems to be primarily of live animals (only 39 bodies reported in the CITES trade database).* Uromastyx *species are used for medicinal purposes in Malaysia, to increase potency in men, and possibly in India, but the species used cannot be confirmed (Shepherd, 2009; Zain, 2009).*

Other information

Threats

The supporting statement suggests the following present threats to *Uromastyx ornata*:

- Legal and potentially illegal collection of specimens for the pet trade, as the primary threat to the species.

- Demand for skin and meat, much of which is sold in North African and Near Eastern countries. High levels of trade for consumption of *Uromastyx aegyptia* in Saudi Arabia have been reported. However, *U. ornata* is not exploited locally for bushmeat in Israel or Saudi Arabia, but could be in Yemen and Egypt. The proponent admits that "it is unclear if *U. ornata* is utilised in this way".

- Possible use in traditional medicines.

- Use of all-terrain vehicles by tourists which causes habitat damage through creating tread marks and damaging flora.

- Habitat loss and reduction in habitat quality as a result of quarrying, military developments, cutting of acacia and over-grazing of domestic livestock.

- Climate change and drought.

No information has been found to suggest this species is heavily used for meat, although Uromastyx *(of unknown species) are thought to be eaten as a delicacy in the Arabian peninsula (Zain, 2009). Lizards are used as a source of protein in some cultures, but usually the larger species, such as* Iguana *and* Ctenosaura*, are favoured (Klemens and Thorbjarnarson, 1995).* U ornata *is much smaller than* U. aegyptia *(Nemtzov, 2008), which is known to be eaten in Saudi Arabia.*

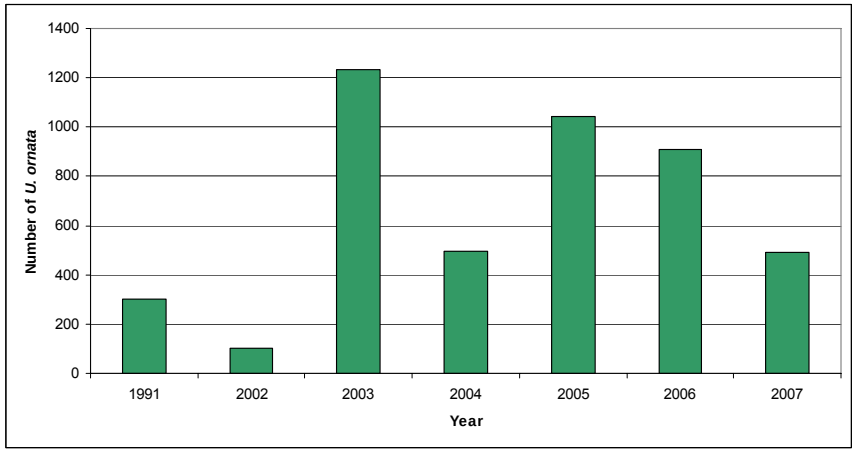
The use of all-terrain vehicles by tourists is said to be a localized threat in Israel and, although likely to increase over time, it is not thought to be a severe threat owing to the protected status of most of the U. ornata *habitat in Israel (Nemtzov, 2008). Wagner (2009) suggests that sporting activities in other range States also threaten the habitats of* Uromastyx.

According to Nemtzov (2008), in many areas, habitat loss does not pose a severe threat to Uromastyx *species as much of their habitat is unsuitable for human use (e.g. agriculture and real estate), although others argue that over-grazing by livestock such*

Supporting Statement (SS)	Additional information
	as camels poses a significant threat to Uromastyx *species (Wilms, 2009; Wagner, 2009).*
Conservation, management and legislation	
All *Uromastyx* species have been listed in CITES Appendix II since 1977 and are listed on Annex B of the EU wildlife trade regulations. *Uromastyx ornata* is legally protected in Israel by the *Wildlife Protection Law* of 1995 and by the *National Parks, Nature Reserves and National Monuments Law* of 1998. *U. ornata's* habitat in Israel lies within one protected area. *Uromastyx ornata* is fully protected by law in Egypt and the species occurs in five Egyptian nature reserves. Its status in Yemen and Saudi Arabia is unknown.	Uromastyx ornata *is listed as endangered in the* Red Book of Vertebrates in Israel *and is fully protected in Israel. It cannot be "disturbed, harmed, captured, held, bred in captivity moved, nor bought or sold, nor offered for sale" (Nemtzov, 2008).* *Egypt initiated an export ban in 1991 for several reptile species, specifying four* Uromastyx *species, including* U. ornata*. This came into force in 1992 (*Notification to the Parties No. 662 *of 16 January 1992) although Egypt continued to report exports until 1995. Since then, just 248 specimens have been recorded as confiscated or seized specimens exported from Egypt, 165 of which were re-exports according to the CITES trade database (2009).*
Similar species	
Prior to 2004, *Uromastyx ornata* was regarded as a subspecies of *U. ocellata* and traded under that name. *Uromastyx ornata* can be distinguished from *U. ocellata* by the presence of enlarged scales on the anterior border of the ear opening. *U. ornata* also has yellow dorsal spots compared to the very pale cream or white dorsal spots found on *U. ocellata*.	*It appears that there has been significant confusion in reporting of trade in* Uromastyx ornata, *demonstrated by the discrepancies found in the CITES trade database.* *According to Baha el Din (2001), "The very different nuptial colouration of male* U. ornata *and* U. ocellata *strongly supports the specific status of both taxa".*
Captive breeding/artificial propagation	
According to wildlife trade records, there has been commercial captive breeding of *Uromastyx ornata* in the USA, Ukraine, Jordan and Turkey in recent years.	*Until recently, captive breeding of* Uromastyx ornata *was very unusual. However, in recent years knowledge and success of captive care and breeding has increased significantly (Wilms, 2001). This appears to be reflected in the CITES trade database, which shows a significant increase in the number of captive-bred specimens since 2003 now being traded (see Figure 2), and by Internet searches, which also suggest a number of captive-bred specimens are available for sale.*

Supporting Statement (SS)	Additional information

Figure 2: Number of captive-bred* Uromastyx ornata *reported as imports, excluding re-exports (CITES trade database, 2009)



Other comments

Trade in Uromastyx *species has been assessed in recent years under the Review of Significant Trade. At the 20th meeting of the CITES Animals Committee, held in 2004,* U. ocellata *was chosen amongst other species for more detailed review. At that time, the taxon included* U. ornata*. By the time the review was carried out in 2006,* U. ornata *had been removed from synonymy with* U. ocellata *under CITES taxonomy. It was therefore not considered in the review process. At the 22nd meeting of the Animals Committeee, trade in* U. ocellata *from Djibouti, Egypt, Eritrea, Ethiopia, Somalia and Sudan was considered of Least Concern.*

Reviewers:
TRAFFIC Europe, P. Wagner, T. Wilms.

Inclusion of the Honduran spiny-tailed iguanas *Ctenosaura bakeri, C. melanosterna* and *C. oedirhina* in Appendix II

Proponent: Honduras

Summary: *Ctenosaua bakeri, C. melanosterna* and *C. oedirhina* are three species of spiny-tailed iguana in the family Iguanidae endemic to Honduras. They are closely related to a fourth species, *C. palearis,* which is endemic to Guatemala and also proposed at the present CoP for inclusion in Appendix II (see proposal Prop. 12). Two other species in the genus (*C. similis* and *C. flavidorsalis*), not subject to any listing proposal, also occur in Honduras. There are around 15 currently recognized species of *Ctenosaura*, occurring in Mexico and Central America. Two species (*C. pectinata* and *C. similis*) reportedly exist as introduced populations in the USA.

C. bakeri is a medium-sized (55–83 cm) primarily arboreal iguana found in three areas of mangrove forest on Utila Island. Its total range is estimated at 10 km^2, although nesting is confined to some 100 ha of beach habitat. Recent mark-and-recapture studies found high population densities (24–103 individuals per hectare) and estimated an overall population of 42 000–68 000 adults, with a balanced sex ratio and large numbers of juveniles. Habitat loss is regarded as the primary threat to the species, it having apparently been affected by wetland drainage leading to loss of mangrove habitat and beach side developments which destroy their breeding grounds. It is also exploited locally for food, with take having apparently increased in recent years. There is reportedly some potential threat from hybridization with *C. similis*.

C. melanosterna is a relatively large (70–90 cm), primarily arboreal, omnivorous iguana, endemic to the thorn scrub of the Aguán valley and tropical dry forest and subtropical dry forests of the Aguán valley and Cayos Cochinos Archipelago. The latter has a total land area of some 2 km^2; area of distribution on the mainland is unknown but likely to be small. The species is said to be affected by habitat loss and hunting for food, although details are lacking. A population size of 2 000–2 500 has been suggested.

C. oedirhina is a relatively small (40–60 cm) iguana found on Roatán Island (13 000 ha) off the Caribbean coast of Honduras. The species is reported to be found in a wide range of habitat types on the island. The species is thought to be affected by habitat destruction and hunting for food, although the importance of these is not clear. According to some accounts these constitute important threats. Other accounts suggest that the species is adaptable and widespread enough, and occurs in enough protected areas, to be secure at present. A population size of 5000 has been suggested.

Additional threats for these species may include pollution, motor traffic, and collection for medicinal purposes although the significance of these threats is currently unknown.

C. bakeri and *C. melanosterna* are protected by Honduran law, although enforcement is apparently poor. *C. oedirhina* is not currently protected under national law but all three species are offered some protection through protected land and/or research and breeding programmes.

All three species have been classified by IUCN as Critically Endangered, on the basis of their small ranges, presumed limited and fragmented populations and ongoing threat from habitat loss. In at least one case (*C. bakeri*) the population estimate used in the Red List Assessment appears to be a considerable underestimate.

Ctenosaura species have featured in the exotic pet trade in Europe and North America. However, their popularity as pets has reportedly decreased in recent years and there appears to be little demand for or availability of these species in international trade, although some evidence was found to suggest that *C. melanosterna* is in circulation in the pet trade and is being successfully captive-bred. The US Fish & Wildlife Service's trade database (LEMIS) for 2000–

2007 showed that 858 *Ctenosaura* had been exported from Honduras to the USA during this period, the majority recorded as wild-taken and 60% for scientific purposes. The specimens were not identified to species level and therefore could be any of the five species (the three under discussion, plus C*. similis* and *C. flavidorsalis*) of *Ctenosaura* which occur in Honduras. In 2004 and 2008, 17 and 11 *C. melanosterna* respectively were imported to the USA (according to the SS) but it is not known if they were imported for commercial trade or other purposes. In 2008 a further 49 wild-taken *C. melanosterna* were imported to the USA for scientific purposes.

Although these three species are similar, they are reportedly easy to distinguish based on morphological characteristics as adults. However, hatchlings are thought to be more difficult to tell apart. *C. melanosterna* and *C. palearis* are said to be more similar in appearance and can be particularly difficult to distinguish, especially as hatchlings or young. A proposal to include *C. palearis* in Appendix II has also been submitted for consideration at this CoP (see proposal Prop. 12); therefore look-alike issues should also be considered.

Analysis: All three species of *Ctenosaura* have restricted ranges. One (*C. bakeri*) has a very small range but is evidently numerous within it; another (*C. oedirhina*) is reportedly adaptable and occurs within a wide range of habitats in its 13 000-ha range. Little information is available on the third (*C. melanosterna*), which has a disjunct and possibly very limited distribution. All are reportedly affected by habitat loss and degradation, and by hunting for food, although the severity of these threats in each case is not clear. Iguanas, including *Ctenosaura* species, feature in the exotic pet trade. However, international trade in these particular species appears to be very limited. Although unidentified *Ctenosaura* species have been exported from Honduras in recent years, there is no evidence to suggest that *C. bakeri* and *C. oedirhina* are in international trade at present. It would appear therefore that these species do not meet the criteria for inclusion in Appendix II in that regulation of international trade is not needed to ensure that they do not become eligible for inclusion in Appendix I in the near future, nor is it required to ensure that harvesting for trade is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

There has been a small amount of reported trade in *C. melanosterna* in recent years. Available evidence suggests that there are adequate numbers of captive-bred specimens to supply the limited demand for this species in the pet trade but there are unconfirmed reports of limited export from Honduras. The species may have a small wild population and conceivably any harvest for export may reduce the population to a level at which its survival might become threatened. However there is no evidence to support this, and so it is not possible to state with confidence whether the species meets the criteria for inclusion in Appendix II set out in *Resolution Conf. 9.24 (Rev. CoP14)* or not.

Hatchlings or young specimens of these species may be difficult to distinguish from those of *C. palearis*, proposed by Guatemala for inclusion in Appendix II (proposal Prop. 12). In theory the look-alike criteria of Annex 2b of *Resolution Conf. 9.24 (Rev. CoP14)* could apply were that proposal to be accepted. However, as there is little evidence that these species are in trade, and they have a different country of origin, it is unlikely that their inclusion would be necessary to assist in regulation of trade in the former, particularly in view of the fact that all other *Ctenosaura* species would remain unlisted.

Supporting Statement (SS)	Additional information
Taxonomy	
Subgenus *Loganiosaura Ctenosaura*. The *Ctenosaura palearis* complex or clade includes: *C. bakeri, C. melanosterna, C. oedirhina* and *C. palearis* (included in a separate proposal).	

Supporting Statement (SS)	Additional information
Until 1987 *C. oedirhina* was considered to be the same species as *C. bakeri.* Until 1997 *C. melanosterna* was considered to be the same species as *C. palearis*.	
Range	
***C. bakeri*:** Honduras (Island of Utila) ***C. melanosterna*:** Honduras (Aguán valley and the Cayos Cochinos Archipelago (also known as the Hog Cays)) ***C. oedirhina*:** Honduras (island of Roatán)	
IUCN Global Category	
All three species are listed as Critically Endangered by the *IUCN Red List of Threatened Species*.	**C. bakeri:** *Critically Endangered B1ab(iii)+2ab(iii) (Assessed 2004, Categories and Criteria ver. 3.1).* **C. melanosterna:** *Critically Endangered B1ab(iii,v) (Assessed 2004, Categories and Criteria ver. 3.1).* **C. oedirhina:** *Critically Endangered B1ab(iii) (Assessed 2004, Categories and Criteria ver. 3.1).*

Biological and trade criteria for inclusion in Appendix II *(Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

The SS states that the "wild populations are greatly diminished and all have highly restricted geographical ranges".

***C. bakeri*:** The supporting statement reports an estimated population size of 10 000 but states that there have been no detailed population studies to date. According to the proposal, experts consider this to be an overestimation and the proponent suggests 'a more realistic' population estimate is 3000.

Wilson and McCranie (2003) conducted a study on the environmental stability of Honduras and categorized C. bakeri, C. oedirhina *and* C. melanosterna *as of high vulnerability based on extent of geographic range, extent of ecological distribution and degree of human persecution.*

C. bakeri: *A recent study found that the habitat of* C. bakeri *consisted of three isolated mangrove regions on the island which covered a total area of 1091 ha (Gutsche, 2005), comprising 27% of Utila's land area. Nesting sites were restricted to 109 ha of sandy coastal territory.*

A mark-and-recapture study found high population densities of 24, 39 and 103 individuals per ha, leading to an overall population estimate of 57 823 to 93 826. Just over 70% of animals captured in the study were adults, and observation indicated that juveniles were under-represented, indicating that the overall population was even higher (Gutsche, 2005; Gutsche and Streich, 2009). These figures were similar to those reported by Kuttler (2000) and considerably higher than earlier estimates (e.g. Zoerner and Köhler, 2004) that were evidently based on more or less casual observation rather than detailed sampling. Earlier observations had also indicated a biased sex ratio while Gutsche and Streich (2009) report a sex ratio of males to females of 1:1.2.

It is broadly acknowledged that habitat loss is the primary threat to C. bakeri*. This is a result of tourist and housing developments, road construction, mangrove forest habitat being used as rubbish dumps and the establishment of exotic, invasive plants making areas unsuitable for egg laying (Zoerner and Köhler, 2004). Between 1999 and 2003, Gutsche and Streich (2009) observed the cutting of 25 ha of mangrove forest. In addition to this, much of the nesting grounds (the beaches) have been sold for tourist developments (Binns, 2003) and since the females only use a small number of coastal areas (amounting to approximately 109 ha), they are particularly vulnerable to loss of potential nest sites (Gutsche, 2006). If current development plans continue it may result in a 50% loss of current mangrove area and a loss of 80% of all nesting sites within the next 20 years, resulting in significant population declines (Gutsche and Streich, 2009).*

Traffic and pollution could also threaten the stability of C. bakeri *populations (Pasachnik, 2006; Gutsche and Streich, 2009).*

A further threat to C. bakeri *may be hybridization with the more abundant and widespread* C. similis*. It is predicted that further habitat destruction will increase contact between the two species and may result in increased potential for hybridization (Gutsche and Köhler, 2008).*

Gutsche and Streich (2009) observed an increased number of subsistence hunters in

***C. melanosterna*:** Endemic to Aguán valley and the Cayos Cochinos Archipelago (also known as the Hog Cays), Honduras. Can be found in the thorny scrub habitat of the Aguán valley. Estimated population size of 2000.

***C. oedirhina*:** Endemic to the island of Roatán in Honduras. They can be found in a variety of habitats, including rocky cliffs, beaches, mangroves and dry forests. Estimated population size of 5000.

the field and local residents reported that they hunt up to 20 animals per hunt in the dry season. This may be a result of the temporary accommodation which has been established to accommodate migrant workers, working on the building developments (Binns, 2009).

C. melanosterna: *According to Gaal (2009a),* C. melanosterna *is found on the mainland (Aguán valley) and on three of the Cayos Cochinos islands, including: Cayo Cochino Grande, Cayo Cochino Menor and Chachahuate.*

Their habitat is decreasing in quality and area (Köhler, 2004) and they are also thought to be used for food by local people both on the mainland and on Cayo Grande (Pasachnik, 2006).

The species was classified as Critically Endangered by IUCN in 2004 on the basis of its having an estimated area of occurrence and area of occupancy of less than 100 km^2, a fragmented population of perhaps fewer than 2500 mature individuals and ongoing decline in area of habitat (Köhler, 2004b).

There are unconfirmed reports of sporadic smuggling of the species from the Cayo Cochinos (where the species is apparently abundant in its extremely limited range) to San Pedro Sula for export (TRAFFIC North America, 2010).

C. oedirhina: *Pasachnik (2006) regarded Roatán island to be large enough (and have enough protected areas) to maintain the species which is adept at exploiting different habitat types. Roatán island covers 13 000 ha. Recent satellite imagery of the island indicates that much of it may contain suitable habitat for the iguana.*

The species was classified as Critically Endangered by IUCN in 2004 on the basis of its having an estimated area of occurrence and area of occupancy of less than 100 km^2, a fragmented population of perhaps fewer than 2500 mature individuals and ongoing decline in area of habitat (Köhler, 2004b).

Pasachnik (2010) regarded the species as threatened by habitat destruction and hunting.

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

The proposal specifies that these species are highly valued in the exotic pet trade, particularly in Europe and the USA, due to their medium to small size, relatively docile nature and their ease to maintain in captivity.	*Newman (2009) states that* Ctenosaura *are now quite uncommon in trade in the UK and Werning (2009) believes that there is not a high demand for these species and that they are difficult to keep in captivity. Gutsche (2009) states that according to keepers and dealers of* Ctenosaura*, these species are not popular in the pet trade due to their relatively large size, unsuitable temperaments and because they are not particularly attractive; whereas, smaller species, such as* C. defensor *and* C. alfredschmidti *are more popular in the pet trade.* *According to Werning (2009), the number of kept and traded animals of these species is seemingly very low and there does not appear to be any real demand for these species. Werning (2009) verifies that wild* C. melanosterna *has, in the past, been imported for the pet trade but, more recently, the minimal demand for this species is easily supplied by captive-bred specimens. A breeder of* C. melanosterna *reported that he finds it difficult to sell the 20–30 specimens he breeds per year due to lack of demand (Werning, 2009).*
Information from the US Fish & Wildlife Service database (2009) shows that 17 (in 2004) and 11 (in 2007) *C. melanosterna* have been exported from Honduras to the USA.	*Data from the US Fish & Wildlife Service's trade reporting system (LEMIS) showed that 858 specimens of* Ctenosaura *has been exported from Honduras to the USA between 2000 and 2007, all but 17 of these were recorded as wild-taken and over 60% were for scientific purposes. However, these specimens were not identified to species level. Unfortunately, hard copies of the declarations and invoices would be needed to identify to species level, at the time of writing this information was unavailable to the IUCN/TRAFFIC Analysis Team. However, it was identified that 49 wild-taken* C. melanosterna *were imported to the USA from Honduras for scientific purposes in 2008.*
The proposal states that a survey detected there is regular trade of these three species, most of which is illegal. The summary table shows the species are available for sale in Spain, Germany, the Netherlands, and the USA from between USD90 and USD100.	*The SS did not provide details regarding the number and source of the specimens available for sale.* *A brief internet search for the purpose of this review indicated that these species are not abundant in the pet trade. Only* C. melanosterna *was found for sale, specified as captive-bred. Reijngoud (2009) also conducted a study on the availability of these species on the internet and found that* C. bakeri *and* C. oedirhina *were not available for sale, whilst* C. melanosterna *were available but only on a small scale and advertised as captive bred.* **C. bakeri:** *Binns (2009) stated that* C. bakeri *does not appear to be available in the USA.* **C. melanosterna:** *Gaal (2009b) suggested that* C. melanosterna *are not threatened by the international trade, partly because they are not easy to keep in captivity. Gaal*

(2009b) also found that the only C. melanosterna *found for sale in pet shops were captive-bred. All other* Ctenosaura *found for sale were the more popular, smaller species including:* C. flavidorsalis, C. oaxacana *and* C. quinquecariniata. *Binn (2009) stated that whilst specimens are occasionally available in trade they are primarily imported into the USA in small numbers along with* C. palearis. *An online chat room forum, suggested* C. melanosterna *are bred in captivity in the USA but that they are not highly sought after due to their reputation as bad pets (Anon., 2009).*

C. oedirhina*: Werning (2009) reported that an adult* C. oedirhina *can be sold for between USD150–250 but is not in high demand.*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

No Ctenosaura *species are currently listed in Appendix II.*

A proposal has been submitted to list C. palearis *in Appendix II, which will be discussed at CoP15 (Prop. 12).*

Hatchlings of Ctenosaura *species are similar in appearance and therefore may be difficult to identify to the species level without knowledge of origin.*

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

These three *Ctenosaura* species can contribute to seed dispersal and therefore the regeneration of forests.

Other information

Threats

They are subject to national use for food where the meat, eggs and skin may be consumed by local communities as a source of protein. *Ctenosaura* have also been used as aphrodisiacs (eggs and meat) and in some local communities, in traditional medicine (fat and meat) and more recently as laboratory animals and for exotic skins.

Wilson and Townsend (2006) state that the future of the Honduran herpetofauna is endangered due to deforestation as a result of unregulated human population growth. As all three species are primarily arboreal (Malfatti, undated; Gaal, 2009b), they are likely to be particularly vulnerable to deforestation and selective felling of trees.

Similar species

The species within the subgenus *Loganiosaura* are easily differentiated from other

Gutsche and Köhler (2008) note that all three Ctenosaura *species are easily*

Ctenosaura species.

***C. melanosterna*:** Until 1997 this species was considered to be the same species as *C. palearis*. However they differ in colouring, behaviour and osteological features.

***C. oedirhina*:** Until 1987 this species was considered to be the same species as *C. bakeri.* However, molecular and morphological characteristics demonstrated that they should be considered as distinct species.

distinguished by their morphological characteristics and their allopatric distribution despite their genetic similarities (only 1–2% difference). However, experts recognize (Pasachnik, 2009; Echternacht, 2009; Köhler, 2009) that look-alike issues may be problematic in identifying specimens of unknown origin, especially hatchlings.

Ctenosaura flavidorsalis *is present in Honduras.*

C. melanosterna *and* C. palearis *can also be distinguished by their size and weight when grown (Gaal, 2009b).*

U.S. LEMIS data, from 2000-2007, showed that wild taken specimens of C. similis *from Honduras are in trade (total: 8 025). However,* C. similis *are said to be easily identifiable due to their green colouration as a hatchling and their intercalary scale rows (Echternacht, 2009; Pasachnik, 2009).*

Conservation, management and legislation

C. bakeri: *Has been protected by Honduran law since 1994; this includes a ban on hunting. However, this has been sporadically and poorly enforced (Pasachnik, 2006). They are known to occur in Turtle Harbour Wildlife Refuge and The Utila Research and Breeding Station which was established in 1997 in order to promote conservation ethic and to establish a breeding programme (Binns, 2003).*

The Bay Island Conservation Agency (BICA) and the Conservation Project Utila Iguana (CPUI) are also promoting conservation of C. bakeri*, one major project is focusing on establishing a 'mangrove sanctuary' to protect* C. bakeri *habitat (Binns, 2003).*

C. melanosterna: *Is protected by Honduran law, which includes a ban on hunting. Additionally the Cayos Cochinos Archipelago is protected by the Honduran Coral Reef Foundation (HCRF) which has set up a research centre in Cayo Pequeno. This has halted hunting and habitat destruction and allowed "*C. melanosterna *to thrive" (Pasachnik, 2006). There is also a protected area in the Aguán valley (Pasachnik, 2006) and a research and breeding centre on the mainland has also been proposed (Gaal, 2008).*

C. oedirhina: *Is not currently under any legal protection, although according to Pasachnik (2006), the island is large enough and has enough protected areas to conserve this species which is adept at exploiting different habitat types. Some protection is offered to specimens on private land (e.g. Paya Bay on Roatán) and specimens which occur in the red Mangrove Canal are relatively well protected as* C. oedirhina *is regarded as a tourist attraction (Pasachnik, 2006).*

Captive breeding/artificial propagation

C. bakeri: *A breeding program exists at the The Utila Research and Breeding Station where over 750 hatchlings have been produced (Castillo, 2009).*

In 1994 several specimens were imported to Germany for a captive breeding programme (Köhler and Rittmann, 1998) and there are now a number of specimens in European zoos being successfully captive bred, including at London Zoo. Plans include breeding programmes at zoos in Spain, Poland and California (Eccleston, 2007). There are also two zoos in the USA which hold collections of C. bakeri *(http://www.fortworthzoo.com/conserve/utilaiguana.html).*

C. melanosterna: *A Studbook was established for* C. melanosterna *in 2007 which includes 30 specimens. There are six known locations keeping* C. melanosterna*, three in the Netherlands and three in the USA (Gaal and Henningheim, 2008*). *A zoo in Helsinki and Vienna also hold collections of* C. melanosterna *(Gaal, 2009b).*

C. oedirhina: *A captive population exists in Rotterdam Zoo and there are some specimens kept by private reptile keepers in Germany, the Netherlands (Köhler, 2004) and the USA (Gaal, 2009b). A captive breeding programme in Germany began in 1994 (Köhler and Rittmann, 1998), information on the success of the programme could not be found. The European Studbook Foundation also keeps a studbook for* C. oedirhina*, with two known locations: Netherlands and the USA.*

Other comments

C. bakeri: *The mangroves are usually state-owned and therefore could be easily protected, whilst the beaches are often privately owned and may be harder to protect.*

Gaal (2009) acknowledges that illegal trade for C. melanosterna *is not the primary threat for this species; rather the primary problems for this species are loss of habitat and local consumption.*

Reviewers:
R. Gaal, A. Gutsche, TRAFFIC North America, H. Werning.

Inclusion of the Guatemalan Spiny-tailed Iguana *Ctenosaura palearis* in Appendix II

Proponent: Republic of Guatemala

Summary: The Guatemalan Spiny-tailed Iguana *Ctenosaura palearis* is a medium-sized omnivorous arboreal iguana, endemic to the semi-arid dry forests and spiny thickets of the Rio Motagua Valley in Guatemala. It is one of around 15 species of *Ctenosaura,* a genus in the family Iguanidae native to Mexico and Central America. Two or possibly four other species of *Ctenosaura* occur in Guatemala, including *C. flavodorsalis* and *C. similis* and, debatably, *C. alfredschmidti* and *C. acanthura.*

Female *C. palearis* reproduce once a year; clutches of six to twelve eggs are deposited in holes or tunnels between March and April and the eggs hatch in May, coinciding with the start of the rainy season.

Recent field work has established that the species occurs fairly widely in the Rio Motagua Valley ecoregion, in which around 100 000 ha of potentially suitable habitat remains. However, much of this is reported to be degraded, with degradation ongoing, in particular through felling of the tree cactus *Stenocereus pruinosus*, an important component of the habitat for the iguana. A 2008 study based on sample plots estimated an overall average density of one individual per 1.7 ha (0.6 individuals per ha) in a 3000 ha area that included some of what was considered to be the best quality habitat for the species. Overall, some 20 sub-populations of the species have been identified to date. An unpublished mark-recapture study indicated that the overall population might comprise around 5000 individuals, with perhaps fewer than 2000 mature individuals. Only a very small proportion of the habitat is included within protected areas.

The species is (legally) harvested for subsistence purposes for food and in traditional medicines. In two areas where it is harvested (Los Morales and Morazán) the species is also reported to have been collected for (illegal) export in the live animal trade. Local people in these areas stated that those collecting *C. palearis* for subsistence took an average of around six specimens per month, whilst those collecting live animals for export took 50–60 per month. They also reported that populations of the iguana had declined dramatically in the past 20 years and researchers visiting these areas recently failed to find the species.

C. palearis is in international trade as a live animal, although seemingly on a relatively small scale. The US Fish and Wildlife Service data reporting system (LEMIS) shows the importation of 240 wild-taken *C. palearis* individuals from Guatemala in 2008 for commercial purposes; this trade was allegedly unknown to Guatemalan authorities. LEMIS data also show the importation into the USA from Guatemala of 210 wild-taken specimens of the genus *Ctenosaura* in the period 2000–2007. It is not known how many of these, if any, were *C. palearis*. There are conflicting reports on the level of international demand for the species. Advertised prices are said to be relatively low, between USD25 and EUR25, although some websites are offering specimens at considerably higher prices (up to USD149).

C. palearis is included in Category No. 2 of the Endangered Species List in Guatemala (CONAP, 2009) and can only be used for scientific, research and breeding purposes aimed at the conservation of the species. Individuals can only be traded if they are captive-bred to F2 generation, are bred by authorized persons and the trade has no commercial value. It appears that no captive-breeding operations have been established in Guatemala.

Three other similar species of *Ctenosaura*—*C. bakeri, C. melanosterma* and *C. oedirhina,* all endemic to Honduras—have also been proposed for inclusion in Appendix II at CoP15 (see CoP15 Prop. 11).

Analysis: *Ctenosaura palearis* is reasonably widespread, with 20 identified subpopulations (of which two may be extinct) occurring in around 100 000 ha of habitat. However, much of the habitat is fragmented and degraded, with conversion and further degradation continuing. The most recent information indicates that the overall population may be small, perhaps around 5000 individuals. The species is taken for subsistence use and in two areas has apparently been collected for export in the live animal trade; in these areas it is now reportedly either very rare or extinct. The number of individuals reported in international trade is small and, although reports conflict somewhat, demand for the species appears generally low.

The most recent information suggests that the population of *Ctenosaura palearis* may be around the guideline figure for a small population given in Annex 5 of *Resolution Conf. 9.24 (Rev. CoP14)* and the fact that collection for export has been implicated in the decline or extirpation of two sub-populations, *Ctenosaura palearis* may meet the criteria for inclusion in Appendix II in that regulation of trade may be necessary to prevent the species becoming eligible for inclusion in Appendix I in the near future.

Supporting Statement (SS)	Additional information
Taxonomy	
Synonyms: *Enyalisaurus palearis*	*Prior to 1997* C. palearis *and* C. melanosterna *were considered conspecific (Buckley and Axell, 1997).*
Range	
Guatemala	
IUCN Global Category	
Critically Endangered (criterion B1ab(iii)).	*Assessed 2004 Categories and criteria ver. 3.1*

Biological and trade criteria for inclusion in Appendix II *(Res. Conf. 9.24 (Rev. CoP14)* Annex 2 a)

A) Trade regulation needed to prevent future inclusion in Appendix I	
Endemic to the semi-arid dry forests and spiny thickets of the Rio Motagua Valley, including the departments of El Progreso and Zacapa. The supporting statement (SS) states that *C. palearis* is restricted to a few remaining wooded areas and semi-arid parts of the Motagua Vallery, over an area of 101 353 ha², citing Cotí and Ariano (2008). However, the SS also states that only 100 206 ha of the original habitat remains. The SS also notes that much of this area has been degraded and that the species	*The figure given in the SS of 101 353 ha is from Ariano and Coti (2007) who estimated the potential area of distribution as 101 353 ha by investigating historical collections of* C. palearis *which was confirmed through interviews with local people regarding catches and direct observations of individuals. They found that* C. palearis *was distributed throughout more or less this entire area. They observed that populations of* C. palearis *appeared to be in good conservation condition throughout the area, particularly in Cabañas and Gualán. In the regions of Morales and El Progreso the species was doing less well, which was linked to high levels of illegal trade.*

Supporting Statement (SS)	Additional information
has become locally extinct. The altitudinal range is 350–700 m asl.	*Cotí and Ariano (2008) give a figure for the area of the semi-arid region of the Motagua valley as around 200 000 ha, and note that there has been considerable loss of habitat in the region, but do not provide a figure for the remaining habitat. In their study, they sampled a total area of 6400 m² and estimated the total population in their study area to be 99 individuals. From this they calculated the maximum population in their 3000 ha study site to be 651 (95% confidence) and the average density to be one individual per 1.69 hectares.*
The SS notes that mark-and-recapture studies carried out in 2007 indicate a total population of around 5000 individuals. Elsewhere it quotes that mark-recapture studies have estimated total population size of between 2500 and 5000 individuals. Declines in numbers have been noticed by local residents, who stated that about 20 years ago, they used to see up to five individuals in any one tree and now they only occasionally see one or two specimens.	*The study site was reported to be one of the areas of best remaining habitat for the species, with habitat elsewhere more fragmented and degraded, particularly through felling of the tree cactus* Stenocereus pruinosus*, an important habitat component for the iguana (Ariano, 2010). Recent studies had identified 20 sub-populations of the species, although no iguanas had been found in recent visits to two of these—Los Morales and Morazán—where the species was reported to have been collected commercially. Overall population was thought to comprise around 5000 individuals, of which mature individuals comprised fewer than 2000 (Ariano, 2010).* *Köhler and Vesely (1996) collected just 15* C. palearis *with the help of local people over four days suggesting population numbers may be relatively low.*

Supporting Statement (SS)	Additional information
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
There is huge international demand for this species for the pet trade, particularly within Europe and America. The demand for *C. palearis* for the pet trade is now greater than for local consumption. The supporting statement details internet sales of *C. palearis* to Germany, USA and Czech Republic for USD90. However, at a different point in the supporting statement, the average price for *C. palearis* is given as USD70.00.	*The* IUCN Red List of Endangered Species *specifies that the international pet trade is a threat to* C. palearis *but states that "it is not thought to be a serious threat at present" (Köhler, 2004).* *In a review conducted by TRAFFIC, it was observed that* C. palearis *was found in the EU (European Union) pet trade during the 1990s (Auliya, 2003).* *Coti and Ariano (2008) found that people harvesting* C. palearis *for commercial purposes would collect 50–60 specimens per month in order to sell them to international traders, compared to around six per month when collecting for local food consumption. Ariano and Cotí (2007) and Ariano (2010) reported that commercial collection was confined to two areas (Los Morales and Morazán) and did not appear to take place elsewhere, although harvesting for subsistence use did. Ariano (2010) reported that in recent visits to these areas, no iguanas had been found.* *A study investigating the availability of* C. palearis *for sale through the internet was conducted by Reijngoud (2009) and found that* C. palearis *was not available on a large scale. A brief internet search for the purpose of this review was also conducted; similarly this search indicated limited availability and demand for* C. palearis*. Specific observations during the internet search included: a chat room forum which implied that imported* C. palearis *are readily available in the USA, a forum which indicated that* C. palearis *is being exported from the Netherlands, though the source and country of import were not specified, and a limited number of websites advertising specimens for sale (EUR69–USD149), some of which were said to be captive-bred.* *Coti and Ariano (2008) specified that web and market surveys have revealed that* C. palearis *is sold in countries such as Greece, Germany and the USA for approximately USD25 per specimen.* *Binns (2009) reported that there appear to be hundreds of* C. palearis *for sale in the USA. He believes that local people are driven to supply* C. palearis *by economic incentives and that they are now targeting isolated populations of* C. palearis*, therefore devastating populations which are already threatened due to agricultural developments. Gaal (2009) also believes that* C. palearis *is being heavily traded, being smuggled into Europe and then later sent to the USA. Gaal states that this species is relatively easy to maintain in captivity, therefore making it a more popular pet than some other* Ctenosaura *species. However, Werning (2009) believes that although* C. palearis *is available in the pet trade, it fetches a relatively low price (approximately EUR25 wholesale in Germany; Hoch, 2009) and is usually only a*

Supporting Statement (SS)	Additional information
	"supplement" to imports of more popular reptile species. A reptile trader reported that there is very little specific demand for C. palearis *and that most purchasers of this species are uninformed and inexperienced reptile keepers (Werning, 2009). A breeder of* C. palearis *in the USA stated that he had difficulties selling his specimens despite breeding small numbers (Werning, 2009). This suggests that* C. palearis *is unlikely to be highly sought after by smugglers or traders.* *Data from the US Fish & Wildlife Service's data reporting system (LEMIS) show that in the period 2000–2007, 210 wild-taken specimens of the genus* Ctenosaura *have been imported by the USA from Guatemala. 193 of these specimens were live and reported to be for commercial purposes, the remainder (all imported in 2007) were for scientific purposes. However, these specimens have not been identified to species level and several species of* Ctenosaura *are known to occur in Guatemala.*
The supporting statement states that the local residents have reported receiving requests to capture up to 200 individuals for international trade. In addition, the US Fish & Wildlife Service reported the importation of 240 *C. palearis* from Guatemala in 2008.	*The 240* C. palearis *imported into the USA in 2008 were from one consignment and for commercial purposes.*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under Res. Conf. 9.24 (Rev. CoP14) Annex 2 a or listed in Appendix I

	No Ctenosaura *species are currently listed in Appendix II.* C. bakeri, C. melanosterna, *and* C. oedirhina *have been proposed for listing in Appendix II (CoP15, prop. 11).* C. melanosterna *and* C. palearis *are regarded as very similar in appearance and may be particularly hard to distinguish as hatchlings.*

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Other information

Supporting Statement (SS)	Additional information
Threats	
There are four major threats to *C. palearis*, including: increase in human population size, habitat loss (related to increased population), illegal trade and unsustainable hunting techniques.	*According to the* IUCN Red List of Threatened Species*, habitat loss is the greatest threat to* C. palearis *(Köhler, 2004).*
As the population of Guatemala has increased, so has the need for greater infrastructure and development. It has been estimated that approximately 30% or 60 000 ha of suitable *C. palearis* habitat has been lost. This is thought to be related to agricultural development, including farming of products such as corn, melons and tobacco. However, some of its habitat (3%) is protected and 56% of original habitat remains, although much of this is fragmented and degraded.	*The semi-arid region of the Motagua Valley covers approximately 200 000 ha but natural ecosystems have been fragmented and the area is now made up of a combination of crops, grasslands, thornscrubs and deciduous dry forest remnants (Cotí and Ariano, 2008).*
The supporting statement suggests that because *C. palearis* is primarily a tree-dwelling species, it is sensitive to selective felling of trees and as their habitat becomes more fragmented, individuals are becoming increasingly isolated and are forced closer to urban areas, resulting in an increased risk of poaching.	
Subsistence or local hunting of *C. palearis* is common in order to obtain meat and eggs. The meat of *C. palearis* is said to be preferred to the meat of *Ctenosaura similis,* which also occurs in Guatemala. The supporting statement suggests that some hunters (17.3%) prefer to hunt *C. palearis* during the dry season which correlates with their breeding season. They do this to obtain pregnant females which they can use for both meat and eggs. Another practice is to remove the eggs of live gravid females. Unfortunately, the females often die as a result of the incision made to extract the eggs. Parts of *C. palearis* are also used as an aphrodisiac and in traditional medicines. More recently it has been used as a laboratory animal and in the exotic skin industry.	*Coti and Ariano (2008) conducted a study on hunting of* C. palearis*. They found that 88% of people asked had eaten iguanas in the past, but only 39% ate them currently. Those collecting for subsistence reportedly took around six specimens per month, whereas those hunting for trading purposes collected 50–60 per month. The authors report that local people believe soup made from the meat of* C. palearis *can heal eye problems and cancer, whilst their fat is used to reduce swellings and heal earaches.*
The flooding caused by Hurricane Mitch is known to have affected *Heloderma horridum charlesbogerti* in the same region as *C. palearis*, which implies that *C. palearis* may have also been affected.	*According to Ariano (2006), the impact of Hurricane Mitch on populations of* H. h. charlesbogerti *could not be determined due to the lack of baseline data. However, they stipulated that eggs were probably lost as a result of the sensitivity of reptile eggs to changes in humidity. It is therefore likely that* C. palearis *was also affected.*
Similar species	
C. palearis is included in the subgenus *Loganiosaura* which also includes: *C. melanosterna, C. bakeri* and *C. oedirhina*. These are easily differentiated from one another.	*Prior to 1997* C. palearis *and* C. melanosterna *were considered conspecific due to their closely related phylogenetics (Buckley and Axell, 1997). However,* C. palearis *is much smaller and less colourful than* C. melanosterna *(in adulthood) and possesses different behavioural traits (Malfatti, undated), although hatchlings may be more difficult to distinguish.* C. melanosterna *has also been proposed at the present CoP for inclusion in Appendix II (see analysis for Prop. 11).*
A study was carried out to find out whether the species described as *C. palearis* in Guatemala was the same as the species described in Honduras or not. Their	

Supporting Statement (SS)	Additional information
findings led them to describe the Honduran population as an independent species—*C. melanosterna*.	C. similis *is easy to distinguish from* C. palearis *due to its intercalary scale rows and green colouring when a hatchling (Echternacht, 2009; Pasachnik, 2009).*
Conservation, management and legislation	
Ctenosaura palearis is included in Category No. 2 of the Endangered Species List in Guatemala. Locally, the species is one of those for which subsistence hunting is allowed, although its sale is prohibited. Hence, trade in any parts or derivatives of the species is illegal. There are a number of laws offering protection to *C. palearis* and other protected species, including laws related to the hunting of specimens, protected areas and the List of Threatened Species of Guatemala. Most importantly, the *Protected Areas Law, Decree 4-89* specifies that endemic species of Guatemala (including *C. palearis*) can only be used for scientific, research and breeding purposes aimed at the conservation of the species. Specimens can only be traded if they are captive bred to F2 generation and are bred by authorized persons. Prison sentences of five to ten years and fines of USD1250–2 500 are applicable to those found using wild species illegally. Guatemala implements a system of permits for all wild specimens and has capacity for enforcement amongst Customs, police and quarantine personnel. A national conservation plan for *C. palearis* is currently being developed. Since 2007, an NGO (Zootropic) has been monitoring *C. palearis* populations in the wild, microchipping some specimens and recording their behaviour. They have also implemented environmental education programmes. At this time only 3% (934 ha) of the species habitat is within Protected Areas. However, there are proposals to increase Protected Areas in the region and to encourage conservation by large land-owners.	*According to Cotí and Ariano (2008) "the lack of a regulator entity for the international trade markets make it difficult to control illicit commerce in this species". TRAFFIC North America (2009) suggest that, given that all use of this species (other than for scientific, research and breeding purposes aimed at its conservation) is prohibited by Guatemalan legislation, the primary problem is the lack of enforcement.* *Zootropic is also involved in conservation of private lands and is working towards an official declaration of municipal, communal and private nature reserves as part of the Guatemalan protected areas system (Ariano, 2006). Although aimed primarily at* H. h. charlesbogerti*, it may also benefit* C. palearis*.*
Captive Breeding/Artificial Propagation	
There is currently no captive breeding programme for *C. palearis* due to limited knowledge of the species, therefore sustainable harvesting of specimens is not considered an option at present.	*Captive populations are known to exist in three zoos, including: Rotterdam Zoo, Woodland Ark Zoo and Sacramento Zoo (Köhler, 2004).*
Other comments	
	Coti (2009) acknowledges that illegal collection for trade is not the primary threat to

Supporting Statement (SS)	Additional information
	the species, but believes that unless controlled it could increase pressure on the species.

Reviewers: P. Coti, TRAFFIC North America, H. Werning.

Inclusion of the genus *Agalychnis* in Appendix II

Proponent: Honduras and Mexico

Summary: *Agalychnis* is a genus of tree frogs occurring in Mexico, Central and South America. Five species are currently recognized by the CITES standard reference for Amphibians; a sixth (*Agalychnis litodryas*), generally considered synonymous with *A. spurrelli,* is sometimes recognized as a separate species. An additional species, *Cruziohyla calcarifer*, was previously included in *Agalychnis* but was moved to the genus *Cruziohyla* in 2005.

Agalychnis callidryas is the most widespread species. It occurs in Belize, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua and Panama. Although the population is said to be decreasing, it is considered to be abundant and fairly tolerant of habitat modification and is classified as Least Concern in the *IUCN Red List of Threatened Species*. A recent study in Belize found this species present at densities of between 0.05 and 0.21 frogs per m^2 in mating ponds at seasonal breeding aggregations. Estimated population size for Belize was thought to be under 2000; the population in Panama is possibly up to 10 000. Population estimates are unavailable for other range States.

Agalychnis moreletii occurs in Belize, El Salvador, Guatemala, Honduras and Mexico. It was reportedly locally abundant in some locations in Chiapas State, Mexico, El Salvador and Guatemala. However, recent surveys in Guerrero, Oaxaca and Chiapas, Mexico, indicate that it has disappeared from all the sites surveyed. In Guatemala and Honduras, the population is reported to be declining due to habitat destruction. It is uncommon, but occasionally found in breeding aggregations in Honduras. A recent study in Belize found the species present at mating ponds with similar densities to *A. callidryas* (0.07–0.21 frogs/m^2). However, there are far fewer ponds that support populations of *A. moreletii* and the overall population was estimated at well under 1000 individuals. The species is currently classified by IUCN as Critically Endangered.

Threats to *Agalychnis* species include deforestation and draining of areas for agricultural development, logging, human settlement, water pollution, introduction of invasive fish species, pest control, harvesting for international trade and climate change. The fungal disease, chytridiomycosis, in particular, is known to have seriously affected subpopulations of all *Agalychnis* species.

Of the other species, *Agalychnis annae,* endemic to Costa Rica, is classified by IUCN as Endangered, although is reportedly tolerant of modified habitats such as plantations and gardens, *A. spurrelli* (Colombia, Costa Rica, Ecuador and Panama) and *A. saltator* (Costa Rica, Honduras and Nicaragua) are classified as Least Concern. *Agalychnis litodryas* (Ecuador, Panama, presence uncertain in Colombia) is recognized as a separate species in the *IUCN Red List of Threatened Species* and is classified as Vulnerable.

Of the species within the genus, the Red-eyed Tree Frog, *A. callidryas,* is the most common in international trade. Nearly 19 000 individuals per year (between 2000 and 2007) have been imported into the USA according to their records, mainly from range States. Although the majority of trade is recorded as from captive sources, wild specimens (just over 20 000 in total between 2000 and 2008) have also been recorded in the USA's LEMIS trade database. This designation may not be reliable as there is no requirement to indicate source in the database for non-CITES species, and where no source is specified, wild origin is assumed. The majority of trade in *A. callidryas* originates from Nicaragua; wild export is prohibited from that country and, in theory at least, all exports should be of captive-bred specimens. The USA also reports significant imports from Panama and Guatemala.

A small number of wild *Agalychnis moreletii* has been recorded as imported by the USA from Guatemala recently (168 in 2007, 3 in 2008), and there are reports of *A. annae* available in small quantities as wild-collected individuals. Both species are also apparently available in limited numbers as captive-bred

specimens. There is no direct evidence of recent commercial trade in *A. saltator* or *A. spurrelli*, although there is a small amount of recorded trade from Ecuador of *Agalychnis spp.*. *A. spurrelli* is the only member of the genus present in Ecuador, although *Cruziohyla calcarifer,* considered at that time to be an *Agalychnis,* is also present.

The genus *Agalychnis* is proposed for inclusion in Appendix II, with *Agalychnis callidryas* and *Agalychnis moreletii* proposed in accordance with Article II paragraph 2a and the other three species of the genus proposed for look-alike reasons.

Analysis: *Agalychnis moreletii* is subject to a range of identified threats and appears to have undergone dramatic population declines that would already qualify it for listing in Appendix I. The species has been recorded in trade in limited numbers, it is offered for sale on the internet, often as captive-bred, but the total level of trade is unknown. However, it is possible that any uncontrolled collection of wild specimens will increase pressure on an already highly threatened species, so that regulation of trade may be required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences (Criterion in Annex 2 (a) B in *Resolution Conf. 9.24 (Rev. CoP 14))*.

The Red-eyed Tree Frog *Agalychnis callidryas* is by far the most abundant species of *Agalychnis* in international trade. Around 20 000 per year are imported to the USA and it is apparently popular as a pet in Europe and Asia. The majority of trade into the USA has been from Nicaragua, although it is unclear whether this is met through captive-breeding or wild harvest. Trade from other range States has also been recorded into the USA for both wild and captive-bred specimens, although the level of trade and its impact on this widespread and apparently locally abundant species is unclear. It is not evident, in this case, that regulation of trade is required to ensure that the species does not qualify for inclusion in Appendix I in the near future (Criterion in Annex 2 (a) A in *Resolution Conf. 9.24 (Rev. CoP 14)*), or that it is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences (Criterion in Annex 2 (a) B in *Resolution Conf. 9.24 (Rev. CoP 14)*).

Agalychnis annae appears to be in trade as wild specimens in very limited numbers, if at all, and it seems unlikely that regulation of trade is required to ensure that it does not become eligible for inclusion in Appendix I, or to ensure that harvest is not reducing the wild population to a level at which its survival might become threatened.

Agalychnis species are generally similar in appearance to each other. It is possible to distinguish between them on the basis of a combination of iris and flank colour, although there is intraspecific variation in the latter. Of the three species currently known to be in trade (two, *A. annae* and *A. moreletii,* apparently only in small quantities), each has a different iris colour and could be relatively easy for a non-specialist to distinguish. *A. callidryas, A. saltator* and *A. spurrelli* all have red irises, although there are differences between them in flank colour. Of these only *A. callidryas* is known to be in trade at present. Young frogs may be more difficult to distinguish, but there is agreement that these are rarely in trade as wild-collected animals.

Supporting Statement (SS)	Additional information
Taxonomy	
Under Frost (2004) the genus includes the species; *Agalychnis callidryas* (Cope, 1862), *Agalychnis moreletii* (Duméril, 1853), *Agalychnis annae* (Duellmann, 1963), *Agalychnis saltator* (Taylor, 1955), *Agalychnis spurrelli* (Boulenger, 1913).	Cruziohyla calcarifer *was previously within the genus* Agalychnis *but has recently been moved to the new genus* Cruziohyla *(Faivovich,* et al*., 2005, Colma* et al*., 2008).*

Supporting Statement (SS)	Additional information
A. litodryas, considered by some as a separate species, is treated as a synonym of *A. spurrelli.*	
Range	
Agalychnis annae; Costa Rica *Agalychnis callidryas*; Belize, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua and Panama *Agalychnis moreletii*; Belize, El Salvador, Guatemala, Honduras and Mexico *Agalychnis saltator*; Costa Rica, Honduras and Nicaragua *Agalychnis spurrelli*; Colombia, Costa Rica, Ecuador and Panama	A. callidryas—*there is also an isolated record from the Cartagena Botanic Garden in northern Colombia (Solis* et al.*, 2008).*
IUCN Global Category	
A. annae Endangered *A. callidryas* Least Concern *A. moreletii* Critically Endangered *A. saltator* Least Concern *A. spurrelli* Least Concern	*All species assessed 2008 (categories and criteria ver. 3.1)* Agalychnis litodryas *Vulnerable B1ab(iii) Assessed 2004 (categories and criteria ver. 3.1)*
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
A. moreletii —drastic decline in population, estimated at more than 80% in the last ten years.	A. moreletti *was formerly locally abundant in some locations in Chiapas State, Mexico, El Salvador, Guatemala. Recent surveys in Guerrero, Oaxaca and Chiapas, Mexico, indicate that it has disappeared from all the sites surveyed. It is uncommon, but occasionally found in breeding aggregations in Belize and Honduras. In Guatemala and Honduras, the population is declining due to habitat destruction (Santos-Barrera, 2004). In Belize it was formerly locally abundant but now found in very few breeding aggregations and the population is declining due to habitat destruction (Briggs, 2009).*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to a level where survival might be threatened by continued harvest or other influences	
Agalychnis annae tolerates disturbed habitats and can live in plantations and gardens. It has disappeared from most parts of its range, surviving mainly around San José only. It is estimated that the population has declined by over 50% in the last 10 years and continues to decline. Some recovery has been seen since declines in	A. annae *is offered for sale on some websites.* *Reijingoud (2009) found both* A. moreletii *and* A. callidryas o*ffered for sale on the internet at around EUR35 apiece, sometimes as captive-bred specimens.*

Supporting Statement (SS)

the mid-eighties in Costa Rica's Central Valley.

A. annae is offered for sale in the international pet trade. Costa Rica's letter of support states that there is illegal extraction and trade in this endemic species. No permits have been issued for wild harvest for trade or captive breeding.

Agalychnis callidryas considered to be a species with a wide distribution and presumed large population; abundant in some areas. In Honduras, the status of the species is controversial and ranges from scarce to locally common, even in deforested areas. It can live in secondary, but not highly degraded forests and adapts well where there has been selective logging. Populations in Colombia and Costa Rica appear to be stable. Population declines in Belize are attributed to change in land use. No information for Guatemala.

A. callidryas is one of the most popular and highly sought after in the international pet trade. Nicaragua, Guatemala, Panama, and Honduras, are the principal exporting countries, followed by Mexico and Costa Rica.

In the last 10 years at least 20 000 specimens were imported into the USA annually. According to US import records, specimens originated from all range States except Belize and Colombia. Export of specimens from Costa Rica is only permitted for scientific purposes. Nicaragua has exported considerable numbers of captive-bred specimens to USA, Canada, France, Germany and the Netherlands (approximately 26 000 per year from 2006–2008). Nicaragua's letter of support states that it only exports captive bred specimens of *A. callidryas* although trade data show almost 25 000 wild-caught specimens imported into the USA between 1999 and 2008 *(see # in additional information)*

Additional information

A. callidryas *tolerates a degree of habitat modification (Solís* et al.*, 2008). Common and stable in at least one rainforest locality in Honduras (Wilson and Townsend, 2006).*

Briggs (2008) found A. callidryas *densities at mating ponds in Belize of between 0.05 and 0.21 frogs/ m^2 at a single field site.* A. moreletii *specimens were also present in similar densities but for a shorter time period. In attempting to estimate population sizes of* A. callidryas *using field site densities as a reference and verbal accounts of others numbers, Briggs estimated fewer than 2000 frogs for the country. For Panama, the population sizes are larger and the longer rainy season allows for prolonged breeding; estimated population to be nearer 10 000 for the country (Briggs, 2009).*

No population information is available for this species in Nicaragua.

Origin	Source	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total	Ave. per year
NI	C	5280	9087	11534	1723	16805	10870	21447	20625	24726	122097	13566
NI	W	2521	7278	5958	1415	300		700	1230	1700	21102	2345
NI	R		150	50		250	199				649	72
CR*	W			12	34	28		20	2		96	11
GT	W	2265	2195	1166			689	720	737		7772	864
PA	W		2300		1100		200	750	100	100	4550	506
PA	C		600	500	1350	1700	1000	800	767	600	7317	813
HN	W	110	656	1418	1209	1083	430	164			5070	563
SV	C					272	50	200			522	58
MX	W	186	950	150	79	30					1395	155

Table*: Imports of* A. callidryas *into the USA. Source: FWS Lemis database. *Costa Rica for scientific purposes only.*

Although the majority of trade in A. callidryas *was reported as captive-bred from Nicaragua, significant numbers of wild-caught specimens were also recorded as exported by Nicaragua, despite the law apparently prohibiting wild exports. #However, for importation of non-CITES listed species into the USA it is not a requirement to specify source and where source is unspecified specimens are often*

Supporting Statement (SS)	Additional information
European Union Member States imported 16 077 *A. callidryas* from the USA between 1999 and 2008; the main importers were Germany, the UK, Italy, and the Netherlands. Although the species is very abundant in trade in Europe, there are no detailed import data available. The species is available from pet shops and dealers regularly or seasonally**.**	*recorded as wild (Henry, 2009) and therefore all statistics for wild imports are unreliable#. Nicaragua maintains that it only exports captive-bred specimens (Castellon, 2009). Significant imports to the USA have also been recorded from Panama, Guatemala and Honduras.*
El Salvador's letter of support (annex 5) states that it does not have any knowledge of captive breeding of the species or commercial wild harvest of the species. However, US import data show some trade in captive-bred specimens for *A. callidryas*.	*Large numbers (6281 in 2007, 6321 in 2008) reported as both wild and captive-bred specimens have also been re-exported from the USA to Europe, Canada, Taiwan POC, and Japan (see above on reporting of wild sourced specimens).*
Agalychnis moreletii globally Critically Endangered and in Guatemala and Belize also considered Critically Endangered. In Belize populations are small and scattered; spawning aggregations are mostly fewer than 50 but have been observed with more than 100. In the *Endangered Species List of Honduras*, *A. moreletii* is classified as rare and it has disappeared from two of its historic sites, although just recently, two new populations have been described. Leenders notes that it was never common in Honduras. El Salvador's population is estimated at 212 individuals in 20 populations; some populations are already known to be infected with the fungus *Batrachochytrium dendrobatidis*, another population may have been impacted by a volcanic eruption in 2005. This species is found in both intact and disturbed habitats, including coffee plantations.	**A. moreletii** *is infrequent in Honduras (Wilson and Townsend, 2006).* *A recent study in a single field site in Belize found densities at mating ponds of* A. moreletii *between 0.07 and 0.21 frogs/m^2, with an estimated population in Belize of far fewer than 1000 individuals (Briggs, 2009).*
Drastic declines in populations are estimated at more than 80% in the last ten years and populations continue to decline. In El Salvador, the population is currently listed as stable. The letter annexed to the SS from Twan Leenders notes the disappearance of *A. moreletii* from several localities previously known to have viable populations in the 1970s in Mexico.	*Greenbaum and Komar (2005) considered the species to be endangered in El Salvador, where its area of occupancy was approximately 90km² and found in nine localities.*
A. moreletii used to be common in the pet trade. Between 1999 and 2008, the United States recorded the import of 168 wild-caught specimens of *A. moreletii*, all from Guatemala, as well as 15 captive-bred individuals from Germany; 1610 *Agalychnis* specimens not identified to species level were imported from the range States of Guatemala and Honduras. The United States exported 52 specimens of *A. moreletii* to Canada, Japan, Sweden, and the Republic of Korea during that period	*US trade data (LEMIS) showed that 168 live wild specimens of* A. moreletii *were imported into the USA in 2007 and three live wild specimens in 2008, all from Guatemala. No other records of imports of this species were recorded in the US trade data. Some of these were re-exported to Brazil, Canada, Sweden, Japan and the Republic of Korea.*
According to Guatemalan authorities there have been no legal exports of *A. moreletii* and *A. callidryas* in recent years. Exports from Guatemala were probably illegal. Leenders in Annex 6 notes that 275 specimens were imported into the USA from Guatemala (which are not recorded in the US trade data) and that wild specimens have been offered for sale on the internet. However, he considers that no information exists to assess whether the harvest of wild frogs poses a threat to the continued survival of the species but considering the overall decline of the species warrants CITES protection.	*Anon. (2009a) observed that a small amount of people are captive breeding* A. moreletii *although some hobbyists suspected that wild specimens were also being offered for sale as captive.* *In addition to species specific imports recorded in the LEMIS database into the USA imports of* Agalychnis *species have been reported, which number over 5000 (wild and captive) with many originating in Nicaragua recorded as of both captive (~2000) and wild (950) (see above) and wild specimens from Guatemala and Panama and to a lesser extent Costa Rica, Ecuador, Honduras and Peru. An import of 620 live wild specimens was recorded in 2000 from Ghana. This is almost certianly in error*

Supporting Statement (SS)	Additional information
Agalychnis annae is endemic to Cost Rica and classified as Endangered. Ittolerates disturbed habitats and can live in plantations and gardens. It has disappeared from most parts of its range, surviving mainly around San José only. It is estimated that the population has declined by over 50% in the last 10 years and continues to decline. Some recovery has been seen since declines in the mid-eighties in Costa Rica's Central Valley. *A. annae* is offered for sale in the international pet trade. Costa Rica's letter of support states that there is illegal extraction and trade in this endemic species. No permits have been issued for wild harvest for trade or captive breeding. The USA recorded the importation of 953 specimens of *Agalychnis* spp. spp. from spurrelli (although these are also A. callidryas range States. 1610 *Agalychnis* specimens that were not identified to species level were imported from Guatemala and Honduras. Specimens from non-range States such as Ghana (3610) have also been recorded.	*One web forum entry notes that* A. annae *is also still being imported on a small level from an import seller know to the author (Anon., 2009b). Specimens offered for sale as captive-bred are advertised at a much higher price than* A. callidryas *and* A. moreletii *(see section on captive-breeding).*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

A.annae, A. saltator and *A. spurrelli* are proposed for inclusion in App. II in accordance with Article II, Annex 2 (b) paragraph A. Non-experts have difficulty distinguishing between *Agalychnis* species and the situation is exacerbated by each species displaying variations in colour patterns depending on its location, age or even the time of day. *A. saltator* and *A. spurrelli* can also be confused with *Duellmanohyla uranochroa*, and A. *spurrelli* with *Cruziohyla calcarifer* (formerly *Agalychnis calcarifer*), however there are obvious markings specific to each that would enable identification for enforcement purposes.	*The Splendid Leaf Frog* Cruziohyla calcarifer *is sometimes referred to by hobbyists as* Agalychnis calcarifer *on web fora (see caudata.com);* Cruziohyla calcarifer *was previously within the genus* Agalychnis *but has recently been moved to the new genus* Cruziohyla *(Faivovich,* et al.*, 2005, Colma* et al.*, 2008). This species occurs in Colombia, Costa Rica, Ecuador, Honduras, Nicaragua and Panama.*
A. saltator is presumed to have a large (but uneven) distribution and large population. Locally in Costa Rica it has been determined that this species is abundant. Populations are stable. There are no trade data for *A. saltator*.	**A. saltator** *is not especially common, but is regularly seen in mating aggregations at many sites. This species lives in tree canopies. It is an explosive breeder descending to temporary pools to reproduce (Bolaños* et al.*, 2008). In Honduras* A. saltator *is considered common and stable in at least one rainforest locality (Wilson and Townsend, 2006) and despite habitat loss at two of the known localities in Honduras, much suitable habitat remains and it does not appear to be under threat (Bolaños* et al.*, 2008). In Costa Rica, recent studies indicate that, although it has a patchy distribution, there is no ongoing habitat loss at the known localities.*

Supporting Statement (SS)	Additional information
A. spurrelli has a wide distribution and a presumably large population. In Colombia, the species is described as abundant but data collection indicates that they might be rare. Considered to be declining but difficult to determine because of the species' arboreal nature. *A. spurrelli* is occasionally sold in international trade and information is scarce. In the past 10 years, the USA has officially imported 21 wild-caught specimens from Costa Rica for scientific purposes.	**A. spurrelli** *is a medium-large sized frog. In Ecuador* A. spurelli *may have a high local population size, even in disturbed areas (Duellman, 2001, Ortega-Andrade, 2008).* *In addition to the 21* A. spurrelli *imported from Costa Rica to the USA, 150 specimens of wild* Agalychnis *species were imported from Ecuador in 2003, which could have been of* A. spurrelli*, the only species that occurs there, although* Cruziohyla calcarifer*, considered at that time to be* A. calcarifer*, is also present in Ecuador.*
There is potential confusion of the Critically Endangered *Agalychnis moreletii* with the more abundant *Agalychnis callidryas* (Leender Annex 6). Young *Agalychnis callidryas* can change from green to brown during the day to purplish at night. The young frogs have yellow eyes instead of red, and have coloured flanks which are dimmer and without bars.	Agalychnis spurrelli *is distinguished from other species of the genus* Agalychnis *by having the flanks and limbs uniformly yellow, orange, pale rose or pale purple, without dark stripes. The dorsum is green, usually with black-bordered pustular white warts (Ortega-Andrade, 2008).* A. annae *has a yellow iris whereas the other species have either a red or dark red iris (Faivovich* et al.*, 2005).* Agalychnis *species are generally similar in appearance to each other. It is possible to distinguish between them on the basis of a combination of iris and flank colour, although there is intraspecific variation in the latter. Of the three species currently known to be in trade (two,* A. annae *and* A. moreletii*, apparently only in small quantities), each has a different iris colour and could be relatively easy for a non-specialist to distinguish.* A. callidryas*,* A. saltator *and* A. spurrelli *all have red irises, although there are differences between them in flank colour. Tadpoles of* A. moreletii *are purplish brown, whereas those of* A. callidryas *are almost white and readily visible in muddy* water *(Stuart, 1948). There is no indication that tadpoles are in trade. Young frogs are unlikely to be traded as wild-collected specimens because of their fragility (Allen, 2010).*

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Supporting Statement (SS)	Additional information

Other information

Threats

Some areas of the rainforest within the range of *Agalychnis* have suffered the effects of global warming, deforestation, pollution and changes in drainage of the marshes. In several range countries deforestation rates are high.	*Chytridiomycosis is most likely the main cause of the disappearance of populations of* A. moreletii *in Mexico, and the species is now probably seriously at risk from this disease. Habitat destruction due to subsistence and small holder agriculture, and for the floral trade in Belize (Briggs, 2009) is also a threat to this species, which also was formerly common in the pet trade (Santos-Barrera* et al., *2004). The presence of chytridiomycosis has been confirmed in some* A. moreletii *populations in El Salvador (Felger* et al.*, 2007).*
Degradation and destruction of habitat by agriculture, logging, pollution and global warming is a threat to several species of tree frog, especially for species living in the canopy.	
In Belize, habitat modification and pollution are considered threats to *A. moreletii* and *A. callidryas* because they can limit access to breeding sites.	
In El Salvador, most specimens of *A. moreletii* are found in coffee plantations where pollution is a threat.	
In Honduras, deforestation, habitat modification, pollution and pest control are threats to the native tree frog species.	A. spurelli *has been recorded from a number of protected areas, including at least three in Panama and three in Costa Rica. In Ecuador, its geographic range overlaps with Reserva Ecológica Cotacachi-Cayapas, but it is not confirmed from any protected areas in Colombia (Jungfer* et al.*, 2008)*
In Honduras A*. callidryas*, *A. moreletii* and *A. saltator* correspond to a medium vulnerability, so that these species are considered moderately threatened.	
A. annae, *A. callidryas* and *A. moreletti* are in the international pet trade.	
The fungal disease chytridiomycosis has decimated populations of *Agalychnis*, which is probably the main cause of the disappearance of *A. moreletii* in Mexico and Belize. *A. annae* has survived in polluted areas because the fungus appears to be more susceptible to pollution than the frog.	
The few remaining known populations of *A. annae* are threatened by an introduced fish (*Xiphophorus hellerii*) which eats the tadpoles.	

Conservation, management and legislation

In many of the range States populations of *Agalychnis* occur within protected areas. *A. annae, A. callidryas A. saltator* and *A. spurrelli* are all found in many protected areas in Costa Rica. In Ecuador the range of *A. spurrelli* overlaps with Ecological Reserve Cotacachi-Cayapas. *A. spurrelli* has not been confirmed to occur within any protected areas in Colombia although populations of *Agalychnis* have been registered in reserves in Colombia.	A. spurelli *has been recorded from a number of protected areas, including at least three in Panama and three in Costa Rica. In Ecuador, its geographic range overlaps with Reserva Ecológica Cotacachi-Cayapas, but it is not confirmed from any protected areas in Colombia. (Jungfer* et al.*, 2008; Ortega-Andrade, 2008).*

Supporting Statement (SS)	Additional information
Agalychnis callidryas and *A. moreletii* are found in the Mayan Mountains in the Chiquibul Forest Reserve in Belize**.** In Panama, populations of *A. spurrelli* are known in various protected sites and *A. callidryas* is also found in the Darién National Park. In El Salvador, most of the distribution of *A. moreletii* is outside protected areas in shade-coffee plantations. In Costa Rica, *A. annae, A. saltator* and *A. spurrelli* are protected by the *Wildlife Conservation Law No. 7317*, *The Environmental Law No. 7554* and *Decree No. 32 633* of the regulation to the *Law of Conservation*. No commercial export of any *Agalychnis* species is permitted from Costa Rica. *A. annae* is one of four Costa Rican amphibians that have been chosen for an *ex situ* conservation breeding programme for management. In Guatemala, *A. callidryas* and *A. moreletii* are protected by the Constitution of the Republic of Guatemala, Articles 64 and 97, and the *Protected Areas Law (Decree 4-89)*, by which exporters must be registered and receive permits. In Guatemala, between 2005 and 2006, two companies have been registered for breeding and export; one for *A. moreletii* and one for *A. callidryas*. It has allowed the collection of a very limited number of specimens in specific sites with high populations of frogs for these companies to establish as a breeding group. Export permits are only given for copies of second generation (F2); so far, neither company has applied for export permits. Permits and certificates of origin will be required for export. In El Salvador, *A. moreletii*, is considered an endangered species. In El Salvador no requests have been made for harvesting from the wild. In Colombia *A. callidryas* and *A. spurrelli* are protected. In Belize, the trade in *A. callidryas* and *A. moreletii* are not permitted, and although there is specific protection for amphibians in the country, it is through legislation that protects the habitat and environment. In Mexico, neither *A. moreletii* nor *A. callidryas* are on the list of species at risk. Permits for collecting and export licences are required for export of all wild species. Honduras has a system of export quotas in place for *A. callidryas* and *A. moreletii* (3040 and 176, respectively, for 2003).	

Captive breeding/artificial propagation

Supporting Statement (SS)	Additional information
In El Salvador there are no captive breeding facilities legally established. For several species captive breeding is limited. Recently, German, Swiss and Austrian breeders selected *A. moreletii* as one of the 11 species of frogs as a priority for captive breeding and promoting *ex situ* conservation. Captive breeding operations are only known to exist in Nicaragua.	*Captive-bred Red-eyed Tree Frogs* Agalychnis callidryas *are generally healthier, less stressed, and easier to care for initially. One website was found advertising them for sale at USD30. Captive-bred specimens were found for sale, including:* Agalychnis callidryas *froglets for USD20 each,* Agalychnis moreletii *froglets for USD30 each and* Agalychnis annae *juveniles for USD80 (noted as rare).* *Anon. (2009a) notes that there are issues of legality with captive-bred specimens if the parent animals aren't legally imported.* *Briggs (2009) notes that* A. callidryas *eggs are easily reared and successful captive breeding can reduce and hopefully eliminate the wild-caught specimens used in the pet trade. For* A. moreletii*, eggs are similarly reared, but at this stage she strongly recommends their not being encouraged in the pet trade.*

Other comments

Reviewers:
F. Bolaños Vives, V. Briggs, TRAFFIC North America.

Inclusion of Kaiser Spotted Newt *Neurergus kaiseri* in Appendix I

Proponent: Islamic Republic of Iran

Summary: The Kaiser Spotted or Lurestan Newt *Neurergus kaiseri* is a rare amphibian endemic to Iran, where it is known from only four highland streams in the southern Zagros Mountains. It is the smallest of the four *Neurergus* species, with an adult length of 10–14 cm. Longevity in the wild is unknown, although in captivity the species regularly lives beyond six to eight years. *N. kaiseri* reach breeding size at two to three years of age. Females lay around 45–60 eggs, which are deposited singly or in clutches. Its unique colouring, a mosaic of black and white patches and orange-red dorsal stripe, legs and belly, has made it a popular species with hobbyists.

The species was assessed in 2008 by IUCN as Critically Endangered on the basis that there appear to have been drastic population declines, estimated to be more than 80% within ten years; its area of occupancy is less than 10 km^2; its populations are severely fragmented; and there is a continuing decline in the extent and quality of its habitat. There is little concrete information on population size and/or trends, although it is estimated that there may be fewer than 1000 mature individuals.

Over-collection for the pet and hobbyist trade is believed to have been a major cause of decline. Other threats include habitat loss as a result of firewood collection for small-scale subsistence use, coupled with the effects of recent severe droughts, and the introduction of non-native fishes that are spreading into the streams from lower elevations and which may feed on the larvae and eggs of *Neurergus kaiseri*. Concerns have also been raised that climate change may affect survival of *N. kaiseri*, causing fluctuations of water levels of streams and probably by contraction of optimum habitat as a result of increasing water temperature.

Collection of this species is prohibited under Iranian law. However, it has been observed for sale in markets in Tehran and wild specimens are apparently exported illegally. The species is offered for sale on the Internet, frequently said to be bred in captivity, but wild specimens are reportedly also available. Owing to the illegal nature of trade in wild specimens, the level of trade is difficult to determine. However, the purported levels of availability of wild specimens from one known dealer are in the order of 15–25% of the estimated mature population.

Analysis: The Kaiser Spotted Newt *Neurergus kaiseri* has a restricted range; the population is said to be small and it occurs in fewer than five severely fragmented locations. The population is said to have declined by more than 80% within recent years because of collection for trade, habitat destruction and the introduction of non-native fish. There is known to be trade in wild-collected specimens, despite export from Iran being illegal. *Neurergus kaiseri* would therefore appear to meet the criteria for inclusion in Appendix I.

Supporting Statement (SS)	Additional information
Taxonomy	
Neurergus kaiseri was first described as a subspecies of *Neurergus crocatus.*	
Range	
Islamic Republic of Iran.	

Supporting Statement (SS)	Additional information
IUCN Global Category	
Critically Endangered (A2d; B2ab(iii, v) ver 3.1)	*Assessed 2008.*

Biological criteria for inclusion in Appendix I

A) Small wild population

(i) Population or habitat decline; (ii) small sub-populations; (iii) concentrated geographically during one or more life-history phases; (iv) large population fluctuations; (v) high vulnerability

The SS states that the species meets criteria A ii), iii) and v) owing to observed small, fluctuating populations highly vulnerable to both intrinsic and extrinsic factors.

The total population is estimated to number fewer than 1000 mature individuals. Evidence based on field observations indicates that this species is rare and has undergone a dramatic decline within the previous 10 years.There is no population estimate available for *Neurergus kaiseri* in any of the four streams it inhabits in the southern Zagros Range.

B) Restricted area of distribution

(i) Fragmented or localized population; (ii) large fluctuations in distribution or sub-populations; (iii) high vulnerability; (iv) decrease in distribution, population, area or quality of habitat, or recruitment

The SS states that the proposal meets criteria B i), iii) and iv) owing to a very restricted (far less than 100 km^2) and fragmented area of occupancy.

Neurergus kaiseri is endemic to just four streams (in a single catchment area) within a restricted area of the southern Zagros Mountains of Lurestan, Iran; its area of occupancy is less than 10 km^2.

Although no information is available regarding terrestrial activity of *Neurergus kaiseri*, the appearance of the animals in aquatic habitat in March and their disappearance from the water in June suggests that this newt uses aquatic habitats mainly for breeding and spends a considerable amount of time in a terrestrial habitat, similar to the habit of other *Neurergus* species.

As a result of the substantial distance between different aquatic habitats and very rough topography, populations of *Neurergus kaiseri* are severely fragmented. Considering that all streams with *N. kaiseri* are located in deep valleys with very sharp slopes and are well separated, it is unlikely that the newts can disperse far from their streams during their terrestrial phase in summer, autumn and winter.

Neurergus kaiseri *inhabits periodic streams and ponds (Schmidtler and Schmidtler, 1975; Schultschik and Steinfartz, 1996, cited in Steinfartz* et al*, 2002) which do not provide stable environmental conditions, since water availability may drastically fluctuate over time. As a consequence, the breeding period of* N. kaiseri *and subsequent larval development are notably shorter than for the stream-species (Schmidtler and Schmidtler, 1975 cited in Steinfartz* et al.*, 2002).*

The populations are naturally fragmented by the local topography (Barani and Sharifi, in press).

High vulnerability to extrinsic factors, including: habitat decline owing to habitat loss for human development (such as forest practices), and dams, and resource extraction causing restricted movement because of habitat fragmentation (TRAFFIC North America, 2006).

Supporting Statement (SS)	Additional information
C) Decline in number of wild individuals **(i) Ongoing or historic decline; (ii) inferred or projected decline owing to decreasing area or quality of habitat, levels of exploitation, high vulnerability, or decreasing recruitment**	
The SS states that the species meets criterion C ii) owing to a marked decline in the population size, inferred from habitat loss as a result of expansion of warm water of Lake Dez Dam. The expansion of the dam has caused an increase in cyprinid fish to some streams inhabited by *Neurergus kaiseri*. The SS also suggests that numbers have declined as a result of extremely high levels of harvesting for national and international trade with a dramatic decline within the previous 10 years. Population decline is estimated to have been more than 80% within recent years (2001–2005). Although there is no population trend information available for populations of *Neurergus kaiseri*, in recent years it has become extremely rare to observe this newt in the wild.	. *No additional information on population trends was available; however the purported annual level of trade in wild specimens from one dealer may be in the region of 15–25% of the estimated number of mature individuals in the wild [see below].*
Trade criteria for inclusion in Appendix I	
The species is or may be affected by trade	
Evidence indicates that *Neurergus kaiseri* is being retailed in several European countries and in Japan. Live specimens are collected and smuggled out of Iran, probably via Azerbaijan, Ukraine, and the Russian Federation. In December 2004, 50 specimens of Kaiser Spotted Newt were offered for sale via an Internet web site. The price for a Kaiser Spotted Newt, up to approximately CAD350 per specimen, is high compared to most salamander species. Several shipments have been made in successive years to North America and Europe by a dealer in Ukraine (in 2005–2008 and 2010). Correspondence with this dealer in 2005 confirmed that wild-caught specimens of Kaiser Spotted Newt were imported and sold. According to the dealer, in early 2005 approximately 200 specimens were traded and approximately 250 more were expected, available by January 2006. It has been announced that wild-caught adults and captive-bred juveniles will be available in 2010. A wholesale trader in France offered the newts for EUR135 each and another large trader in Germany has been offering this species every year since 2005. Captive-bred animals have been offered for sale in the period 2006–2009 at lower prices (around EUR50–100) than those for wild-caught animals (EUR100–150).	Neurergus kaiseri *is a highly attractive animal, much in demand by private keepers (Federation of British Herpetologists and Reptile and Exotic Pet Trade Association, 2009).* *In January of 2006, one dealer was willing to export approximately 150 wild-caught adult* Neurergus kaiseri *to Canada (TRAFFIC North America, 2006).*

Supporting Statement (SS)	Additional information

Other information

Threats

An important threat to *Neurergus kaiseri* is the introduction of several species of fish that have recently been able to expand their range upstream because of the expansion of the Dez Dam.

Furthermore, global warming may affect survival of *Neurergus kaiseri* through fluctuation of stream discharge and probably by contraction of optimum habitat as a result of increasing water temperature.

There is no information on chytrid fungus being a threat to this species but it may have been introduced by collectors or researchers.

Terrestrial habitat of *Neurergus kaiseri* is temporarily used by nomads. The fuel demand of these nomads is mainly supplied by wood, which coupled with the effects of recent severe droughts, could impact on the survival of *N. kaiseri*.

Direct negative effect may be expected to happen in Taleh Zang stream where an increasing number of visitors come to see the Shevi Waterfall during the Iranian new year holiday, starting on 21 March, during the time male *Neurergus kaiseri* expose themselves to find females.

Although *Neurergus kaiseri* is protected in Iran, animals have been observed for sale in Tehran pet shops for local use in aquaria.

Damming of the few known inhabited streams is a serious potential threat to the species. Non-native cyprinids are additionally spreading into the streams from lower elevations and present a threat to the larvae and eggs of this species (Sharifi et al.*, 2008).*

The Zagros Mountains are in a highly earthquake-prone region. Such tectonic movements often close off springs, dump debris into habitats, and make ponds and streams uninhabitable (Anderson, 2009).

Conservation, management and legislation

The Department of Environment (DOE) is responsible for protecting wild animals and plants. This department has general jurisdiction for environmental protection based on the *Game and Fish Law* (1967) and *The Environmental Protection Law* (1975). Iranian environmental legislation considers *Neurergus kaiseri* as an endangered species and it is therefore protected by law. Any collection of this amphibian needs a permit issued by the CITES office in the legal department of DOE in Tehran. Any illegal collecting or keeping is subjected to a fine, but not imprisonment.

Control and surveillance in the area where *Neurergus kaiseri* exists is the responsibility of the Regional Office of Environment in Khoramabad, Lurestan. If

*In a decree (*NO 168*) issued in September 1999 "Stream Salamander" were declared to be a protected species. The scientific name was not specified, but the two native species of* Neurergus (N. microspiletus *and* N. kaiseri) *are the only stream-dwelling caudates in Iran, therefore it can be inferred that these are legally protected (Sharifi, 2009).* N. crocatus *has also been recorded in the past from north-western Iran, although its presence there now needs to be verified (Papenfuss* et al.*, 2008).*

In the Iranian Game and Fish Law*, the species is not specified as protected. Aquatic animals are defined as "all marine or freshwater fish", i.e.do not include amphibians. No licences for the export of* Neurergus kaiseri *have ever been issued (Sharifi, 2009).*

Supporting Statement (SS)	Additional information
game rangers of any regional office of DOE encounter an illegal collector in the field, they are entitled to confiscate the specimens collected and the instrument by which they have been collected. However, the personnel of this regional office have no planned programme to conduct periodic checks to prevent illegal collection. According to present legislation, members of DOE are entitled to confiscate all live specimens in pet shops and also in the field. However, there is no evidence indicating how effectively this has been enforced. The area that the species is known from is close to the Zagros Oak Forest protected area.	
Similar species	
The northernmost species of the genus *Neurergus, N. strauchii, N. crocatus* and *N. microspilotus*, are similar in general appearance, with dark coloured bodies and contrasting bright yellow spots. *N. kaiseri*, occurring further south, is typically different, with its black and white mottling and orange dorsal stripe. All species of the genus appear to be stream-dwellers. *N. crocatus, N. microspilotus* and *N. strauchii* all have small or large round yellow-orange dots covering the dorsal side of the body, but never white coloured spots.	*All* Neurergus *species can be easily distinguished on morphological and ecological grounds (Schmidtler, 1994, cited in Steinfartz* et al*., 2002; Raffaëlli, 2009).* *A comparison made between characters pertaining to morphology and body stature in* N. microspilotus *and* Neurergus kaiseri *(Rastegar-Pouyani* et al*., 2006) indicated that the two species were distinguishable from each other (Barani and Sharifi, in press)*
Captive breeding/artificial propagation/	
So far *Neurergus kaiseri* has been bred only irregularly by private persons (see http://www.caudata.org/cc/species/Neurergus/N_kaiseri.shtml). There is a German studbook for this species run by private persons (see www.ag-urodela.de). There is a growing interest in zoos to start *ex situ* breeding programmes (e.g. Amphibian Ark) for rare and endangered amphibian species. However, this ability has rarely been documented in scientific journals.	*The first known captive specimens of* Neurergus kaiseri *were brought to Europe from field studies conducted in the 1970s by father and son Schmidtler and Schmidtler. In the early 1990s, Schultschik and Steinfartz brought some pairs to Europe, of which some descendents are still alive (Olsson, n.d.).* *A captive breeding programme is in place at the Sedgwick County Zoo in Wichita, Kansas, which now has hundreds of surplus captive-bred* Neurergus kaiseri*. The zoo has found that captive* N. kaiseri *will breed in both moving water and still water systems, and juveniles have been raised successfully in both aquatic and terrestrial environments (Amphibiaweb, 2009).* *An amateur breeder in Germany also manages a studbook for the species (TRAFFIC North America, 2006). Breeding guidelines are now available for this species (Olsson, n.d.). Bogaerts reports raising them in an aqua-terrarium without problems (Caudata, 2009).* *Specimens are offered for sale on the Internet, frequently as captive-bred. Wild-caught adults are generally more shy than their captive-bred counterparts (Caudata, 2009).* *On various Internet sites there are breeders offering specimens declared as captive-bred. Quoted prices include GBP40/EUR50 for young, GBP75.00 for a captive-bred*

Supporting Statement (SS)	Additional information
	juvenile, USD125.00 for captive-bred adults.

Other comments

Reviewers:
S. Anderson, T. Papenfuss, J. Raffaëlli, TRAFFIC North America.

Inclusion of Scalloped Hammerhead Shark *Sphyrna lewini*, Great Hammerhead Shark *Sphyrna mokarran*, Smooth Hammerhead Shark *Sphyrna zygaena*, Sandbar Shark *Carcharhinus plumbeus,* and Dusky Shark *Carcharhinus obscurus* in Appendix II

Proponent: Palau and the USA

Summary: The Scalloped Hammerhead Shark *Sphyrna lewini* is a large circumglobal species found in distinct ocean basin populations in coastal warm temperate and tropical seas. It has low productivity due to several life history characteristics including: long life span (up to at least 30 years), large size at maturity (108–200 cm or more depending on sex and population), late age at maturity (6–17 years), long generation time (20 years), long gestation time (8–12 months), relatively low litter size (12–41 pups per litter) and low population growth rate (8–10% per year). In much of their range, Scalloped Hammerheads are caught both in targeted shark fisheries, where they make up a large proportion of total catches, and as by-catch by longline, gillnet, coastal trawlers and purse-seine fleets. In some countries these sharks are also caught in recreational fisheries. Juveniles and neonates are heavily targeted in many locations. Where data are available on abundance and catch rates of Scalloped Hammerheads or a hammerhead complex including two other sphyrnid species (*S. zygaena* and *S.mokarran*), marked historic declines to below 15–20% of baseline as well as recent declines are evident. These include: a stock assessment of Scalloped Hammerheads in the North West Atlantic reporting an 83% decline in 24 years; decline in catch per unit effort of Scalloped Hammerheads by 98% in 32 years off North Carolina (United States of America); stocks in the Eastern Pacific (Cocos Island National Park) and South West Indian Ocean (South Africa) have also undergone declines of around 60–70% over the course of between eight and 25 years. Data aggregated for the hammerhead shark complex (*S. lewini*, *S. mokarran* and *S. zygaena*) follow similar declines including up to 99.9% in the Mediterranean since the early 19th century, by more than 85% over 44 years off the Queensland coast in Australia, and by 93% in industrial landings of sphyrnids in southern Brazil between 1994 and 2008. Scalloped Hammerheads are heavily exploited in several data-poor areas, including large parts of the Western Indian Ocean and the Western Pacific, where similar declines are suspected.

Scalloped Hammerhead fins are among the most highly valued in the international fin trade due to their large size and high needle count (meaning these fins are particularly desirable as the needles are the consumerable part of the fin). Patterns and trends in international trade are largely unknown due to lack of species-specific trade records. However, commercial trade records and genetic analysis of the Hong Kong fin market provided a combined estimate of 1.3–2.7 million Scalloped Hammerheads and Smooth Hammerheads harvested for the fin trade annually. Genetic analysis of a sample of fins in the Hong Kong market indicated that Scalloped Hammerheads are exploited for the fin trade from populations in the Indo-Pacific, East and West Atlantic. Growing demand for fins is driving increased retention and targeting of hammerheads, including Scalloped Hammerheads. Hammerhead shark meat is often considered unpalatable because of a high concentration of urea; nonetheless, there are some records of international trade. In some regions, such as Brazil, Scalloped Hammerhead neonates and juveniles are targeted by coastal gillnet fisheries and traded in domestic markets. Scalloped Hammerheads are listed on various international conventions, but species-specific management measures have yet to be introduced. As of January 2010, capture of Scalloped Hammerheads will be prohibited in Spanish fishing fleets wherever they operate. Scalloped Hammerheads should be gaining some protection from various regional shark finning bans, wherever they are effectively enforced, as well as shark fishing bans throughout the Exclusive Economic Zones of French Polynesia, Palau and the Maldives. Scalloped Hammerheads are listed globally as Endangered on the *IUCN Red List of Endangered Species*, with regional populations assigned individual listings of Vulnerable and Endangered.

The Food and Agriculture Organization of the United Nations (FAO) Committee on Fisheries (COFI) recognized the need to improve management of shark fisheries with the adoption in 1999 of the International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks), endorsed by the FAO Council in 2000. In 2009, FAO reported that out of 68 members responding to a questionnaire, 50% had conducted assessment as to whether a National Plan of Action (NPOA) was needed; 90% of those have gone on to develop and implement an NPOA. To date there has been no assessment of the effectiveness of NPOAs.

The Scalloped Hammerhead is proposed for inclusion in Appendix II under *Resolution Conf. (Rev. CoP14)* Annex 2a because of significant and continuing population declines driven by the international fin trade and caught as by-catch in other fisheries. The proposed listing would include an annotation to delay entry into effect of the inclusion by 18 months to enable Parties to resolve related technical and administrative issues. The Great Hammerhead Shark *Sphyrna mokarran*, the Smooth Hammerhead Shark *Sphyrna zygaena*, the Sandbar Shark *Carcharhinus plumbeus*, and the Dusky Shark *Carcharhinus obscurus* are also proposed for listing in Appendix II under *Resolution Conf. (Rev. CoP14)* Annex 2b criterion A for look-alike reasons. All are caught in targeted and by-catch fisheries and their fins are traded internationally. Fins from all these species are thin and falcate with the dorsal fin height longer than its base. As fins in trade, hammerhead fins, along with fins from *C. plumbeus* and *C. obscurus*, are morphologically similar to *S. lewini*. Hammerhead catches are often amalgamated as *Sphyrna* spp., and *S. lewini* is often confused with *S. zygaena*. Because of the difficulty in identification of these larger hammerhead species, catches of *S. lewini* are often amalgamated with *S. mokarran* and *S. zygaena*. Because of the higher value associated with the larger triangular fins of hammerheads and *Carcharhinus plumbeus* and *Carcharhinus obscurus*, traders sort them separately from other carcharhinid fins, which are often lumped together. Sorting fins to species is done by professional fin processors but this does not occur until late in the trade chain and certainly occurs after Customs would be officially required to identify fins to species.

The four other species proposed share many life history characteristics with Scalloped Hammerheads, making them vulnerable to exploitation and slow to recover. A series of stock assessments in the North West Atlantic have shown the following declines: Great Hammerheads declined by 96% between 1981 and 2005, Smooth Hammerheads declined by 91% between 1981 and 2005, Sandbar Sharks declined by 64–71% from unexploited levels, and Dusky Sharks declined by at least 80% from unexploited levels.

Analysis: The Scalloped Hammerhead is the target of fisheries that are driven by the international fin trade and is also caught as by-catch in other fisheries, with the products entering international trade. The species is intrinsically vulnerable to overexploitation. Harvest has led to major declines in some areas such that some stocks would appear already to meet the criteria for inclusion in Appendix I. Similar declines are suspected in other areas where the species is known to be harvested, but quantitative data are lacking. All subpopulations of the species have been assessed as either Vulnerable or Endangered by IUCN and there are not known to be any major unexploited populations. It would appear therefore that the species meets the criteria for inclusion in Appendix II, in that regulation of the trade is required to ensure that the species does not become eligible for inclusion in Appendix I, assuming that it does not already do so.

Scalloped Hammerheads are primarily in trade as fins. These fins are traded with those of the other four species proposed here for look-alike reasons. While fin traders with expert knowledge are able to sort shark fins reliably to species—except notably for Scalloped and Smooth Hammerheads which are often grouped together at all stages in the supply chain—such sorting typically does not occur until after Customs would be officially required to identify fins to species. DNA tests are available to confirm species identification for sharks but are not suitable for routine Customs checks. Hence it would seem that these other species do meet criterion A in Annex 2b of *Resolution Conf. 9.24 (Rev. CoP14)* based on the difficulty of distinguishing their fins from those of Scalloped Hammerheads.

Supporting Statement (SS)	Additional information

Taxonomy

Supporting Statement (SS)	Additional information
Range	
Circumglobal distribution in coastal warm temperate and tropical seas in the Atlantic, Pacific and Indian Oceans. Distinct breeding populations within each ocean basin, including North West Atlantic, Caribbean Sea, South West Atlantic, Eastern Central Atlantic and Indo-Pacific populations which are likely based on strong genetic traits. Nursery populations linked by continuous coastline have high connectivity. Adult sharks use offshore oceanic habitats (e.g. seamounts, continental shelves) and do not regularly roam large distances. **Number of FAO fishing areas present in:** Scalloped Hammerhead: 11 Great Hammerhead: 13 Smooth Hammerhead: 14 Sandbar Shark: 10 Dusky Shark: 10	***Scalloped Hammerhead:*** *Juveniles were formerly distributed throughout the continental shelf (Kotas, 2009). Females migrate seasonally inshore for pupping. Pregnant females have high fidelity to their native pupping grounds (Ibid).* ***Great Hammerhead:*** *Widely distributed throughout tropical waters, 40^0N–35^0S. Apparently nomadic and migratory with some populations moving polewards in the summer.* ***Smooth Hammerhead****: Has a wider range than other members of its family occurring in the Atlantic, Pacific and Indian oceans.* ***Dusky Shark:*** *Cosmopolitan but patchy distribution in tropical and warm temperate seas, including western and eastern Atlantic, Mediterranean, Indian Ocean, western and eastern Pacific.* ***Sandbar Shark:*** *Occurs worldwide in tropical and warm temperate waters, including northwestern and eastern Atlantic, Mediterranean, western Indian Ocean, western and eastern Pacific.*
IUCN Global Category	
Scalloped Hammerhead: Globally–EN Great Hammerhead: Globally–EN Smooth Hammerhead: Globally–VU Dusky Shark: Globally–VU Sandbar Shark: Globally–VU	***Scalloped Hammerhead:*** *Global species assessment Endangered A2bd+4bd (Assessed 2007, Criteria ver. 3.1).* *East Central and South East Pacific subpopulation–EN* *East Central Atlantic subpopulation–VU* *North West and West Central Atlantic subpopulation–EN* *South West Atlantic subpopulation–VU* *West Indian Ocean subpopulation–EN* ***Dusky Shark:*** *Global species assessment Vulnerable A2bd (Assessed 2007, Criteria ver. 3.1).* *North West Atlantic and Gulf of Mexico subpopulation–VU* ***Sandbar Shark:*** *Global species assessment Vulnerable A2bd +4bd (Assessed 2007, Criteria ver. 3.1).* *North West Atlantic subpopulation–Lower Risk/conservation dependent*

Supporting Statement (SS)	Additional information

Biological and trade criteria for inclusion in Appendix II *(Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Scalloped Hammerheads have several life history characteristics that make them highly vulnerable to over-exploitation in fisheries and will be slow to recover, including long life span (up to 30 years), large size at maturity (108–200 cm depending on sex and population), late age at maturity (6–17 years), long generation time (20 years), long gestation time (8–12 months), relatively small litter size (12–41 pups per litter), and low population growth rate (8–10% per year). In one demographic study, Scalloped Hammerheads were found to have among the lowest productivity compared to 26 other shark species.

Populations of Scalloped Hammerheads, and in some cases of the hammerhead shark complex (*S. lewini, S. mokarran, S. zygaena*), have undergone marked long-term and recent declines in the Atlantic, Mediterranean, and Indo-Pacific, as evidenced by stock assessments and catch rates. Other stocks are likely to experience similar declines unless trade regulations provide an incentive to introduce sustainable management.

The Scalloped Hammerhead has declined to at least 15–20% of baseline in many populations. Based on shorter-term abundance series, recent rates of decline are projected to drive this species down from the current population level to the historical extent of decline within approximately a 10-year period.

Details of the severe declines in hammerhead populations and catches are given in the SS and summarized below.

Years	Location	Data Source	Trend
Sphyrna lewini			
1972–2003	NW Atlantic	CPUE	98% decline*
1981–2005	NW Atlantic	SA (C, LH, CPUE)	83% decline*
1994–2005	NW Atlantic	CPUE	56% increase*
1993–2001	SW Atlantic – inshore	CPUE	60–90% decline
1992–2004	E Pacific (Cocos Is)	S	71% decline*

Size at maturity for Scalloped Hammerheads occurs between 150–250 cm, depending on sex and population (Branstetter, 1987, Stevens and Lyle, 1989).

An individual female Scalloped Hammerhead from southern Brazil was aged at 36.5 years (Kotas, 2009).

There are conflicting estimates of growth rates and productivity for Scalloped Hammerheads, probably confounded by regional variation and differences in methodologies between studies (Cortes, 2002). Ages and therefore growth rates of Scalloped Hammerheads are yet to be validated anywhere (Piercy et al.*, 2007).*

Despite assessment of the Australian subpopulation of Scalloped Hammerheads as Least Concern in 2003 by the IUCN Shark Specialist Group (Cavanagh et al., *2003), preliminary results from a 44-year dataset from the Queensland Shark Control Programme suggested a long-term decline (the 85% decline in the West Pacific listed in the table opposite) in hammerheads in the Cairns and Townsville region (de Jong and Simpfendorfer, 2009).*

Very large declines in Scalloped Hammerheads in most areas are evident, but should also be considered in the context of original population sizes, which were probably also very large (e.g. estimated abundance in north-west Atlantic after 1995 in one assessment was 25–45 000 individuals, Jiao et al., *2008).*

A 62% decline in landings of Scalloped Hammerheads is reported from the southern Mexico Pacific coast (Soriana et al., *2006).*

Industrial landings of the Sphyrna *group (mainly* S. lewini *and* S. zygaena*) in Santa Catarina State, southern Brazil underwent an overall decline of 93% between 1994 and 2008, following a peak of 570 t in 1994, and smaller peaks of 202 t in 1998, 353 t in 2002, and 381 t in 2005, eventually falling to 44 t in 2008 (Kotas, 2004). This was largely driven by rapid expansion in a gillnet fishery that targeted mainly hammerheads for the international fin trade (Ibid). Steep declines in CPUE (kg/cruise) were also observed for hammerheads caught by longliners and bottom gillnetters based in the same region (Kotas, 2004; Kotas, 2009).*

More than an 80% decline in Sphyrnid *catches and CPUE was observed in a driftnet fishery supplying the fin trade operating along the southern Brazilian coast during the period 1995–2005 (Kotas* et al.*, 2008).*

Supporting Statement (SS)

2004–2006	E Pacific	L	49% decline
1978–2003	SW Indian	CPUE	64% decline*
1989–1992	SW Indian	C	47% decline in neonates
***Sphyrna* complex (*S. lewini*, *S. mokarran*, and *S. zygaena*)**			
1986–2005	NW Atlantic	CPUE (C, LH, CPUE)	89% decline*
1981–2005	NW Atlantic	SA (C, LH, CPUE)	72% decline
1898–1922, 1950–2006, 1978–1999, 1827–2000	Mediterranean	CPUE	99% decline*
1978–2007	SW Atlantic – offshore	CPUE	None
***Sphyrna* spp. (Hammerhead sharks)**			
2004–2006	E Pacific (Ecuador)	L	51% decline
1963–2007	W Pacific	CPUE	85% decline
1997–8 & 2004–5	E Indian	CPUE	50–75% decline
1992–2005	NW Atlantic	CPUE	76% decline*
1994–2005	NW Atlantic	CPUE	25% decline*
1983–4 & 1994–5	NW Atlantic	CPUE	66% decline

CPUE=Catch Per Unit Effort, L=Landings, C=Catch, SA=Stock Assessment, S=Sightings, LH=Life History. *Data have undergone statistical standardization to correct for factors unrelated to abundance.

Additional information

CPUE of hammerheads (mostly S. zygaena *and* S. lewini*) in industrial bottom gillnets based in Santa Catarina State, southern Brazil, declined from 365 kg/trip in 2000 to 15 kg/trip in 2008 (a decline of around 96% in eight years), indicating that declines may be more severe in coastal areas where the neonates and juvenile hammerheads*

*are more common (Kotas, 2009). In contrast, offshore driftnet fleet recorded a relatively stable catch rate trend with some fluctuations (in 2008 the driftnet CPUE was 4700 kg/trip). However, this information should be considered with caution since this industrial fishery collapsed in 2008, with only a few vessels remaining in the region (Ibid). For industrial offshore longliners, CPUE declined from 1461 kg/trip in 2000 to 105 kg/trip in 2008, over a 90% decline (*Ibid*).*

Supporting Statement (SS)	Additional information

Recreational shark fisheries became extremely popular in the North West Atlantic with the release of the motion picture 'Jaws', and associated declines in abundance were observed in the 1970s and 1980s. Scalloped Hammerheads in the North West Atlantic seem to have stabilized at relatively low levels and possibly increased from mid-1990s levels.

Scalloped Hammerhead population and catches are not available from the eastern Atlantic other than the Mediterranean. Nevertheless, similar declining trends are expected in the North East and Central Atlantic as have been documented in the North West Atlantic, since longline fleets have shifted effort from western to eastern waters where they are exerting comparable fishing effort.

In the South West Atlantic, inshore fisheries catch rates have undergone recent declines by up to 90%, while offshore fleets recorded a relatively stable catch rate trend indicating that declines may be more severe in coastal areas where Scalloped Hammerheads are more common.

Hammerhead sharks have declined dramatically in Belizean waters in the past 10 years as a result of over-exploitation, leading to a halt in the Belize-based shark fishery. Pressure is sustained in this area by fishers entering Belizean waters from Guatemala. Few other sources of information are available to assess the Caribbean population of Scalloped Hammerheads, although they are caught in various fisheries along the Caribbean coasts of South America, Guyana, Trinidad and Tobago and in the eastern Caribbean Sea.

Juvenile Scalloped Hammerheads are heavily targeted and taken as by-catch in fisheries throughout the Eastern Pacific and Southeast Asia. Large hammerhead sharks were formerly abundant off the Pacific Coast of Central America but were reported to be depleted in the 1970s. As traditional and coastal fisheries in Central America are depleted, domestic fleets have increased pressure at adult aggregating sites such as Cocos Island and the Galapagos Islands, or along the slopes of the continental shelf where high catch rates of juveniles can be obtained.

There is reason to suspect that declines have also occurred in areas where Scalloped Hammerheads are subjected to high fishing pressure but where data are unavailable to assess population status and trends, including Southeast Asia and Western Indian Ocean.

Supporting Statement (SS)	Additional information
B) Regulation of trade required to ensure that harvest from the wild is not reducing the wild population to a level where survival might be threatened by continued harvest or other influences	
Scalloped Hammerheads are subject to target and non-target fisheries in parts of their range, driven by international demand for their valuable fins (see Section A above for details of stock declines). Hammerhead shark fins are highly desired in the fin trade due to their large size and high needle (ceratotrichia) count. The average wholesale price for dry/unprocessed Scalloped Hammerhead fins is USD135/kg making them among the most valuable fin types on the market. *S. lewini* and *S. zygaena* fins account for just under 5% of the Hong Kong fin trade. Commercial trade data from the Hong Kong fin market, combined with DNA and statistical analysis to account for missing records, provide a combined estimate of 1.3–2.7 million Scalloped Hammerheads and Smooth Hammerheads harvested for the fin trade every year. Greater international demand for fins and flesh since the late 1990s is known to have resulted in a substantial increase in the retention rates and targeting of sharks, including hammerheads, in the South West Atlantic and by longline fleets in the Central and South East Pacific. Hammerhead shark meat is often considered unpalatable because of high urea concentrations. Nonetheless, there are some records of international trade including from the Seychelles to Germany and from Uruguay to Brazil, Spain, Germany, the Netherlands and Israel. Hammerhead shark is favoured for its meat in Spain and Japan. Scalloped Hammerheads are a preferred species for production of leather and liver oil, and there is some use of jaws as marine curios. Hammerhead sharks have been documented in illegal, unreported, and unregulated fishing activities including 120 longline vessels operating illegally in the Western Indian Ocean and industrial vessels and shark finning elsewhere in the Indian Ocean. Illegal shark finning in the Galapagos Islands is likely to include Scalloped Hammerheads due to their local abundance, and the high value of their fins. Scalloped Hammerheads are fished heavily, both in target and by-catch fisheries, in western Africa by artisanal and offshore European fisheries. *Sphyrna* species comprised over 40% of the total by-catch taken by European industrial freeze trawlers targeting small pelagic fish off Mauritania from 2001–2005. Scalloped Hammerhead catches off Mauritania are exclusively juveniles. Declining catch rates in West African sharks, and Scalloped Hammerheads in particular, off Senegal and	*Unpublished data show an average wholesale auction price for dried/unprocessed Oceanic Whitetip fins as USD125/kg (range USD8–470/kg) (Clarke, 2009). The average price for hammerheads is less than for Oceanic Whitetips (*Ibid*).* *Genetic stock identification of fins collected from the Hong Kong market indicated that Scalloped Hammerheads from populations in the Indo-Pacific, East and West Atlantic are exploited for the fin trade (Chapman* et al.*, 2009). From a sample of 62 Scalloped Hammerhead fins, 21% were from the West Atlantic, indicating that the international fin trade remains a threat to the endangered population in this region (*Ibid*).* *In some regions, such as Brazil, hammerhead neonates (mainly Scalloped Hammerheads) are targeted by coastal gillnet fisheries and traded in domestic markets (Kotas, 2009). Summertime recreational fisheries also catch many Scalloped Hammerhead neonates (*Ibid*).*

Supporting Statement (SS)	Additional information
Gambia have been noted. The Scalloped Hammerhead is one of five dominant species in shark fisheries in Oman. FAO shark landings data for Oman report varied catches of between approximately 3000–8000 t since 1985, with peaks in the mid-1980s and 1990s, and a decline to under 4000 t in 2000. Large sharks, including Scalloped Hammerheads, appear to have undergone declines. In the eastern Pacific, Scalloped Hammerheads are a common catch in target shark fisheries: 36% of total catch in an artisanal shark fishery in the Gulf of Tehuantepec, Mexico; 6–74% in various areas in Guatemala; 12% in El Salvador. Scalloped Hammerheads constitute 18–30% of shark fisheries off Australia's east coast.	

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

Four other species are proposed for inclusion based on look-alike issues:

Great Hammerheads *Sphyrna mokarran*, Smooth Hammerheads *Sphyrna zygaena*, Dusky Sharks *Carcharhinus obscurus*, and Sandbar Sharks *Carcharhinus plumbeus* are proposed for inclusion because their fins are morphologically similar to Scalloped Hammerheads and difficult to distinguish in trade.

The larger triangular fins of hammerheads, Sandbar and Dusky Sharks are separated by traders from other carcharhinid fins, which are often lumped together. Traders in the Hong Kong fin market have separate categories for fins from Scalloped Hammerheads (Bai chun), Smooth Hammerheads (Gui chun), Great Hammerheads (Gu Pian) and a general category containing both Scalloped and Smooth Hammerheads (Chun chi) in an approximately 2:1 ratio respectively. Sandbar Sharks and Dusky Sharks also have their own market categories.

Together Scalloped, Great and Smooth Hammerhead fins account for nearly 6% of the identified fins in the Hong Kong shark fin market.

Catches of *S. lewini*, *S. mokarran*, and *S. zygaena* are often amalgamated.

Stock assessments in the North West Atlantic found that Sandbar Sharks have been depleted 64–71% from unexploited population levels. Current levels of exploitation of Sandbar Sharks in Western Australia have been determined as unsustainable.

A genetic analysis of fins in the Hong Kong market indicated that a relatively high proportion of samples (86–95%) for the five species in this proposal matched the hypothesized species based on traders' market categories (Clarke et al.*, 2006, see table below). Seven other categories containing various shark species were also identified accurately 60–100% of the time. Thus it seems that traders are able to distinguish between species in trade although there is still some mixing.*

Results of genetic analysis of shark fins by market category for five species in this proposal (Clarke* et al.*, 2006).

Traders' market category	*Hypothesized major shark species within market category*	*% of sample confirmed as matching the hypothesized species*
Gu Pian	S. mokarran	*86*
Chun chi	S. zygaena *or* S. lewini	*95*
Bai qing	C. plumbeus	*63*
Hai hu	C. obscurus	*85*

A large volume of fins (over half by weight) traded in unstudied and often nonspecific categories could not be characterized in this study (Clarke et al.*, 2006), indicating that much of the trade consists of relatively indistinct fins.*

Although professional fin processors and traders may be able to sort visually many fins to species, this does not occur until late in the trade chain and certainly occurs after Customs would be officially required to identify fins to species (Sant, 2009).

Supporting Statement (SS)	Additional information
Shark nets deployed off beaches of KwaZulu-Natal, on the south-western Indian Ocean coast of South Africa from 1978–2003, showed significant declines for Sandbar Sharks but not for Dusky Sharks.	
Multiple stock assessment models found Dusky Sharks in the North West Atlantic have declined by at least 80% with respect to virgin population levels. There are concerns for populations of this species due to declining neonate recruitment and unquantified catch of older sharks in non-target fisheries.	*Dusky Sharks were estimated to contribute approximately 1.4% of the fins in the Hong Kong market, and were the least reliably identified in the study (Ibid).*
Sandbar Sharks are commonly targeted in directed coastal gillnet and longline fisheries and occasionally caught as by-catch by pelagic longlines. Important Sandbar Shark fisheries are found in the western and eastern North Atlantic, and South China Sea. FAO catch statistics, reported primarily from the USA, peaked at 89 t in 1990 and has steadily declined since due to management restrictions.	*Stock assessments show that populations of Great Hammerheads and Smooth Hammerheads in the North West Atlantic have declined by 96% and 91% between 1981 and 2005 (Hayes, 2007).*
Sandbar Sharks are targeted in Australia by a gillnet fishery (SW) and demersal longline shark fishery (NE). Annual catches in these fisheries more than doubled between 1994–5 and 2003–4 to over 400 t.	*Several life history characteristics of Great Hammerheads contribute to their low productivity including: large body size (maximum recorded length 610 cm, Compagno 1984; common length 370 cm, Compagno, 1998), and long gestation (approximately 11 months, White* et al., *2006).*
Sandbar Shark fins are highly valued among Hong Kong traders and are one of the more common species identified in the international fin trade.	*Several life history characteristics of Smooth Hammerheads contribute to their low productivity including: large body size (maximum recorded size 500 cm, Muus and Nielsen, 1999; common length 335 cm, Compagno, 1998), and long gestation (10–11 months, White* et al.*, 2006).*
Dusky Sharks and Sandbar Sharks both have low intrinsic rebound potentials and low productivity when compared to other sharks.	*Sandbar Sharks are considered to be a low productivity species due to several life history characteristics including: large body size (maximum recorded length 250 cm, Nakaya, 1984; common length 200 cm, Frimodt, 1995), long life span (maximum reported age 32 years, Casey and Natanson, 1992), small litter size (1–14 pups, Randall* et al.*, 1990), long gestation (12 months, White* et al.*, 2006), and late age at maturity (13–16 years, various references from fishbase.org).*
Dusky Sharks are harvested in coastal shark fisheries in several parts of the world. They are also caught as by-catch in pelagic swordfish and tuna fisheries.	*Dusky Sharks are considered to be a low productivity species due to several life history characteristics including: large body size (maximum recorded length 420 cm, Compagno* et al., *1989; common length 250 cm, Sanches, 1991), late age at maturity (14–23 years, various references from fishbase.org), long life span (maximum reported age 40 years, Smith* et al., *1998), long gestation (approximately 16 months, White* et al.*, 2006), and small litter size (3–14 pups, Compagno, 1984).*
Juvenile Dusky Sharks have been the primary target of a demersal gillnet fishery in south-western Australian waters since at least the 1970s; annual catches increased rapidly from under 100 t to a peak of approximately 600 t in 1998–9 before management restrictions reduced and stabilized annual catches at approximately 300 t.	
Dusky Shark fins are highly valued among Hong Kong fin traders and are still documented in international trade.	
A PCR-based assay has been published for hammerheads, Dusky and Sandbar Sharks. DNA tests are also available to confirm species identification.	

Supporting Statement (SS)	Additional information
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	

Other information

Threats

The principal threat is from over-exploitation in target and by-catch fisheries, which catch adults, juveniles and neonates.

Conservation, management and legislation

Hammerhead sharks are listed in Annex I (Highly Migratory Species) of the UN Convention on the Law of the Sea (UNCLOS). Most Regional Fisheries Management Organizations (RMFOs) have implemented shark finning bans.

There are no known species-specific conservation or management measures in place for Hammerheads.

Scalloped Hammerheads are included in the Large Coastal Shark complex management unit in the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan in the USA, which includes commercial shark quotas and recreational retention limits. However, there are no management measures specific to this species in the USA or elsewhere.

The Spanish Ministry of Environment and Rural Affairs will prohibit the capture of Scalloped Hammerheads from 1 January 2010 by means of a Ministerial Order. This will apply to Spanish fishing fleets wherever they operate.

Shark fin export is prohibited from Ecuador, an attempt to stop illegal finning in the Galapagos.

There are shark finning bans in various fishing states including the European Union (EU), and nine RFMOs including the tuna commissions in the Atlantic (ICCAT), Eastern Pacific (IATTC), and Indian (IOTC) Oceans. These may help reduce harvesting of hammerheads for their fins alone and for Sandbar Sharks where they are captured.

Dusky Shark is a prohibited species (no commercial or recreational harvest) in the US EEZ of the Atlantic Ocean, Gulf of Mexico and Caribbean Sea. The same goes for Sandbar Sharks except for a small research fishery. Management measures exist

Shark fisheries are prohibited throughout the Exclusive Economic Zones (EEZs) of French Polynesia, Palau and the Maldives (in 2010).

Hammerheads are known to suffer high mortality from capture. Estimated on-line mortality of Scalloped Hammerheads in the North Atlantic was 91.4% (Morgan and Burgess, 2007). Therefore mandates for live release are not likely to be sufficient to offset captures to conserve hammerhead populations (Camhi et al.*, 2009).*

The International Plan of Action (IPOA) for the Conservation and Management of Sharks urges all States with shark fisheries to implement conservation and management plans. In 2009, FAO reported that of 68 members responding to a questionnaire, 50% had conducted assessments as to whether a shark National Plan of Action (NPOA) was needed; 90% of those have gone on to develop and implement an NPOA (Lack and Sant, 2009). In 2009, the Pacific Islands Regional Plan of Action (RPOA) for sharks was announced (Lack and Meere, 2009).

There have been no assessments of the effectiveness of any NPOAs to date and no RFMO has yet adopted a regional plan of management for sharks (Lack, 2009).

In the Brazilian EEZ, shark finning is prohibited by law, but requires enforcement by government authorities (Kotas, 2009).

Supporting Statement (SS)	Additional information
for Sandbar Sharks in Australia and for Dusky Sharks in Western Australia and South Africa (e.g. recreational bag limit).	
Captive breeding/Artificial propagation	
None known.	
Other comments	
It will be important to develop guides for the meat/carcass and fins of Scalloped Hammerheads and the other look-alike shark species also proposed for inclusion. The entry into effect of the inclusions of Scalloped Hammerheads, Great Hammerheads, Dusky Sharks and Sandbar Sharks in Appendix II of CITES is proposed to be delayed by 18 months to enable Parties to resolve the related technical and administrative issues.	

Reviewers:
S. Clarke, A. Harry, C. G. Hayes, J. Kotas, E. McManus, O. Sosa, TRAFFIC Oceania.

Inclusion of Oceanic Whitetip Shark *Carcharhinus longimanus* in Appendix II

Proponents: Palau and the United States of America

Summary: The Oceanic Whitetip Shark *Carcharhinus longimanus* is one of the most widespread shark species, ranging across tropical and subtropical waters (30^0N–30^0S). This highly migratory species has a large body size (largest specimens in recent studies 250–300 cm), late age at maturity (four to seven years), moderately long life span (up to 22 years), long gestation time (9–12 months), small mean litter size (five–six pups), and long generation time (10 years). These factors mean that the species has low productivity, making it vulnerable to over-exploitation and slow to recover following depletion.

Oceanic Whitetip Sharks were formerly among the most abundant pelagic sharks within their range and have been caught as by-catch in many pelagic fisheries around the world. A few significant small-scale fisheries target them and this species continues to make up a substantial proportion of total shark by-catch in many pelagic fisheries, mostly longline and purse seine fleets targeting tuna and Swordfish. Between 1993 and 2004, Oceanic Whitetip Sharks made up over 20% of the total shark by-catch by the purse seine fishery in the East Pacific. They are also present in 16% of French and Spanish tuna purse seine sets in the western Indian Ocean. The estimated annual by-catch of Oceanic Whitetip Sharks in longline fisheries is over 7000 individuals in the North Pacific and just under 540 000 in the Central and South Pacific. Lack of reporting and recording mean that Oceanic Whitetip Shark catches may be higher than documented in some areas. No stock assessments are available to determine population sizes, but available catch datasets indicate that this species has undergone severe historic and recent declines. In the North West Atlantic and Central Pacific, declines of 90–99% in catch per unit effort and biomass have been observed since the 1950s. Catch per unit effort of Oceanic Whitetip Sharks underwent a declining trend in the East Pacific of 90% in 10 years. Catches reported to the West and Central Pacific Fisheries Commission (WCPFC) declined by around 85% in eight years up to 2006. There is relatively little information on the status of the species in the Indian and South Atlantic Oceans, but it is known to be taken as by-catch in these areas (and in a directed fishery in the Gulf of Aden) and may be expected to have been subject to similar declines to those documented elsewhere. Catches in longline fisheries in the equatorial Atlantic are reported to have declined steeply. A large proportion of Oceanic Whitetip Shark by-catch in pelagic longlines is alive when brought onto the vessel (>75% in the USA longline fishery, 76–88% in Fijian longline fishery) and most individuals would be likely to survive if released unharmed.

Strong demand for Oceanic Whitetip Shark fins drives international trade and encourages the removal and retention of fins from sharks taken as by-catch throughout their range. Patterns and trends in the international fin trade are largely unknown as a result of a lack of species-specific trade records. However, analysis of commercial trade data from the Hong Kong fin market provided an estimate of 200 000 to one million Oceanic Whitetip Sharks harvested for the fin trade in 2000. It is estimated that Oceanic Whitetip Shark fins made up 2% by weight of the total global fin trade between 2002 and 2004.

Oceanic Whitetip Sharks are listed in Annex I of the United Nations (UN) Convention on the Law of the Sea, although no species-specific management has yet been put in place. They are subject to a joint quota in the USA and should benefit from shark finning bans which are in place in various countries and shark fishing bans in Palau, French Polynesia and the Maldives. Oceanic Whitetip Sharks are listed globally as Vulnerable on *The IUCN Red List of Threatened Species*, while the North West Atlantic and Central Atlantic populations are listed as Critically Endangered.

The FAO Committee on Fisheries (COFI) recognized the need to improve management of shark fisheries with the adoption in 1999 of the International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks), endorsed by the FAO Council in 2000. In 2009, FAO reported that out of 68 members responding to a questionnaire, 50% had conducted assessment as to whether a National Plan of Action (NPOA) was needed; 90% of those have gone on to develop and implement an NPOA. Several current NPOAs encompass regions where Oceanic Whitetip Sharks are caught as by-catch, including Japan, USA, and Fiji (Pacific Islands Regional Plan of Action). To date there has been no assessment of the effectiveness of NPOAs.

The proposed listing would include an annotation to delay entry into effect of the inclusion of *C. longimanus* in Appendix II by 18 months to enable Parties to resolve related technical and administrative issues.

Analysis: Oceanic Whitetip Shark fins are heavily exploited as by-catch in fisheries that occur throughout their range, where removal and retention of fins is encouraged by the high value of their fins in international trade. A large proportion of the Oceanic Whitetip Shark catch is alive when brought onto the vessel and it is believed that most individuals would survive if released unharmed, rather than retained for fin removal. The species is inherently vulnerable to over-exploitation and there is evidence demonstrating declines in most cases where exploited populations are monitored. Several stocks of Oceanic Whitetip Shark appear already to meet the criteria for inclusion in Appendix I, with historical declines to <10% of baseline, which for this low productivity species is within the decline guidelines for commercially exploited aquatic species in *Resolution Conf. 9.24 (Rev. CoP14)*. Other stocks are of unknown status, but in many areas are known to be subject to heavy fishing pressure; these may be expected to show similar changes to monitored populations. There is no indication of substantial unexploited stocks.

It would appear, therefore, that the species meets the criteria for inclusion in Appendix II, in that regulation of international trade is required to ensure that the species does not become eligible for inclusion in Appendix I.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Occurs between 20^0 N and 20^0 S in a circumglobal band, moving up to 30^0 N and 30^0S during summer migrations. Its range may possibly include the Mediterranean.	*Oceanic Whitetip Sharks fall within the jurisdiction of 131 range States. Native to the following FAO fishing areas: Atlantic – eastern central; Atlantic – northeast; Atlantic – northwest; Atlantic – southeast; Atlantic – southwest; Atlantic – western central; Indian Ocean – western; Indian Ocean – eastern; Pacific – southeast; Pacific – southwest; Pacific – western central; Pacific – eastern central; Pacific – northwest; Pacific – northeast*
IUCN Global Category	
Global—VU North West Atlantic—CR Central Atlantic—CR	*Global species assessment VU A2ad+3d+4ad (Assessed 2006, Criteria version 3.1)*
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
Oceanic Whitetip Sharks have several biological characteristics which contribute to their having a low intrinsic rate of population increase (7–9% per year), indicating	*There is some variation in the measurements given for Oceanic Whitetip Sharks. Maximum recorded length for Oceanic Whitetip Shark according to Randal* et al.*,*

Supporting Statement (SS)

that they are vulnerable to depletion and will be slow to recover from over-exploitation based on FAO's low productivity category (<0.14yr^{-1}).

These characteristics include: large theoretical body size (325–342 cm), large size at maturity (168–296 cm), late age at maturity (four to seven years), moderately long life span (11–13 years), long gestation time (9–12 months), small mean litter size (five–six pups), and long generation time (10 years).

Populations of Oceanic Whitetip Sharks have undergone marked historic and recent declines in the North West Atlantic, West Central Atlantic, Central and East Pacific. In several locations Oceanic Whitetip Sharks have declined at least to 15–20% of baseline. Other stocks are likely to experience similar declines unless trade regulations provide an incentive to introduce sustainable management.

Despite their prevalence in pelagic fisheries, catches of Oceanic Whitetip Sharks are often unrecorded or unreported and in many cases not reported to species level; thus catches may be larger and more widespread than documented.

Declines in Oceanic Whitetip Shark catch rates and body size, mostly as by-catch in pelagic longline fisheries, as described in the SS are summarized below:

Year	Location	Data	Trend
1992-2005	NW Atlantic	CPUE	57% decline*
1992-2000	NW Atlantic	CPUE	70% decline*
1992-2003	NW Atlantic	CPUE	9% decline*
1954-1957 & 1995-1999	Gulf of Mexico	CPUE	99% decline*
1954-1957 & 1995-1999	Gulf of Mexico	Mean size (kg)	35% decline
1951/58-1999/2002	C Pacific	B	90% decline*
1951/58-1999/2002	C Pacific	Mean size (kg)	50% decline

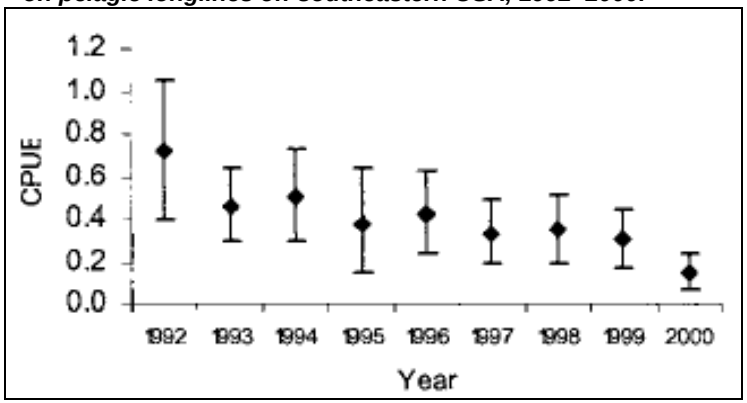
Additional information

(1990) is 396 cm; common length reported in Compagno et al.*, (1995) is 270 cm. Size at maturity appears to be approximately 180–200 cm for most populations of Oceanic Whitetip Sharks globally (Harry, 2009). In all recent studies, the largest empirically measured specimens were between 250–300 cm; sizes of 250–296 cm are larger than the usual size obtained (*Ibid*). By all estimations, these are very large sharks.*

Maximum reported age for Oceanic Whitetip Sharks is 22 years (Smith et al.*, 1998).*

Catch per unit effort (numbers/1000 hooks) of Oceanic Whitetip Sharks in a Swordfish fishery off Florida's east coast, USA, was 0.87 in 1981/1983 and 0.32 during 1992/2000, a decline of 63%, with an ongoing decline in catch per unit effort within the latter time period (Berkley and Campos, 1988; Beerkircher et al.*, 2002) (See Figure 1 below).*

Figure 1: Yearly mean catch per unit effort of Oceanic Whitetip Sharks caught on pelagic longlines off southeastern USA, 1992–2000.



Source: Beerkircher et al.*, 2002*

Supporting Statement (SS)

1967/70-1992/95	C Pacific W of 180^0 Lat	CPUE	No change
1967/70-1992/95	C Pacific E of 180^0 Lat, 0-10^{0}N	CPUE	40-80% increase
1967/70-1992/95	C Pacific E of 180^0 Lat, 10-20^{0}N	CPUE	30-50% decline
1995/2000-2004/6	C Pacific	CPUE	78% decline in deep sets 54% decline in shallow sets
1996-2006	E Pacific	CPUE	Decreasing trend ~90%

CPUE=Catch per unit effort, B=Biomass.

* Data have undergone a statistical standardization to correct for factor unrelated to abundance.

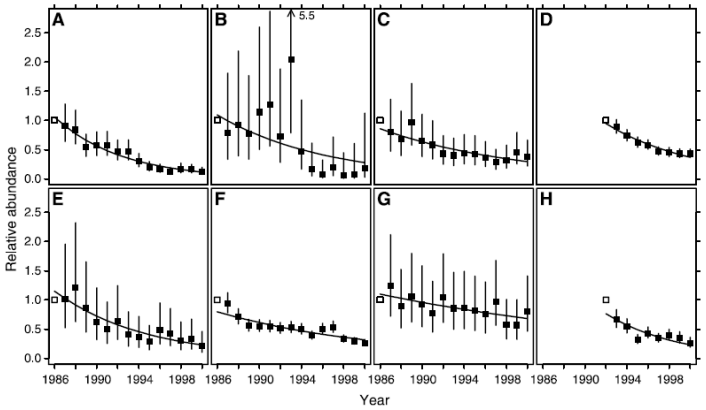
There is some variation in the estimated declines in catch per unit effort of Oceanic Whitetip Sharks in the North West Atlantic based on different data sources. These include 57–70% decline from 1992 to 2000 (from self-reported logbooks on commercial longliners), 36% decline (nominal observer series), and 9% decline, 1992–2003 (on-board scientific observers). There has been some debate over the extreme declines estimated for Oceanic Whitetip Sharks in the Gulf of Mexico since the 1950s. However, extrapolation of more recent datasets, dating back to the 1950s, match the historical analysis and thus it is likely Oceanic Whitetip Sharks are at least 15–20% of baseline in the North West Atlantic.

Long-term catch or abundance data are scarce for Oceanic Whitetip Sharks in the South and Central Atlantic. Their abundance appears to be patchy with evidence suggesting it has declined where formerly abundant. Catch rates by Brazilian longline vessels in equatorial waters have declined steeply since 1997.

No data are available to assess the status of Ocean Whitetips in the Indian Ocean, although they are known to be caught there (see section B below).

Additional information

Figure 2: Declines in estimated relative abundance for various coastal and oceanic shark species in the North West Atlantic. H shows logbook data for Oceanic Whitetip Sharks collected from 1993.

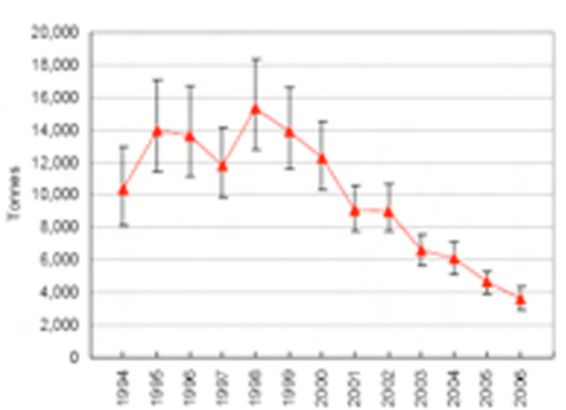


Source: Baum et al.*, 2003*

Oceanic Whitetip Shark catch data reported to the WCPFC since 1994 have declined by about 85% in eight years to 2006. Reported increases in catch and catch per unit effort up to the late 1990s may be the result of species identification errors (WCPFS, 2008). See Figures 3 and 4 below.

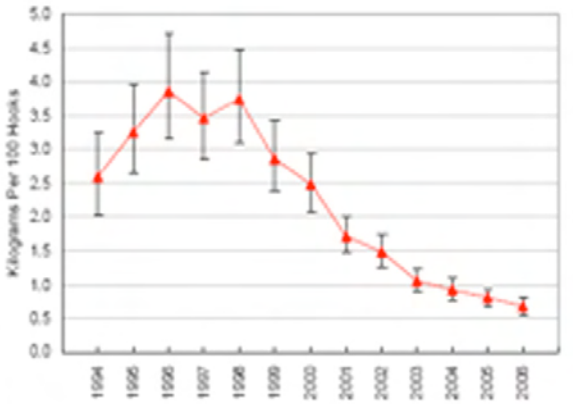
Supporting Statement (SS)	Additional information

Figure 3: Annual catch (t) for Oceanic Whitetip Shark by longliners from 1994 to 2006 in the West and Central Pacific.



Source: WCPFC, 2008.

Figure 4: Annual catch per unit effort (kg/100 hours) for Oceanic Whitetip Shark by longliners from 1994 to 2006 in the West and Central Pacific.



Source: WCPFC, 2008.

Supporting Statement (SS)	Additional information
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
International demand for their high value fins (USD45–85 per kg) drives retention of Oceanic Whitetip Sharks caught as by-catch in unsustainable high seas fisheries in parts of their range. Other stocks are likely to experience similar declines unless trade regulations provide an incentive to introduce sustainable management. Fins are usually removed and carcasses discarded at sea since the meat is generally of low value, although it is sometimes consumed fresh, dried or salted. Their livers are sometimes also harvested for oil and the skin used as leather. A large proportion of Oceanic Whitetip Shark by-catch in pelagic longlines is alive when brought onto the vessel (>75% in US longline fishery, 76–88% in Fijian longline fishery), thus most would be likely to survive if released unharmed.	*An average wholesale auction price for dried/unprocessed Oceanic Whitetip Shark fins in 2001 was USD122/kg (range USD 27–357/kg) (Clarke, 2009). They are among the top 20 preferred species for the fin trade (*Ibid*).*
Commercial trade data from the Hong Kong fin market, combined with DNA and statistical analysis to account for missing records, provide an estimate of 222 000–1 210 000 Oceanic Whitetip Sharks traded globally in 2000. Oceanic Whitetip Shark fins are some of the most distinctive and constitute approximately 2% by weight of the total international fin trade.	
Oceanic Whitetip Sharks are taken as by-catch throughout the Atlantic, including by French and Spanish tuna purse-seine fleets, the Uruguayan longline fleet, and the Japanese Atlantic longline fleet. This species make up a greater proportion of total shark by-catch in fisheries operating in tropical compared to temperate regions of the Atlantic. Brazil, Mexico, Spain, St Lucia, and the USA have reported catches of Oceanic Whitetip Shark to the International Commission for the Conservation of Atlantic Tuna (ICCAT) and are likely to underrepresent (50-fold) the magnitude of catches in the Atlantic.	*Oceanic Whitetip Sharks are significant in by-catch of Brazilian longline fisheries in the South Atlantic (Hazin* et al.*, 2008).*
According to the Inter-American Tropical Tuna Commission (IATTC), Oceanic Whitetip Sharks made up over 20% of the total shark by-catch by the purse seine fishery in the East Pacific between 1993 and 2004. The total observed number caught in this time was 32 000. Given the limited observer sampling coverage, this is likely to be a substantial underestimate. The estimated annual by-catch of Oceanic Whitetip Sharks in longline fisheries is over 7000 in the North Pacific and just under 540 000 in the Central and South Pacific.	
Oceanic Whitetip Shark catches are not reported to the Indian Ocean Tuna Commission, although they are caught in its region of jurisdiction. There are reports of Oceanic Whitetip Sharks being targeted by shark longliners and taken as by-catch by tuna fishermen in the Maldives. In the 1960s, Oceanic Whitetip Sharks made up 3.4% of the shark by-catch taken by Japanese longline vessels targeting Southern	*The lack of information of Oceanic Whitetip Shark catches to the Indian Ocean Tropical Tuna Commission is likely to be because species-level reporting is not required in this region (McManus, 2009).*

Supporting Statement (SS)	Additional information
Bluefin Tuna in the Indian Ocean. Oceanic Whitetip Sharks are present in 16% of French and Spanish tuna purse seine sets in the western Indian Ocean. A few small-scale fisheries target Oceanic Whitetip Sharks, primarily in the Gulf of Aden and on the Pacific coast of Central America.	

Other information

Threats

Directed and by-catch fisheries.

Conservation, management and legislation

Oceanic Whitetip Sharks are listed on Annex I (Highly Migratory Species) of the UN Convention on the Law of the Sea.

No species-specific management exists.

A combined pelagic shark quota in the USA is in place for Oceanic Whitetip Shark, Common Thresher *Alopias vulpinus*, and Shortfin Mako *Isurus oxyrinchus*. Atlantic sharks in the USA must be landed with fins naturally attached. Shark finning is banned in 21 countries, the EU, and by nine Regional Fisheries Management Organizations (RMFOs). Shark fisheries are prohibited throughout the Exclusive Economic Zones (EEZs) of French Polynesia, Palau and the Maldives (in 2010).

The IPOA for the Conservation and Management of Sharks urges all States with shark fisheries to implement conservation and management plans. In 2009, FAO reported that of 68 members responding to a questionnaire, 50% had conducted assessments as to whether a shark NPOA) was needed; 90% of those have gone on to develop and implement an NPOA (Lack and Sant, 2009). FOA member States with NPOAs encompass several regions where Oceanic Whitetip Shark are caught as by-catch, including Japan and USA. In 2009, the Pacific Islands Regional Plan of Action (RPOA) for sharks was announced (Lack and Meere, 2009). This region encompasses several areas where Oceanic Whitetip Sharks are caught as by-catch, including Fiji.

There have been no assessments of the effectiveness of any NPOAs to date and no RFMO has yet adopted a regional plan of management for sharks (Lack, 2009).

By-catch mitigation strategies for Australian pelagic fisheries that capture the species include a trip limit of 20 sharks per boat, restrictions on finning sharks at sea, and the banning of wire traces (Gilman et al*. 2007).*

Captive breeding/artificial propagation

None known.

Other comments

Oceanic Whitetip Shark fins are readily identifiable and are rarely mistaken for other shark fins in trade; it will be important to develop guides for meat/carcass and fins of this species.

The entry into effect of a listing of Oceanic Whitetip Sharks in Appendix II of CITES

Traders in Hong Kong sort Oceanic Whitetip Shark fins into a separate market category, Liu Qui *(Clarke* et al.*, 2006). A genetic study of 23* Liu Qiu *fins showed all 23 were correctly identified as Oceanic Whitetip Sharks (*Ibid*).*

Supporting Statement (SS)	Additional information
would be delayed by 18 months, to enable Parties to resolve the related technical and administrative issues.	

Reviewers:
S. Clarke, A. Harry, C. G. Hayes, E. McManus, TRAFFIC Oceania.

Inclusion of Porbeagle *Lamna nasus* in Appendix II

Proponent: Sweden, on behalf of the European Community's Member States acting in the interest of the European Community.

Summary: The Porbeagle *Lamna nasus* is a large warm-blooded shark occurring in temperate waters of the North Atlantic and in a circumglobal band in the Southern Hemisphere (30–60^{0}S). While it grows faster than many cold-blooded sharks, the Porbeagle has several life history characteristics that make stocks highly vulnerable to over-exploitation and slow to recover subsequently. These include: relatively slow growth rate, late maturation (8–18 years), long life span (29–65 years), large body size (up to 357 cm), small numbers of young (average is four pups per litter), long gestation (8–9 months) and long generation time (18–26 years) leading to a low intrinsic rate of population increase (5–7% annually in the North Atlantic, 2.6% in the South West Pacific) and low productivity.

The Porbeagle is one of relatively few shark species directly exploited for its meat and there is a well documented history of Porbeagle fisheries that have over-exploited stocks, as well as declines in the amount of reported by-catch of other fisheries. Following the collapse of the North East Atlantic Porbeagle fishery in 1960 (with 85–99% declines in landings in 69 years), Norwegian, Faroese and Danish fleets moved into the North West Atlantic where the fishery collapsed after six years. Stock assessments by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the International Council for the Exploration of the Sea (ICES) in 2009 identified historical declines to 6% of baseline in the North East Atlantic in 82 years (1926 to 2008), to 22–27% in the North West Atlantic in 44 years (1961 to 2005), and in the South West Atlantic to 18% in 47 years (1961 to 2008) and also a 60% decline from 1982 to 2008. Catch per unit effort (CPUE) of Porbeagle by pelagic longliners in the South West Pacific may also have declined by 50–80% in 10 years (1992 to 2002) and 80–95% in 17 years (1983 to 2000). Porbeagles have virtually disappeared from the areas of the Mediterranean where they were previously abundant, with catches in tuna traps declining by over 99.99% in some areas. Porbeagles continue to be targeted in the North Atlantic, including by five French vessels, Canadian vessels (185-t quota) and vessels from the USA (11-t quota). Fleets from Spain, Japan, Taiwan (Province of China) and South Korea take unquantified by-catch of Porbeagles in the South East Pacific. Assessments of the North West Atlantic stock indicate that numbers remain at a low but relatively stable level with a slight continuous decline in the number of reproductively mature females, a likely contributing factor to the limited recovery of stocks to date despite catch restrictions. Future projections suggest a recovery to Maximum Sustainable Yield (MSY) in the North West Atlantic would take place between 2030 and 2060, if the fishery were to be closed. Total reported catch in New Zealand has declined steadily from 300 t in the period 1988–89 to 50 t in the period 2005–06, despite increased catch effort.

Porbeagle meat is of high quality and high value and is traded internationally, but patterns and trends in international trade are largely unknown owing to lack of species-level trade records. Porbeagle fins are of questionable value for the fin trade but are traded internationally, largely as a by-product of the meat industry. A large proportion of Porbeagles caught in New Zealand waters are landed as fins and all fins are exported for the fin trade. Porbeagle fisheries are managed in only a small portion of their global range, with catch quotas in Canada, the USA and New Zealand, and a zero catch quota set for 2010 in the European Union (EU). The total allowable catch (TAC) in New Zealand is not based on a stock assessment and only around 20% has been reported as landed in recent years. The amount of unreported and unregulated fishing on the high seas is unknown but believed to be substantial, and a threat to stock recovery. The species is listed globally as Vulnerable in *The IUCN Red List of Threatened Species*, and regional populations have been assigned individual listings ranging from Near Threatened (Southern Ocean) to Critically Endangered (North East Atlantic and Mediterranean).

The Food and Agricultural Organization (FAO) Committee on Fisheries (COFI) recognized the need to improve management of shark fisheries with the adoption in 1999 of the International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks), endorsed by the FAO Council in 2000. In 2009, FAO reported that, out of 68 members responding to a questionnaire, 50% had conducted assessments as to whether a National Plan of Action (NPOA) was needed; 90% of those have gone on to develop and implement an NPOA. To date there have been no assessment of the effectiveness of

NPOAs.

The proposed listing would include an annotation to delay entry into effect by 18 months to enable Parties to resolve related technical and administrative issues.

Analysis: Porbeagles are inherently vulnerable to over-exploitation owing to their life history characteristics. They have a long history of being caught in unsustainable target and non-target fisheries. In all areas for which they are available, landing and CPUE statistics and stock assessments indicate marked recent declines or historic collapses, ascribed in all cases to the impact of fishing. There is undoubtedly high demand for Porbeagle meat, which has high economic value; fins are apparently in less demand. Both products are traded internationally, but a lack of species-specific data means it is not possible to gauge the exact scale of international trade. The relative overall importance of trade on observed and predicted declines compared to other factors, chiefly by-catch and harvest for domestic use, is also unknown. However, at least one fishery (New Zealand) appears to be driven very largely by international demand and it seems likely that such demand is an important contributing factor in other fisheries.

Several stocks, notably those in the North Atlantic and Mediterranean, already appear to meet the biological criteria for inclusion in Appendix I with recorded historical extents of decline in abundance and landings to <10% of baseline. In addition, available trend data for South West Atlantic and Pacific populations have shown declines of at least 50%, some displaying declines to near the quantitative guidelines for Appendix I. No information is available on one stock (South East Atlantic/South West Indian Ocean) but this stock occupies a relatively small proportion of the range of the species and its status is unlikely to affect an assessment of the overall status of the species as a whole. There is also no reason to assume that it would not respond in the same way as all other stocks if harvesting is occurring or were to occur.

Given the observed declines, and the known role of trade in at least one fishery and its likely role in others, it would appear that the Porbeagle meets the criteria for inclusion in Appendix II in that regulation of trade is required to prevent its becoming eligible for inclusion in Appendix I in the near future.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Lamna nasus falls within the jurisdiction of 57 countries and overseas territories in temperate waters of the North Atlantic Ocean (30–70^{o}N) and in a circumglobal band in the Southern hemisphere (30–60^{0}S). There are separate stocks in the North East and North West Atlantic, and also in the South East and South West Atlantic, which extend into the South West Indian Ocean and South East Pacific, respectively.	
IUCN Global Category	
Global–VU	*Global species assessment Vulnerable A2bd+3d+4bd. (Assessed 2006, Criteria*

North East Atlantic–CR
North West Atlantic–EN
Mediterranean–CR
Southern Ocean–NT

version 3.1).

Biological and trade criteria for inclusion in Appendix II *(Res. Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Porbeagles have several life history characteristics that make them highly vulnerable to over-exploitation in fisheries, including relatively slow growth rate, late maturation (eight to 18 years), long life span (29–45 years), large body size (up to 357 cm), small numbers of young (four pups, on average, per litter), long gestation time (eight to nine months), long generation time (18–26 years) and low intrinsic rate of population increase (5–7% in the North Atlantic, 2.6% in the South West Pacific). Therefore, Porbeagle should be considered as a species with low productivity (estimated natural mortality of 0.1–0.2). The animals are also highly migratory and, in at least some regions, they segregate by age, reproductive state and sex.

Porbeagles have undergone marked historic and recent declines in the North and South West Atlantic as evidenced by landings and notably stock assessments conducted in 2009 by ICCAT and ICES indicating declines to 10–30% of baseline in 44–72 years. Porbeagles have virtually disappeared from the areas of the Mediterranean where they were previously abundant, with catches in tuna traps declining by >99.99% in some areas.

The severe declines in Porbeagle stocks and landings are described in detail in the SS and summarized below:

Year	Location	Data	Trend
1936–2007	NE Atlantic (Norway)	L	>99% decline from baseline
1973–2007	NE Atlantic (Norway)	L	96% decline
1954–2007	NE Atlantic (Denmark)	L	99% decline from baseline
1973–2007	NE Atlantic (Denmark)	L	90% decline
1973–2007	NE Atlantic (Faroe Isles)	L	Decline and closure
1936–2007	NE Atlantic (all targeted catches)	C	80% decline since post WWII
1926–2008	NE Atlantic	SA	94% biomass decline, 93% number decline from baseline
Var	Mediterranean	B + A	>99% decline in tuna

1800–2006			traps over 50–100 years
1963–1970	NW Atlantic	L	~90% decline & fishery collapse
1961–2005	NW Atlantic	SA	73–78% decline from baseline
1961–2005	NW Atlantic	SA	84–88% decline in mature females
1961–2008	SW Atlantic	SA	82% decline
1982–2008	SW Atlantic	SA	60% decline
1992–2002	SW Pacific (NZ)	CPUE	>50–80% decline*
1998–2005	SW Pacific (NZ)	L	75% decline

L=Landings (tonnage), C=Catches, SA=Stock Assessment, CPUE=catch per unit effort, B + A= Biomass and Abundance.
* Declines may not reflect stock abundance because of potential sources of variation.

Unsustainable serial depletions of Porbeagle populations have occurred. Following collapse of the North East Atlantic Porbeagle fishery in 1960, Norwegian, Faeroese and Danish shark fleets moved to the North West Atlantic where the fishery was only sustained for six years before also collapsing. In 2005, ICES noted that while directed Porbeagle fisheries in the North East Atlantic stopped in the 1970s owing to low catches—with only small sporadic fisheries occurring since then—the high market value of the species means that a directed fishery would develop again if abundance increased. The ICCAT/ICES specialist meetings in 2009 recommended that high seas fisheries should not target Porbeagles.

Porbeagles continue to be targeted in the North Atlantic, including by a small French fleet in the North East (five vessels) and Canadian (185-t quota) and USA fleets (11-t quota). Unquantified by-catch of Porbeagle are taken by Spanish, Japanese, Taiwanese and Korean longliners.

Despite catch restriction in the North West Atlantic, it has taken 25 years for only very limited recovery to take place; total population numbers have remained relatively stable since 2002, with a possible continuing decline in reproductively mature females. Catch rates of mature sharks in the North West Atlantic in 2000 were 10% of those in 1992 and biomass estimated as 11–17% of virgin biomass; estimated numbers of mature females in North West Atlantic in 2009 were 12–16% of 1961 levels. Unreported and unregulated fishing in the high seas jeopardize stock recovery.

Year	*Location*	*Data*	*Trend*
1983–2000	*SW Atlantic (Uruguay)*	*CPUE*	*80–95% decline*

(Domingo et al.*, 2002).*

Stock assessment of North West Atlantic populations indicates that if the fishery is closed, recovery to MSY would take place between 2030 and 2060; an annual catch of 185–192 t should allow recovery to 20% of virgin biomass within 10–30 years.

An assessment based on the South West Atlantic stock revealed declines in biomass that mirror the decline in CPUE previously identified. This stock probably extends into the South East Pacific.

Data are not available to support an assessment of the South East Atlantic/ South West Indian Ocean Porbeagle stock.

Southern Hemisphere Porbeagle stocks have lower annual rate of population increase, longer generation time, longer life span (approximately 65 years), and greater age at maturity than northern stocks, making them significantly more vulnerable to overfishing than the depleted North Atlantic populations.

Japan also takes Porbeagle in its Southern Bluefin Tuna fishery in the Indian Ocean and in the Western and Central Pacific (CCSBT ERSWG, 2009; WCPFC Scientific Committee, 2009) and Spain reports catch of Porbeagle from its fishing operations in the South East Pacific (FAO FishStat, 2009).

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

Unsustainable target fisheries for Porbeagle in parts of its range have been driven by international demand for its high value meat (for details of population declines see section A above). Based on past fisheries' development and shifting of effort from the North East to North West Atlantic, it can be projected that other Southern Hemisphere stocks are likely to experience similar decreases unless international trade regulation provides an incentive to introduce sustainable management.

Findings indicate that the demand for high quality and high value fresh, frozen or processed meat, and other Porbeagle products is sufficiently high to justify the existence of an international market. However, lack of species-specific landings and trade data make it impossible to assess the proportions of global catches that supply national demand and enter international trade.

Important, but largely unreported by-catch fisheries for Porbeagle include demersal longlining and trawling for Patagonian Toothfish and Mackerel Icefish in the Southern Ocean and southern Indian Ocean, and longline, Swordfish and tuna fisheries off the Atlantic coast of South America, including the Argentinean and Chilean fleets.

Between 1985 and 1991, imports of shark to Italy consisted of 29% Porbeagle although the country of origin is unclear (Laurenti and Rocco, 1996).

Traders in the Netherlands reported Porbeagle among the imported shark species (Rose, 1996).

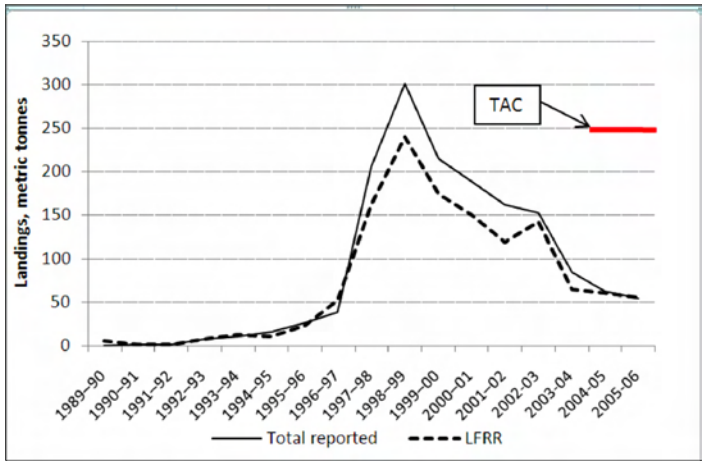
Of US imports of sharks, 40% consist of a group of several species, including Porbeagle, which are imported from Chile, Ecuador, Mexico, Panama, Peru, Surinam, Uruguay, Canada, Portugal, Japan, Philippines, Taiwan (Province of China) (Rose, 1996).

Norway exports fresh and frozen Porbeagle meat to EU markets and fins are exported to Asian countries as by-products of the meat processing (Fleming and Papageogiou, 1997).

According to Kreuzer and Ahmed (1978), preferred species for shark leather production include Porbeagle. However, Rose (1996) suggests that Porbeagle leather is unlikely to appear in markets and trade owing to the different processing requirements for leather and meat production.

In Australia, small quantities of Porbeagle are taken as by-catch in pelagic tuna longline fisheries in the Pacific and Indian Oceans and gillnet fisheries of southern Australia (Patterson and Tudman, 2009).

New Zealand commercial landings of Porbeagles reported by fishers and processors (LFRR), 1989/90 to 2004/5. TAC for New Zealand set at 249 t.



Unquantified commercial transactions include Canadian exports of meat to the USA and the EU, Japanese exports to the EU, EU exports to the USA, and Australian exports to the USA.

Porbeagle has been identified in the fin trade in Hong Kong. Some sources indicate a low value for Porbeagle fins in the trade; nonetheless their large size means they are frequently used.

New Zealand longline fisheries report about 80% of by-catch is alive when retrieved, although survival of unprocessed discarded sharks is unknown.

*Of the landings of Porbeagle in New Zealand, 85% were fins (with carcasses discarded at sea) and the remainder headed and gutted (Francis, 2007). Since the period 1998–99, there has been a 75% decline in the total weight of Porbeagle reported in this fishery, to a low of 54 t in the period 2005–06 (Ministry of Fisheries, 2008). This decline began during a period of rapid increase in domestic fishing effort in the tuna longline fishery in New Zealand, but has accelerated since tuna longline effort dropped during the last four years, thus suggesting that reduction in longline effort does not fully explain the reduced catches (*Ibid*).*

*Given that virtually all shark fins landed in New Zealand are exported (mainly to Hong Kong), this provides a conservative estimate of the exported volume of Porbeagle from New Zealand (Francis, 2007). It is possible some Porbeagle meat is also exported (*Ibid*).*

In New Zealand, the TAC is not based on a stock assessment. Current reported catch is well below the commercial TAC providing ample scope for increased catch to supply unmet demand. "It is not known whether current catches or the TAC are at levels that will allow the stock to move towards the biomass that would support the maximum sustainable yield. However, declining catches over a period when effort has increased rapidly, low CPUE in recent years, combined with the low productivity of the species and a history of fishery collapses in the North Atlantic, are all cause for concern." (Ministry of Fisheries, 2008).

Fin traders are aware of the low needle count in Porbeagle fins, which mean they are less valued than other shark species fins, despite their large size, meaning they are less desirable and rarely appear in trade (Clarke, 2009). Where they are traded, many traders do not sort Porbeagle fins separately from Longfin Mako and sometimes Shortfin Mako (non-caudal) because of the low value of all of these fins (Clarke, 2009).

An estimated 54% of Porbeagles are still alive on gear retrieval in the French Atlantic fishery (Jung, 2008), and 25-68% arrive at the boat alive in the New Zealand fishery (Francis et al.*, 2001).*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

It is proposed that all stocks of Porbeagle that do not currently qualify for listing in Appendix II under Annex 2a meet the criteria at Annex 2b, because of look-alike issues. Complex patterns of export, processing and re-export of meat make it difficult to distinguish products from different stocks, unless DNA analysis is used to confirm the origin of processed products. DNA analysis has been developed to confirm identification of Porbeagle products at a cost of USD20–60 per sample and takes two to seven days. Tests can distinguish between Northern and Southern Hemisphere stocks.

A split listing could facilitate illegal, unrecorded and unreported fishing for stocks listed in Appendix II.

Not considered further since the species as a whole has been assessed against criteria in Annex 2a.

Other information

Threats

The principal threat is from over-exploitation in target and by-catch fisheries, which catch both adults and juveniles of all age classes.

Conservation, management and legislation

International:
Porbeagles are listed in:

- Annex 1 (Highly Migratory Species) of the UN Convention on the Law of the Sea (UNCLOS);
- Annex III (Species whose exploitation is regulated) of the Barcelona Convention Protocol (Mediterranean population only);
- Appendix III of the Bern Convention (Mediterranean population only) as a species whose exploitation must be regulated in order to keep it out of danger;
- Appendix II of the Convention on the Conservation of Migratory Species (CMS);
- OSPAR Convention list of Threatened and/or Declining Species and Habitats (species and habitats in need of protection or conservation).

Porbeagles are listed as a high priority species on the Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Convention); although no management action to address this has been taken (Lack and Sant, 2009).

No management action has yet followed these listings.

The IPOA–Sharks urges all States with shark fisheries to implement conservation and management plans. However, fewer than 20 States have produced Shark Assessment Reports or Shark Plans. Many regional fisheries management organizations (RMFOs) have adopted shark finning bans.

In 2009, FAO reported that, of 68 members responding to a questionnaire, 50% had conducted assessments as to whether an NPOA was needed; 90% of those have gone on to develop and implement an NPOA (Lack and Sant, 2009); several of these have important Porbeagle fisheries, including the EU, New Zealand, Taiwan (Province of China), the USA and Japan. However, there is no evidence yet that these plans will lead to improved management.

North East Atlantic:
In 2008, the EU Porbeagle fishery entered management through TACs and maximum landing size to protect large females. Finning of Porbeagles is prohibited by an EC Regulation that is binding for EU vessels in all waters and all non-EU vessels in EU waters.

North West Atlantic:
Porbeagle quotas (under the Highly Migratory Species Fisheries Management Plan) were reduced to 11 t for all US fisheries in 2008, including a domestic commercial quota of under two tonnes, leading to a closure of the fishery before the end of the year. US Atlantic sharks must be landed with their fins naturally attached. Annual quotas in Canadian waters were reduced to 185 t in 2006.

Southern Hemisphere:
The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) adopted a moratorium on directed shark fishing in 2006. Live release of sharks taken as by-catch is encouraged but not mandatory. In Australian longline fisheries, the possession of shark fins separated from carcasses is prohibited. New Zealand includes Porbeagle in its Quota Management System, with an unrestrictive TAC of 249 t.

*There have been no assessments of the effectiveness of any NPOAs to date and no RFMO has yet adopted a regional plan of management for sharks (Lack, 2009). Many RFMOs, e.g. the Commission for the Conservation of the Southern Bluefin Tuna (CCSBT) and the Western and Central Pacific Fisheries Commission (WCPFC), pertaining to regions in which Porbeagle is known to be taken as by-catch, do not require the submission of catch data on sharks (*Ibid*).*

In the Adriatic, Croatia has listed Porbeagle as a strictly protected species within waters under Croatian jurisdiction (Soldo, 2009).

The EU TAC for Porbeagle was 581 t in 2008 (Camhi et al*., 2009). This was reduced by 25% to 436t in 2009 (see http://ec.europa.eu/fisheries/doc_et_publ/liste_publi/tac09/en/index_en.htm). The EU Council agreed a zero TAC for 2010 following scientific advice from ICES (EU Press release IP /09/1948, 15 December 2009).*

*The requirement to land sharks with fins attached applies in all Australian Commonwealth-managed fisheries, except target shark fisheries (Lack, 2009). It is possible that Porbeagle is taken in some State-managed Australian fisheries (which must adhere to a finning ratio) but no estimate of catch is available (*Ibid*). New Zealand does not have any restrictions on finning (*Ibid*).*

Because Porbeagles are primarily killed for their meat, finning bans alone will not improve their population status.

An ecological risk assessment process conducted by the Secretariat of the Pacific Community (SPC) on behalf of the WCPFC identified Porbeagle as at higher risk from Western and Central Pacific Oceans (WCPO) fisheries than most other shark species encountered in those fisheries (Kirby and Molony, 2006).

Captive breeding/artificial propagation

None known.

Other comments

Trade records are generally not species-specific; international trade levels, patterns and trends are largely unknown.

The entry into effect of the inclusion of Porbeagle in Appendix II of CITES is proposed to be delayed by 18 months to enable Parties to resolve the related technical and administrative issues, such as the possible designation of an additional Management Authority. It will be important to develop species-specific commodity codes and identification guides for Porbeagle meat and fins.

Reviewers:
S. Clarke, A. Domingo, M. Lack, E. McManus, A. Soldo, TRAFFIC Europe.

Inclusion of Spiny Dogfish *Squalus acanthias* in Appendix II

Proponent: Sweden, on behalf of the European Community's Member States acting in the interest of the European Community

Summary: The Spiny Dogfish *Squalus acanthias* is a temperate water, largely migratory shark of the shelf seas in the Northern and Southern Hemispheres. This species is widely acknowledged as the slowest-growing, latest maturing (10–32 years) and longest lived (35–100 years) of the sharks with the lowest known intrinsic rate of population increase for any marine fish (2.3–7%, depending on the stock) and extremely long gestation time (18–22 months). As a consequence, Spiny Dogfish have very low productivity and are exceptionally vulnerable to over-exploitation.

The Spiny Dogfish is one of the few shark species for which some species-specific trade data exist. Strong, persistent demand for highly valued Spiny Dogfish meat, primarily from Europe, is the key driver of international trade and targeted fisheries worldwide. Spiny Dogfish fins and other products are also traded internationally. Many Spiny Dogfish populations have been severely depleted by directed fisheries (which usually target mature females) and the species has been characterized by serial depletion around the globe. As the Spiny Dogfish is migratory and usually strongly aggregated by age and sex, fishers can maintain catches despite stock depletion and they can target the most valuable specimens in the stock (i.e. large females). Spiny Dogfish have undergone marked historic declines in stock abundance and landings in the North Atlantic and North Pacific to <20% of baseline and have also shown high recent rates of decline. Particular concerns for the North West Atlantic stock include a male-biased sex ratio (4–7:1), a decade of poor recruitment, a lack of small and large females (over 100 cm) in the population and declining brood size and mean pup length. Some North East Pacific (Canada) stocks appear relatively stable, some have declined, some are variable. Spiny Dogfish have declined greatly in the West Mediterranean and are now very rare. Data for other stocks are lacking; they are taken as by-catch in the South West Pacific but may be protected in a large part of the Argentinean shelf by management measures for other species; stocks in Alaska and New Zealand are considered to be stable or increasing; little is known about the stocks in South Africa and Australia.

Recent closure of the European Union (EU) and Norwegian Spiny Dogfish target fisheries in the North East Atlantic mean that the majority of future demand for Spiny Dogfish meat in Europe will have to be supplied by imports. The North East Atlantic Fisheries Commission (NEAFC) prohibited high seas fisheries for Spiny Dogfish in the North East Atlantic in 2008 (and 2009). Elsewhere, there has been little improvement in Spiny Dogfish management since 2007 when the Food and Agriculture Organization (FAO) noted that the management record for this species was “poor to extremely poor throughout the world”. Off the east coast of the USA, Spiny Dogfish fishing quotas have notably increased in recent years. There is no management in the North West Pacific despite reported declines in catch per unit effort.

The FAO Committee on Fisheries (COFI) recognized the pressing need to improve management of shark fisheries with the adoption in 1999 of the International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks), endorsed by the FAO Council in 2000. Ten years later, FAO reported that out of 68 members responding to a questionnaire, 50% had conducted assessment as to whether a National Plan of Action (NPOA) was needed; 90% of those have gone on to develop and implement an NPOA. To date, there have been no assessments of the effectiveness of NPOAs. The Spiny Dogfish is listed globally as Vulnerable in *The IUCN Red List of Threatened Species*, and regional populations have been assigned individual listings ranging from Vulnerable to Critically Endangered except for South African and Australasian populations, which are considered to be of Least Concern.

The proposed listing in Appendix II would include an annotation to delay entry into effect of the inclusion by 18 months to enable Parties to resolve the related technical and administrative issues.

Analysis: The Spiny Dogfish is a widely distributed and numerically abundant fish. As a species it is inherently highly vulnerable to exploitation, the

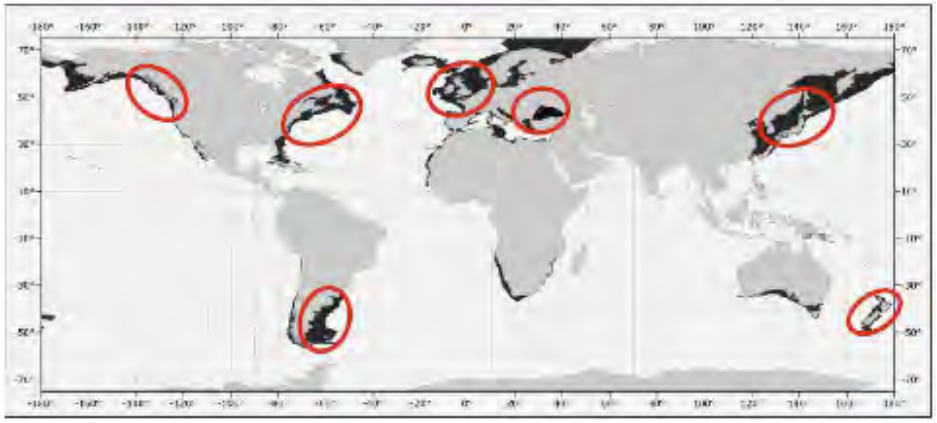
consequence of a suite of life history characteristics including extremely low productivity and a very long generation time (25–40 years). Demand for its high-priced meat, chiefly in Europe, has driven the exploitation of many stocks and it is believed that a high proportion of Spiny Dogfish meat enters international trade.

The state of stocks, and indeed the state of knowledge of stocks, is highly variable across the range of the species. Some stocks, notably in the Southern Hemisphere, are not known to be heavily exploited at present and appear to be stable. Virtually all Northern Hemisphere stocks have been heavily exploited in the past and many continue to be exploited. In almost all cases where data are available exploited stocks have demonstrated marked or very marked historical declines. Some historically or currently exploited stocks are believed to be stable or increasing although none is believed to be near the historical baseline and in at least one case (North West Atlantic–US) it is predicted that the decline will resume within less than 10 years because of recent poor recruitment.

An indication of trends in the species as a whole can be obtained by summing the best available current estimates for mature females, using relatively conservative figures for historical declines where these are known to have taken place, and assuming no change where these are not known (e.g. South West Atlantic, South West Pacific). On this basis, a very rough estimate would be that the current total population of mature females is around one third (33%) of historical population, historical in this case being more than 10 years ago, but well within three Spiny Dogfish generations.

The guidelines for commercially exploited aquatic species note that there should "rarely be a need for concern for populations that have undergone an historic extent of decline of less than 50%". Current information indicates that the Spiny Dogfish (in terms of number of mature females) has undergone a decline considerably in excess of this. The guidelines also note that a species may be considered for listing in Appendix II if it is near the extent-of-decline guidelines recommended for inclusion in Appendix I. In the case of a low productivity species, the latter decline is to 15–20% of baseline, while "near" is defined as between 5% and 10%, taking into due account the productivity of the species. Given the extremely low productivity of the Spiny Dogfish, it may be taken that this species is at the top of these ranges, that is, that an extent-of-decline to 30% of baseline could make the species eligible for inclusion in Appendix II. This is close to the (very rough) figure derived above, indicating that the species may meet the criteria for inclusion in Appendix II in *Resolution Conf. 9.24 (Rev CoP14)*.

Supporting Statement (SS)	Additional information
Taxonomy	
Synonyms: 15 synonyms are provided.	
Range	
Occurs in temperate and boreal waters of 0–12°C, with 6–11°C preferred. It falls within the jurisdiction of 66 countries and overseas territories. Only part of the North West Atlantic population undertakes regular North-South seasonal migrations, others may only migrate occasionally. Some authors have noted the possibility of a metapopulation of Spiny Dogfish in the North West Atlantic and North East Pacific.	*The principal populations occur in the North West and North East Atlantic (including Mediterranean and Black Seas), North East and North West Pacific (including Sea of Japan), South Atlantic and South East Pacific off South America, and New Zealand, with smaller populations off South Africa and southern Australia.*

Supporting Statement (SS)	Additional information
Global distribution of Spiny Dogfish (black) as shown in distribution map of FAO (2003) and major fishing grounds (red circles): 	

IUCN Global Category

Global—Vulnerable Northeast Atlantic—Critically Endangered Mediterranean Sea—Endangered Black Sea—Vulnerable North West Atlantic—Endangered North East Pacific—Vulnerable North West Pacific—Endangered (it may prove to be Critically Endangered once a full regional review can be undertaken) South America—Vulnerable Australasia—Least Concern Southern Africa—Least Concern	*All assessed 2006 ver 3.1.*

Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

The Spiny Dogfish is widely acknowledged to be among the slowest-growing, latest maturing (females 15–32 years, males 10–14 years) and longest-lived of sharks (35–100 years), with the lowest known intrinsic rate of population increase (2.3–7% depending on stock) for any marine fish and longest known gestation of any	

Supporting Statement (SS)

vertebrate (18–22 months). Other life history characters that make Spiny Dogfish particularly vulnerable to over-fishing include long generation time (24–40 years), large body size (83–200 cm). Therefore, the Spiny Dogfish should be considered as a species with low productivity.

Spiny Dogfish are migratory and usually strongly aggregated by age and sex, making it easy for fishers to maintain catches despite stock depletion and to target the most valuable part of the stock (large, pregnant females). Heavily exploited populations become male-biased with associated reduction in pup production leading to heightened risk of stock collapse.

Estimated number of mature females (5–10% of total population):
North East Atlantic: 25 000 to 125 000
North West Atlantic: around 7.2 million
Mediterranean: 170 000
Black Sea 2.5 million
North East Pacific: 2–3 million
North West Pacific: unknown. perhaps similar to North East Atlantic.
South West Atlantic (Argentinean shelf): 2.5–5 million
South West Pacific (New Zealand): not fully assessed. In three main areas one million.

Many stocks of this low productivity shark targeted by fisheries in the North Atlantic and North Pacific have suffered historical extent-of-declines to <20% of baseline and also rapid recent rates of decline. These stocks meet CITES guidelines for the application of decline to commercially exploited aquatic species.

Severe declines in the Spiny Dogfish stocks identified in the SS as meeting Annex 2a criterion A are summarized below

Year	Location	Data	Trend
1905-2005	NE Atlantic	SA – B	93.4-94.8% depletion
1955-2005		SA – B	92.9-93.4% depletion
1985-2005		CPUE	>75% decline from baseline
1957-1995	W Mediterranean	O	Decline from 1980s
1970s-1980s		O	Fishery closed in 1980s
1988-2005	NW Atlantic – US	SA – FB	75% decline from baseline

Additional information

Summing the best available current estimates for mature females from the SS (taking the mid-points of ranges) and using relatively conservative figures for historical declines where these are known to have taken place, and assuming no change where these are not known (e.g. South West Atlantic, South West Pacific), a very rough estimate would be that the current total population of mature females is around one third (33%) of historical population, historical in this case being more than 10 years ago, but well within three Spiny Dogfish generations.

Stock	Current estimate of female population	% declines observed	Estimate of baseline population of females
North East Atlantic	75 000	95	1 500 000
North West Atlantic	7 200 000	75	28 800 000
Mediterranean	170 000	80	850 000
Black Sea	2 500 000	66	7 500 000
North East Pacific	2 500 000	66	7 500 000
North West Pacific: unknown. Perhaps similar to NE Atlantic.	75 000	95	1 500 000
South West Atlantic (Argentinean shelf)	3 750 000	0	3 750 000
South West Pacific (New Zealand)	1 000 000	0	1 000 000
Totals	17 270 000		52 400 000
Current remaining proportion of baseline		**0.33**	

Data from the North West Pacific come from fishing areas marginal to the main distribution for Spiny Dogfish in the region and hence may need cautionary interpretation (FAO, 2007).

Supporting Statement (SS)

1990-2005		SA – B	80% decline from baseline
1987-2005		SA - MFW	50% decline
2010-2017		SA – FB	60-80% decline
1952-2000s	NW Pacific - Japan	L	>99% decline from baseline
1970-1990s		CPUE	80-90% decline from baseline
1970s-2000s	NE Pacific – Straight of Georgia	FC	65-80% decline from baseline
1984-2003	NE Pacific – Hecate Straight	FC	>95% decline from baseline

SA=Stock Assessment, B=Biomass, O=Occurrence, CPUE=Catch Per Unit Effort, FB=Female Biomass, MFW=Mean Female Weight, L=Landings, FC=Female Catches.

Spiny Dogfish have declined greatly in the West Mediterranean and are now very rare. The directed fishery in the Balearics was abandoned in the 1970s following declines. No *Squalus* spp. were recorded in the Balearics by the 1994–2004 MEDITS trawl survey, and very few records elsewhere in the western basin.

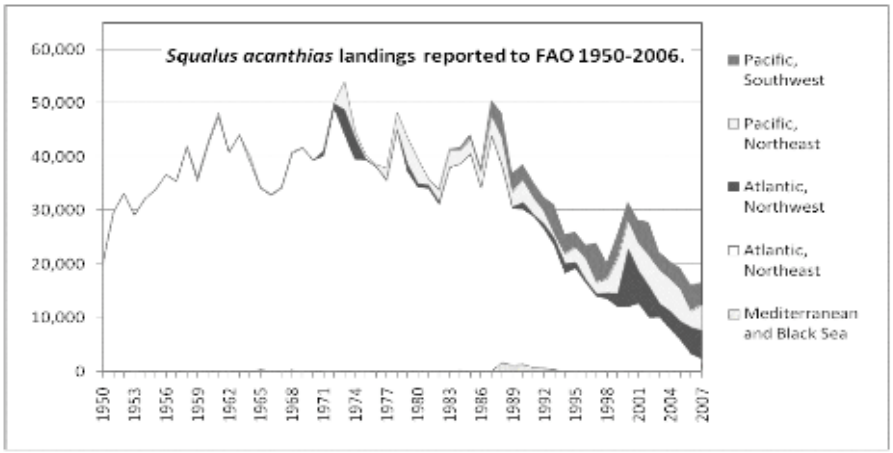
A discrete Spiny Dogfish stock in Puget Sound, North East Pacific, underwent a fall in commercial CPUE in the 1990s and is considered to be at a low level of abundance. This stock is also considered in the SS to meet Annex 2a criterion A.

The most important 20th century Spiny Dogfish fisheries were in the North East Atlantic, North West Pacific and North East Pacific shelf areas; all harvested over 50 000 t per year at their peak, prior to collapse. North West Atlantic landings peaked in the mid-1990s at just under 30 000 t per year before management limits were imposed. Mediterranean and Black Seas fisheries were smaller. Most of the Southern Hemisphere fisheries are more recent and smaller scale.

Additional information

Supporting Statement (SS)	Additional information

Landings of Spiny Dogfish reported from FAO fishing areas, 1950–2007



EU target fisheries for Spiny Dogfish in the North East Atlantic closed in December 2006.

There are a number of concerns for the North West Atlantic Spiny Dogfish stock, including:

- Concentration of the female size range between 75–90 cm, with few over 100 cm or under 75 cm
- Male-biased sex ratio (4-7:1)
- Declining brood sizes and mean pup length, reducing survival rates
- Recruitment failure in the period 1997-2003 and only sight recovery since.

In 2008, scientists associated with the Atlantic States Marine Fisheries Commission (ASMFC) warned that the spawning stock in the North West Atlantic was projected to decline sharply around 2017, owing to persistent low recruitment since 1997. This projection may include optimistic assumptions about pup survival and gear selectivity.

In the North East Pacific, intensive fisheries in the 1940s caused a 60% decline in abundance within three years and reduced the stock by an estimated 40–70%. Following recommencement of the fishery in 1975 to supply the meat to Europe, current stock levels are uncertain with biomass estimates for 2004 ranging from <30% of 1935 stock, to substantial recovery from the 1940s fishery.

Spiny Dogfish has long been a commonly discarded by-catch of demersal fisheries in the South West Atlantic. Very few landings are reported under the recently

Spiny Dogfish are caught as by-catch in various fisheries off the coast of Argentina although not always in substantial numbers and with no clear trends in abundance yet identified (Chiaramonte, 2009). The declines mentioned in the proposal for the Argentinean shelf are based on unclear and potentially problematic methodologies (Ibid*).*

Spiny Dogfish were identified as the fourth-most important species of seven shark species caught as by-catch in Patagonian coastal trawl fisheries (Van Der Molen et al*., 1998). Spiny Dogfish were found year-round throughout the area of the Argentinean hake fishery during studies in 1998 and were present and discarded in 37.91% and 16.53% of the freezers and ice trawlers' tows, respectively, representing 0.57% and 0.13% of the freezers' and ice trawlers' catches (Cañete* et al*., 1999). Average annual by-catch of Spiny Dogfish in the Patagonian red shrimp fishery corresponds to the 0.04% of the total average biomass reported by surveys between 1992 and 2001 (Mari* et al*., 2005).*

Supporting Statement (SS)	Additional information
introduced logbook code for Spiny Dogfish. Some regional and localized declines in Spiny Dogfish have been identified although trends are unclear.	
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
The following Spiny Dogfish stocks are reported to meet criteria for listing under Annex 2a criterion B: Eastern Mediterranean—Surveys of the eastern basin showed no statistically significant trends in Spiny Dogfish abundance. Data for this region are incomplete with considerable underreporting. Black Sea—Biomass declined by 40–60% in 11–13 years; reported landings declined by 65–95% in 13–24 years. Data for this region are incomplete. North West Atlantic, Canada–Biomass increased from early 1980s to early 1990s then declined by 40% to present with an unquantified decline in female biomass. The shared Georges Bank stock declined steeply after 1992. The Scotian shelf stock is relatively high but variable. The small isolated southern Gulf of St Lawrence stock is declining and may disappear owing to lack of recruitment. North West Pacific, Russia–Spiny Dogfish are not currently targeted here but by-catch is increasing. Dogfish are landed in Korea, but no species-specific data are available. Spiny Dogfish are currently not highly valued in South Africa and are not targeted; 99–100% of trawl by-catch is discarded.	*While few export statistics are available to indicate volumes of Spiny Dogfish traded internationally, various reports describe trade routes; 1990–1994 Spain imported from Portugal, Africa, Central and South America and Asia; 1985–1991 Italian shark imports consisted of 38% Spiny Dogfish by weight; South Korea is the major market for New Zealand's Spiny Dogfish; the UK imports fresh Spiny Dogfish from the Faroe Islands; since 2001 EU import data include import 10 t per years of Spiny Dogfish from Namibia (Rose, 1996; Fleming and Papageorgiou, 1997; Lack, 2006).* *Spiny Dogfish may not be currently targeted in South Africa but "experience suggests that the deteriorating status of stocks elsewhere and the introduction of catch limits in some fisheries, together with continued strong international demand, may drive development of such a fishery" (Lack, 2006).*
Spiny Dogfish are subjected to unsustainable target and by-catch fisheries in several parts of their range because of international demand for their high value meat (EUR9–36/kg). Other stocks are likely to experience similar declines unless trade regulations provide an incentive to introduce sustainable management. In 2007, EU Member States (traditionally the major market for and predominant importer of Spiny Dogfish) imported 4177 t of Spiny Dogfish (processed weight) from non-EU States including the USA, Canada, Norway, Morocco, New Zealand, Argentina, Mauritania, Iceland, and Chile. Supplies from Norway and the USA have declined, while exports from Canada, Morocco and New Zealand have increased.	*The proportion of global landings that enter the international market is unknown but is likely to be high, as suggested by comparison of landings reported to FAO and imports to EU (data in SS) between 2004 and 2006; Norway and Iceland exported 91–94% and 55–67% of their reported landings, respectively, to the EU.* *Spiny Dogfish fins are small and consequently are of low value in the fin trade with some traders not bothering to deal in them (Clarke, 2009). Nevertheless, owing to the large volume of Spiny Dogfish caught in the USA and Europe, the fins have been routinely traded for several decades up to at least the late 1990s, and may potentially constitute a significant proportion by volume of the shark fins reported in trade (Rose,*

Supporting Statement (SS)	Additional information
EU market demand for Spiny Dogfish must be met from imports in coming years, following the closure of the European fishery. US exports of Spiny Dogfish in 2007 also went to Thailand, China (Hong Kong), Mexico, Japan and Australia. Spiny Dogfish fins are traded internationally but species-specific global import data are not readily available. Cartilage and liver (oil) are also traded widely, hides can be processed into leather, and teeth and jaws may occasionally be traded. Mortality rates for Dogfishes caught as by-catch are 30-55% in gillnets and 0-50% in trawls. Given survival is often high in non size-selective by-catch fisheries, these may have a smaller impact on stock status than target fisheries for mature females.	*1996). Norway and Canada are also known to export Spiny Dogfish fins (*Ibid.*).* *Out of 112 range States or countries/territories/entities involved in the trade in Spiny Dogfish, only 10 are not Parties to CITES and they do not have significant catch and/or trade in this species (Lack, 2006).* *In 2004, 94% of the reported catch of Spiny Dogfish came from six States: Canada (38%), the UK (24%), New Zealand (15%), the USA (6%), France (6%) and Norway (5%) (Lack, 2006).*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

It is proposed that all stocks of Spiny Dogfish that do not qualify for listing in Appendix II under Annex 2a are listed under Annex 2b criterion A, because of look-alike issues. Accordingly, the SS identifies the following stocks that meet this criterion: North East Pacific, Alaska; South West Atlantic, Argentina; South West Pacific, New Zealand. Complex patterns of export, processing and re-export of meat make it difficult to distinguish products from different stocks, unless DNA analysis is used to confirm the origin of processed products. A split-listing could facilitate illegal, unreported and unregulated fishing for stocks listed in Appendix II.	*Not considered futher as the whole species has been assessed against criteria in Annex 2 a.*

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Other information

Threats

The principal threat to this species worldwide is over-exploitation in directed and by-catch fisheries, particularly when mature females are targeted.	

Supporting Statement (SS)	Additional information

Conservation, management and legislation

Northern Hemisphere stocks are listed in Appendix II of the Convention on the Conservation of Migratory Species (CMS).

Spiny Dogfish are listed on Annex V of the OSPAR Convention. Proposals for actions, measures and monitoring will be considered in 2009.

The IPOA–Sharks urges all States with shark fisheries to implement conservation and management plans.

In 2009, FAO reported that, of 68 members responding to a questionnaire, 50% had conducted assessments as to whether an NPOA was needed; 90% of those had gone on to develop and implement an NPOA (Lack and Sant, 2009). FOA member States with NPOAs include several with important Spiny Dogfish fisheries, including Canada, the EU, New Zealand, and the USA.

Population monitoring for Spiny Dogfish is limited by the general lack of species-specific reporting of landings and by-catch in shark fisheries. Relatively good landings data are available for a few major fisheries in the North Atlantic, North Pacific and New Zealand.

There have been no assessments of the effectiveness of any NPOAs to date and no regional fisheries management organization (RFMO) has yet adopted a regional plan of management for sharks (Lack, 2009).

North East Atlantic:
The large North Sea Spiny Dogfish target fishery was closed in December 2006, following ICES recommendations. In 2009, a 1422 t by-catch total allowable catch (TAC) was in place throughout EU waters. A 100-cm total length (TL) maximum landing size has been imposed since January 2009 in an attempt to protect mature females.

In line with the EU's recently adopted shark action plan, the EU Council authorized a zero TAC for targeted fisheries on Spiny Dogfish for 2010 and a limited by-catch TAC (142 t), with a commitment to zero catches for 2011 (EU Press release IP /09/1948, 15 December 2009).

In 2007, Norway banned fishing and landing of Spiny Dogfish in the Norwegian EEZ and international waters in ICES areas I-XIV, although by-catch must be landed. Small inshore vessels (<28m) are permitted to fish for Spiny Dogfish with traditional gear and in territorial waters. The fishery may be closed when catches reach the previous year's level. There is also a 70-cm minimum landing size.

ICES gave the following advice for Spiny Dogfish in 2009–2010 in the North East Atlantic (ICES areas I-XI): "The stock is depleted and may be in danger of collapse. Targeted fisheries should not be permitted to continue, and by-catch in mixed fisheries should be reduced to the lowest possible level. The TAC should cover all areas where spurdog are caught in the northeast Atlantic and should be set at zero (...)." (ICES, 2008).

In 2008, the North-East Atlantic Fisheries Commission (NEAFC) prohibited Spiny Dogfish fisheries within the NEAFC Regulatory Area.

The Community Plan of Action (CPOA) for the Conservation and Management of Sharks (2009) sets the stage for rebuilding depleted shark stocks, including Spiny Dogfish, fished by the EU fleet. Measures outlined by the CPOA will be implemented at Community and Member State level; the Community will also seek their endorsement for consistent EU shark proposals at all relevant RFMOs.

Management outside the North East Atlantic has improved little since 2007 when FAO noted that the Spiny Dogfish fisheries management record was "poor to extremely poor throughout the world".

Supporting Statement (SS)	Additional information
North West Atlantic: Canadian Spiny Dogfish fisheries have been subjected to a quota in the NW Atlantic since 2002; the limit was reduced to 2500 t in 2004. Future management decisions will be based on a joint Canada-US stock assessment scheduled for January 2010. Canada's National Shark Plan was adopted in 2007. In the USA, federal Spiny Dogfish fisheries have been managed since 2000. The National Marine Fisheries Service (NMFS) imposes science-based trip limits and quotas for Spiny Dogfish, but federal management measures are not compulsory in State waters (out to three nautical miles from shore). The ASMFC adopted its Spiny Dogfish plan in 2002, but has allowed continued directed fishing in State waters at levels higher than scientists' advice. Federal and State dogfish limits have been significantly increased in recent years.	*In 2006, the Atlantic States Marine Fisheries Commission (ASMFC) adopted a commercial quota 50% higher than NMFS quotas and has allowed individual States to set their own trip limits at several times the scientific advice of 50–600 lbs (22–297 kg) (ASMFC, 2006). For example, Massachusetts, Rhode Island and North Carolina allow 2000 lbs per trip (900 kg) and Virginia allows 4000 lbs per trip (1800 kg) (Fordham, 2007). These increases were implemented in the interest of reopening directed fisheries (ASMFC, 2006). The States of Massachusetts and North Carolina have expressed their intent to continue to press for higher Dogfish limits in Federal waters (Fordham, 2007).*
North East Pacific: Although the USA and Canada conduct co-operative surveys for Northeast Pacific Spiny Dogfish, there is no co-ordinated, international or bilateral management for the stock. The Canadian Spiny Dogfish fishery has been managed since 2006 with catch and by-catch quotas based on historic biomass estimates and incorrect rates of population increase. Recent landings have been approximately 30% of quotas. In the US, federal management began in 2006 with trip limits (aimed primarily at other protected species), pending stock assessment and development of quotas which have been postponed repeatedly. In Alaska, Spiny Dogfish are included in a by-catch TAC for "other species". In Washington State, Spiny Dogfish are loosely managed within bottomfish management plans, with mesh restrictions and closure of a pupping ground.	
North West Pacific: No management.	
Southern Hemisphere: Spiny Dogfish have been regulated under New Zealand's Quota Management System since 2004. Landings have never reached the 12 660 t TAC. Shark Plans have been adopted by Argentina (2009), Chile and Uruguay (2008) although none of these plans include specific limitations on Spiny Dogfish. Large areas of fisheries closures established by Argentina for other species encompass much of the known maximum concentration of Spiny Dogfish.	*A long closed season on the Argentinean shelf, implemented to regulate the hake fishery, also encompasses the main spring–summer aggregations of pregnant female Spiny Dogfish (Di Giacomo, 2009).* *Management of Spiny Dogfish fisheries in New Zealand anticipates the expansion of the Spiny Dogfish fishery to meet European demand for meat (Fowler* et al, *2004).* *There is no specific management in place for Spiny Dogfish in Australia and, owing to a lack of clarity at the species level in catch data, it remains unclear to what extent it may be caught (TRAFFIC International, 2007).*

Supporting Statement (SS)	Additional information
Captive breeding/artificial propagation	
Not economically viable for commercial purposes, owing to slow reproductive and growth rates. Possibly some breeding taking place in public aquaria.	
Other comments	
There are likely to be difficulties associated with the identification of some Spiny Dogfish products, where fillets and trunks are marketed and transported with those of other small sharks. It will be necessary to prepare identification guides to differentiate between most common meat products of Spiny Dogfish and other species. These can readily be backed by the development of genetic identification tools. Several research laboratories are working on elasmobranch species and stock identification. The annotation to the proposal provides for the delay by 18 months of the entry into effect of the inclusion of Spiny Dogfish in Appendix II of CITES, to enable Parties to resolve related technical and administrative issues, such as the development of stock assessments and collaborative management agreements for shared stocks and the possible designation of an additional Scientific or Management Authority.	

Reviewers:
S. Clarke, G. Chiaramonte, E. Di Giacomo, S. Fordham, E. McManus, TRAFFIC Europe.

Inclusion of Atlantic Bluefin Tuna *Thunnus thynnus* in Appendix I

Proponent: Principality of Monaco

Summary: Atlantic (or Northern) Bluefin Tuna *Thunnus thynnus* is the largest member of the family Scombridae, capable of reaching a weight of over 650 kg. It is found throughout the North Atlantic and its adjacent seas, particularly the Mediterranean. The species is generally regarded as comprising two stocks, one spawning in the Gulf of Mexico and the Straits of Florida (the West stock), the other in the Mediterranean (the East stock), with adults showing high rates of natal homing and spawning site fidelity. However, there is evidence of significant trans-Atlantic movement, and members of the western population foraging in the eastern Atlantic. Individuals spawning in the Mediterranean mature at around four years of age, younger than those in the Gulf of Mexico, which mature at around 8–12 years. Life span is 30 years or more. Egg production appears to be age (or size)-dependent: a five-year-old female produces an average of five million eggs, while a female of 15–20 years can carry up to 45 million eggs. There is some disagreement over productivity of the species. Some consider that it is a species of low productivity, while others suggest that the East stock has a higher productivity than the West stock and should be regarded as having medium productivity. The West stock is currently estimated to have a population of more than 170 000 individuals over one year old and the East stock to number more than three million individuals aged one and over.

Atlantic Bluefin Tuna has been fished for many centuries, traditionally consumed fresh in Mediterranean countries (particularly Spain, France and Italy). However, exploitation in the Mediterranean is now mainly driven by the international market for sushi and sashimi, largely in Japan, and nearly all declared fishery production is exported. Traps were the main gear to catch bluefin tuna in the Mediterranean and near Atlantic for centuries, but nowadays most commercial harvest is by longline and more recently by purse seine. In the Mediterranean, around 70% of the catch is now taken by purse seine vessels and then transported live to tuna farms where the fish are fattened for six to eight months before export mainly to Japan; weight is estimated to increase by around 13% in this period. Fish fetch high prices on the international market. In the past, the highest value attached to a bluefin tuna was about USD900 per kg at the Tsukiji market auction in Tokyo, Japan; recent prices are mainly in the range USD200–300 per kg.

The International Commission for the Conservation of Atlantic Tunas (ICCAT), which came into force in 1969, is responsible for the management of the Atlantic Bluefin Tuna. All bluefin tuna fishing and farming nations in the Mediterranean are contracting Parties as are the USA, Canada and Japan. The species has been managed by ICCAT as two separate stocks since 1980; various management measures have been put in place, including Total Allowable Catches (TAC) for the two stocks.

TAC for the East stock was set at 22 000 t in 2008 and 19 950 t for 2009. These quotas exceeded the levels suggested by the Standing Committee of Research and Statistics (SCRS) of ICCAT, which had recommended that a maximum annual catch of between 8500 t and 15 000 t would be needed to prevent stock collapse and enable rebuilding to begin. In 2009, the TAC for 2010 was reduced to 13 500 t with a reduced fishing season and other management measures. For the West stock, TAC inclusive of dead discards was set at 1900 t for 2009 and 1800 t for 2010. The 2010 quota was not adjusted at the 2009 ICCAT Annual meeting. ICCAT have committed to setting science-based catch levels for 2011 to 2013 with a 60% probability of rebuilding the stock to healthy levels by 2023.

It is believed that there is considerable catch above the level set by ICCAT; for the period 1998–2007, ICCAT's SCRS reported that East Atlantic annual catches were likely to be in the region of 50 000 t, despite TACs of around 30 000 t. The committee considered that this apparent lack of compliance with the TAC and underreporting of the catch would undermine conservation of the stock. Although the TAC for the East stock has now been reduced to within the limits recommended by the SCRS, it is thought likely that actual catch will remain higher than TAC.

ICCAT's SCRS have estimated the extent of decline of the two stocks. Decline was estimated for current population size compared to estimates of unexploited population size (SSB_0) as well as for the maximum population size estimated between 1970 and 2007 in the stock assessment (SSB_{max}). The committee also examined decline compared with projected population size estimates under various harvest regimes, again in comparison to the estimated unexploited population size and maximum population size in the period 1970 to 2007. The committee concluded there was a greater than 90% probability that both East and West stocks had declined to less than 15% of their unexploited population sizes (SSB_0). When declines were calculated from SSB_{max}, (i.e. maximum stock estimated in the period 1970–2007), the committee concluded that there was a 30% probability that the West stock was below 15% of this and a 21% probability that the East stock was below 20% of this. In both cases there is believed to have been significant depletion of stocks before this period.

The proposal is accompanied by a draft Resolution that "Appendix I listing would be accompanied by a Conference resolution that would mandate the Animals Committee of the Convention to review the status of the East Atlantic and Mediterranean stock and the West Atlantic stock of *Thunnus thynnus* in light of any intervening actions at ICCAT and, if warranted, ask the Depositary Government (Switzerland) to submit a proposal to a subsequent CoP to downlist the species to Appendix II or remove it from the Appendices". The proponent notes that "a ruling to this effect by the Animals Committee only requires a simple majority of the Committee members and CoPs have a high rate of acceptance of proposals submitted by the depositary Government at the request of a relevant CITES Committee".

Analysis: According to the footnote on the "Application of decline for commercially exploited aquatic species", the historical extent of decline should be the primary criterion of consideration in Appendix I, it should extend as far back into the past as possible and can be estimated or inferred using indirect or direct methods. Guidelines in the footnote suggest that historical declines for species with low productivity should be to within 15–20% of the historical baseline and for species with medium productivity declines to within 10-15% of historical baseline are appropriate for listing in Appendix I. The species is considered of low to medium productivity. On the basis of estimated historical extent of decline from un-fished stock, ICCAT's SCRS considered that there was a greater than 90% probability that both East and West stocks have declined to less than 15% of their unexploited population sizes and therefore it appears that *Thunnus thynnus* meets the biological criteria for Appendix I. The species is clearly affected by trade.

TAC for the East stock, which was decreased at ICCAT in 2009 (13 500 t for 2010), is predicted to lead to some stock recovery, if perfectly implemented. However, SCRS recognize substantial unreported catch (likely to be around 60% or 20 000 t per year above the quota for 1998–2007). Its 2009 summary report for Atlantic Bluefin Tuna states: "Based on the Committee's analysis it is apparent that the TAC was overshot during a decade and was largely ineffective in controlling overall catch" [p 75]. There is no reason to assume that this situation will change in the immediate future. Despite low quotas imposed for the West stock, recovery has not yet been evident.

The resolution proposed to accompany the listing would appear not to be in accordance with *Resolution Conf. 9.24 (Rev. CoP14)* Annex 4 A.1 which directs that "no species listed in Appendix I shall be removed from the Appendices unless it has been first transferred to Appendix II, with monitoring of any impact of trade on the species for at least two intervals between meetings of the Conference of the Parties".

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Found throughout North Atlantic Ocean and its adjacent seas, particularly the Mediterranean Sea, ranging from the "southern boundary of the equator to the northern boundary of the north of Norway", and from the western boundary of the Gulf of Mexico to the eastern boundary of the Black Sea.	
IUCN Global Category	
	Eastern Atlantic stock—Endangered A1bd (assessed 1996, Criteria ver 2.3 - needs updating) *Western Atlantic stock—Critically Endangered A1bd (assessed 1996, Criteria ver 2.3 - needs updating)*

Biological criteria for inclusion in Appendix I

A) Small wild population

(i) Population or habitat decline; (ii) small sub-populations; (iii) concentrated geographically during one or more life-history phases; (iv) large population fluctuations; (v) high vulnerability

The wild population is small and is characterized by at least one of the following: iii) a majority of individuals being concentrated geographically during one or more life-history phases; or v) a high vulnerability to either intrinsic or extrinsic factors.	*The wild population of Eastern Atlantic Bluefin Tuna is not considered small (estimated numbers greater than three million individuals of ages one year and older in 2008) (ICCAT SCRS, 2009a).*
Estimates of the genetically effective population size (Ne) for single subpopulations yield values of 400–700 individuals, which would qualify as low values, straddling the minimum threshold (Ne = 500).	*The wild population of Western Atlantic Bluefin Tuna is not considered small (estimated numbers greater than 170 000 individuals ages one year and older in 2008), nor is its distribution restricted (distributed throughout the Atlantic) (ICCAT SCRS, 2009a).*
Atlantic Bluefin Tuna displays strong aggregating behaviour at the spatial scale, relating to both feeding and spawning. The high concentrations of tuna translate to high vulnerability of stocks to the fishing gears (as for example baitboat fishing in the Eastern Atlantic and purse seining in the Mediterranean).	*Many consider there to be two distinct spawning grounds in the Gulf of Mexico or the Straits of Florida and the Mediterranean Sea (Mather* et al*. (1995) to which adults show high rates of natal homing (Block* et al*., 2005; Boustany* et al*., 2007; Carlsson* et al*., 2007; Rooker* et al*., 2008).*

Supporting Statement (SS)	Additional information
B) Restricted area of distribution **(i) Fragmented or localized population; (ii) large fluctuations in distribution or sub-populations; (iii) high vulnerability; (iv) decrease in distribution, population, area or quality of habitat, or recruitment**	
	Distribution is not restricted (ICCAT SCRS, 2009a).
C) Decline in number of wild individuals **(i) Ongoing or historic decline; (ii) inferred or projected decline on the basis of decreasing area or quality of habitat, levels of exploitation, high vulnerability, or decreasing recruitment**	
The SS proposed the listing of the species on the basis of a marked decline in the population size in the wild, which 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 any one of the following: – levels or patterns of exploitation; or – a high vulnerability to either intrinsic or extrinsic factors; or – a decreasing recruitment.	
Bluefin tuna are now absent or rare from formerly occupied habitats, such as the North Sea, Norwegian Sea, Black Sea, Sea of Marmara, off the coast of Brazil and Bermuda, and certain locations off the north-eastern American coasts, whereas large catches have been recently made in new areas, such as the eastern Mediterranean, the Gulf of Sirte and the central North Atlantic. The reasons for these changes in spatial and temporal patterns remain unclear and are likely to result from interactions between biological, environmental, trophic and fishing processes. The Atlantic Bluefin Tuna in Norwegian waters was for all practical purposes fished to extinction in little more than a decade.	*The large population off the coast of Brazil was extirpated after longline fishing harvested 5000–12 000 t annually 1962–1967 (Porch, 2005; Safina and Klinger, 2008). Bluefin fisheries in the Norwegian Sea and the North Sea collapsed in 1963 (Fromentin, 2009).*
Atlantic Bluefin Tuna is currently managed by ICCAT as two separate stocks; the Supporting Statement discussed these stocks separately. A review of relevant information on productivity of the species in Annex 1 supports the SS's assertion that the species has a low productivity.	Thunnus thynnus *has a long life span and a low population growth rate which makes it more vulnerable to exploitation than tropical tunas (Fromentin and Fonteneau, 2001). Reported estimates of mean fecundity of large* T. thynnus *(>205 cm fork length (FL)) from the western Atlantic ranged from 30 to 60 million eggs (Baglin, 1982). Rodriguez-Roda (1967) estimated fecundity of 20-year-old female bluefin tuna from the East stock at 45 millions eggs, although a lower estimate of 13–15 million eggs was made by Medina* et al*. (2002) for spawning* T. thynnus *from areas in the western Mediterranean and Strait of Gibraltar. There is some disagreement over productivity of the species. Some consider that it is a species of low productivity, while others suggest that the East stock has a higher productivity than the West stock and should be regarded as having medium productivity (Fromentin* et al*., 2009).*

Supporting Statement (SS)	Additional information
	The footnote to Resolution Conf 9.24 (Rev. CoP14) *suggests historical ranges of decline to 10–15% for species with medium productivity and 15–20% for species with low productivity would be appropriate.* *ICCAT's SCRS has estimated the extent of decline of the two stocks. Decline was estimated for current Spawning Stock Biomass (SSB) compared to estimates of unexploited population size (SSB_0) as well as for the maximum historical population size estimated in the stock assessment (SSB_{max}). Probabilities were calculated for meeting the declines for high, medium and low productivity species i.e. <10%, <15% and <20%. Probabilities for meeting <15% and <20% are given below, although the report focused on declines to <15%, which was seen as the maximum needed for a species of low productivity and the minimum for a species of medium productivity (ICCAT SCRS, 2009a).*
Historical decline to present The Atlantic Bluefin Tuna scores as a low productivity species using the criteria set up by the American Fisheries Society and/or the criteria of FAO (from supporting information) and therefore to be subject to the criteria of 20% of the baseline regarding marked decline.	***Historical decline to present from unexploited population size estimates SSB_0 to SSB_{2009}.*** *SCRS estimates of long-term potential spawning biomass are not estimates of historical biomass* per se*, but what the stock size might be if there were no fishing.*
From virgin stock Atlantic Bluefin Tuna have shown massive declines in standing stock biomass, and the remaining populations represent 10–20% of virgin biomass.	
West In 1998, ICCAT adopted a rebuilding programme for the West Atlantic stock that called for rebuilding the spawning stock biomass to the levels needed to achieve maximum sustainable yield (MSY) with at least 50% probability. Since then, the spawning stock biomass has remained relatively stable at approximately 15–18% of its pre-exploitation level biomass.	***West*** *Two scenarios were used to estimate SSB_0 "high recruitment scenario" (SSB_0 ~ 221 000 t) and the "low recruitment scenario" (SSB_0 ~ 80 000 t). The former reflects a hypothesis that potential productivity has shown no trend over the assessment period; the latter reflects the hypothesis that productivity potential has shifted to a lower level after the late 1970s.* • ***under the low recruitment scenario*** *there is a high probability (93%) that SSB_{2009} is less that 15% of SSB_0.* • ***under the high recruitment scenario*** *there is a near 100% probability that the SSB_{2009} is below 10% of SSB_0 (ICCAT SCRS, 2009a).* *These results support the view of Rooker* et al. *(2007), that spawning populations in the western Atlantic are at 10% of the biomass prevailing when industrial fishing began, and recovery is confounded by trans-Atlantic movement across international jurisdictions.* *Block (2009) considers that the figures for declines given for the West stock of 15–18% of its pre-exploitation biomass are in fact for its 1970 level and that the stock*

Supporting Statement (SS)	Additional information
East A study by Taylor *et al*. (2009) using the MAST methodology—which integrates the effects of large-scale migrations by Atlantic Bluefin Tuna—suggests that the extent of the historical decline, particularly for the East Atlantic and Mediterranean stock, might be higher than that showed by SCRS (2008a), with current levels for both stocks below 20% of the historical baseline. The studies cited point to a high probability that the spawning stock biomass of the Eastern stock of Atlantic Bluefin Tuna is currently (2009) already below 20% of its historical baseline.	*continued to decline by an additional 9%, so that the West stock is at less than 10% of the pre-exploitation level.* ***East*** *Long term potential SSB_0 of Eastern Atlantic Bluefin Tuna is even less well defined than that in the West. Estimates ranged from 825 000 t to 2.81 billions t, the wide range being the result of uncertainty in the assumption of steepness. Estimates of SSB_0 between 1 and 11.7 million t were used. The SCRS's summary conclusions are provided here. Results using other scenarios are given in the report.* ▪ *There is a 96% probability that it is **less than 15%** SSB_0.* ▪ *There is a 99% probability that SSB_{2009} is **less than 20%** SSB_0. (ICCAT SCRS, 2009a).*
From maximum historically recorded stock	***Recent rate of decline from maximum historically recorded stock (SSB_{max} to 2009)*** *The SCRS evaluated spawning biomass relative to the maximum estimated during the period 1970–2009 (SSB_{max}).The maximum biomass only reflects historical abundance in the context of the post-1970 period.*
West Stock assessment conducted by the SCRS of ICCAT in 2008 shows an absolute extent of decline of the spawning population of 82.4% over the 38-year historical period (meaning that just 17.6% of the spawning biomass in 1970 would remain). The sharp decline of the Western spawning stock biomass took place between 1970 and 1985 (SSB in 1985 was approximately 18.9% of SSB in 1970). Since then, the stock has remained at relatively constant, but low, levels. Additionally, a decrease in recruitment has been estimated for the West Atlantic stock in the historical series considered by SCRS.	***West*** *SSB_{max} for West population = 45 000 t by ICCAT SCRS (2009)* • *The probability that SSB_{2009} is **less than 15%** of the maximum SSB estimated since 1970 is about 30%* • *There is about a 54% chance that it is **less than 20%** of maximum SSB_{max}.* *The SCRS concluded that the maximum biomass only reflected historical abundance in the context of the post-1970 period and did not reflect higher abundances that probably occurred prior to 1970, in view of the high catches in the 1960s.* *Major exploitation of the West stock took place between 1960 and 1970, with catches peaking at 18 679 t in 1964 (Safina and Klinger, 2008). Sharp declines took place during the 1960s. Taylor* et al. *(in press) estimate that the West stock is now 13% of SSB in 1950 on the basis of new models incorporating mixing (Block, 2009).*
East The absolute extent of the decline of the East Atlantic and Mediterranean stock over the 50-year period from 1957 to 2007 was assessed by ICCAT's SCRS at 74.2% in terms of biomass of the spawning population (meaning that 25.8% of the populations then remained). An estimate for SSB for the East Atlantic and Mediterranean stock in 2007 was 78 724 t This contrasts with the biomass peak estimated for 1958 at 305 136 t and with the 201 479 t estimated for 1997. The bulk of the decline (60.9%) was in the last 10 years.	***East*** *Maximum SSB between 1970 and 2009 (SSB_{max}) for East stock 297 000 t to 309 000 t* ▪ *The probability that SSB_{2009} is **less than 15%** of SSB_{max} is about 21%.* ▪ *The probability that SSB_{2009} is **less than 20%** of SSB_{max} is around 33% (ICCAT SCRS, 2009a).*

Supporting Statement (SS)	Additional information
	In 1963, the leading fisheries targeting Atlantic Bluefin Tuna in the Norwegian Sea and North Sea suddenly collapsed without any warning (Fromentin, 2009). Fromentin considers that SSB_{max} is less subjective than SSB_{0}. *Taylor* et al. *(in press) estimate that the East stock is now 15% of SSB in 1950 on the basis of new models incorporating mixing (Block, 2009).*
Projected declines from virgin stock	***Projected declines from virgin or unfished stock (SSB_0) to 2019 (SSB_{2019})*** *Projections were made to estimate SSB in 2019 based on various harvesting regimes over the next 10 years, including those already set by ICCAT, those recommended by the SCRS of ICCAT and a zero quota. Estimates for harvest quotas set by ICCAT were modelled assuming perfect implementation and with a 20% over-harvest error for the East population. Perfect implementation of the other catch quotas was used to estimate SSB in 2019 (SSB_{2019}).*
West Based on one assumption of recruitment, under more restrictive quota limits set in 2008, overfishing could end by 2010 and the West stock could be rebuilt [*the SSB to the levels needed to achieve MSY*] by 2019 with greater than 75% probability, whereas no recovery would take place based on another equally probable hypothesis regarding recruitment.	***West—For Rec 08-04 quotas, see management section below*** • *For perfect implementation of ICCAT Rec 08-04 under **the low recruitment** scenario, the probability that SSB_{2019} would be **less than 15%** of un-fished stock SSB_0 was 4%. Under **the high recruitment model**, the probability was 85% that SSB_{2019} would be **less than 15%** SSB_0.* • *For perfect implementation of a zero quota from 2010 to 2019 (i.e. no catches), SSB_{2019} would almost certainly be **above 15%** of the SSB_0 under **the low recruitment model*** • *For perfect implementation of a zero quota with the **high recruitment model**, there is a 30% probability that the SSB_{2019} would be **less than 15%** of the SSB_0 and 63% chance it would be **less than 20%** of SSB_0.*
East According to SCRS (2008), continued fishing at current fishing mortalities is expected to drive the spawning stock biomass to 6% of the un-fished level.	***East—For Rec 08-05 quotas, see management section below. These estimates were made before the quota for the East stock was reduced in 2009 to 13500 t for 2010*** ▪ *Projections indicate that perfect implementation of [Rec. 08-05] through the year 2019 will result in more than a 85% chance that SSB_{2019} will be **less than 15%** of long-term potential, SSB_0 (91% that it is **less than 20%** SSB_0)* ▪ *If there is imperfect implementation of [Rec. 08-05] through the year 2019 (in the order of 20% overages), then there is a 91% chance that SSB_{2019} will be **less than 15%** of long-term potential, SSB_0. (95% chance that it is **less that 20%** SSB_0).* ▪ *If catches were to be kept at 15 000 t annually from 2010 to 2019, then there would be a 78% chance that SSB_{2019} would be **less than 15%** of SSB_0. (87% chance it would be **less than 20%** SSB_0).* ▪ *If catches were to be kept at 8500 t annually from 2010 to 2019, then there would be a 66% chance that SSB_{2019} would be **less than 15%** of SSB_0. (77% chance it would be **less than 20%** SSB_0).*

Supporting Statement (SS)	Additional information
Projected Declines from maximum historically recorded stock **East** According to SCRS (2008), continued fishing at current fishing mortalities is expected to drive the spawning stock biomass in the East to very low levels; i.e. to about 18% of the 1970 level.	▪ *If there were no catch from 2010 to 2019, then there would be a 48% chance that SSB_{2019} would be **less than 15%** of SSB_0. (61% chance that it would be **less that 20%** SSB_0).* ***Projected Declines (SSB_{2019}) from maximum historically recorded stock (SSB_{max})*** ***West*** • *For perfect implementation of ICCAT Rec 08-04 under both **the low and high recruitment** scenario there is a less than 4% chance that **SSB_{2019}** will be **less than 15% of SSB_{max}.*** • *For perfect implementation of a zero quota from 2010 to 2019 (i.e. no catches) SSB_{2019} would almost certainly be **above 15%** of the **SSB_{max}** under **the low and high recruitment models.*** ***East*** ▪ *Projections indicate that perfect implementation of [Rec. 08-05] through the year 2019 will result in a 35% chance that SSB_{2019} will be **less than 15%** of the maximum SSB_{max}. (38% chance it will be **less than 20%** SSB_{max}).* ▪ *If there is imperfect implementation of [Rec. 08-05] through the year 2019 (in the order of 20% overages), then there is a 49% chance that SSB_{2019} will be **less than 15%** of **SSB_{max}**. (52% chance it would be **less than 20%)*** ▪ *If catches were to be kept at 15 000 t annually from 2010 to 2019, then there would be a 24% chance that SSB_{2019} would be **less than 15%** of **SSB_{max}** (27% chance it would be **less than 20%)*** ▪ *If catches were to be kept at 8500 t annually from 2010 to 2019, then there would be a 9% chance that SSB_{2019} would be **less than 15%** of **SSB_{max}** (11% chance it would be **less than 20%)*** ▪ *If there were no catch from 2010 to 2019, then there would be a 0% chance that SSB_{2019} would be **less than 15%** of **SSB_{max}**. (1% chance it would be **less than 20%**) (ICCAT SCRS, 2009a).* ***Projected decline of biomass in 2019 (SSB_{2019}) compared to biomass in 2009 (SSB_{2009})*** ***West*** *With perfect implementation of ICCAT-recommended catch, it is almost certain that the stock in 2019 will be higher than it is in 2009 (ICCAT SCRS, 2009a). No changes were made to TACs for 2010 at the 2009 ICCAT Annual meeting (ICCAT, 2009).* ***East*** ▪ *Projections indicate that perfect implementation of [Rec. 08-05] through the year 2019 will result in a 39% chance that **SSB_{2019}** will be less than **SSB_{2009}**.*

Supporting Statement (SS)	Additional information
	▪ *If there is imperfect implementation of [Rec. 08-05] through the year 2019 (in the order of 20% overages), then there is a 58% chance that* ***SSB_{2019}*** *will be less than* ***SSB_{2009}****.* ▪ *If catches were to be kept at 15 000 t annually from 2010 to 2019, then there would be a 26% chance that SSB_{2019} would be less than SSB_{2009}.* ▪ *If catches were to be kept at 8500 t annually from 2010 to 2019, then there would be a 7% chance that* ***SSB_{2019}*** *would be less than* ***SSB_{2009}****. (ICCAT SCRS, 2009a).*

The species is or may be affected by trade

The Atlantic Bluefin Tuna is subject to a massive international trade, including a high incidence of illegal trade of the East Atlantic and Mediterranean stock.

ICCAT SCRS estimated real catches of Atlantic Bluefin Tuna in 2007 potentially reaching 61 000 t, which contrast with the quota of 29 500 t for that year. However, comparisons should be made with caution since trade data for 2007 include some

Atlantic Bluefin Tuna has been fished for many centuries with catches from the Mediterranean in the first half of the 20th Century estimated at between 10 and 20 000 t annually (Fonteneau, 2009). Ravier and Fromentin (2002) estimated that mean historical (catches were around 110 000 tunas/year (± 50 000), i.e. 15 000 t/year in the early 20th Century.

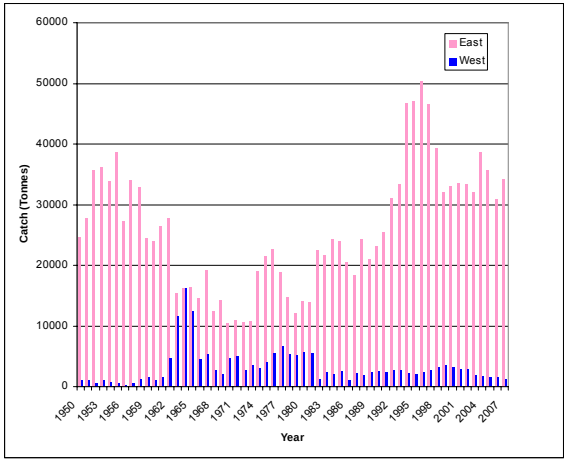


Figure: Total capture production (t) (Source: FAO Fisheries and Aquaculture Information and Statistics Service, 2009)

The overshooting of the TAC is very likely for the period 1998–2007, with roughly a catch closer to 50 000 t and a TAC at around 30 000 t (Fromentin, 2009b). Worm et al. *(2009) consider that the biomass of bluefin tuna in 2007 was approximately a third of that predicted as equilibrium biomass when harvested as*

Supporting Statement (SS)	Additional information
farmed fish caught in 2006, and trade information refers to processed presentations. The maximum annual catch recommended by ICCAT's SCRS to prevent collapse and initiate rebuilding for that stock was estimated at between 8500 t and 15 000 t.	*MSY and that the 2007 harvest rate was near to 10 times that predicted to result in MSY.*
For 2007, Japan reported to ICCAT the import of 32 356 t of processed Atlantic Bluefin Tuna (ICCAT Circulars 1951/07 and 500/08), in contrast with the TAC of 29 500 t for that year.	*A single bluefin tuna was sold for USD174 000 in 2001 at the Tokyo market (Fromentin and Powers, 2005). At the start of 2010 a single tuna of 233 kg was sold in Japan's first auction of the year for JP6.28 million (USD177 000) (The Times, 2010).* *It appears from figures provided in the SS that weight increases by approximately 13% during holding within tuna farms.*

Other information

Threats

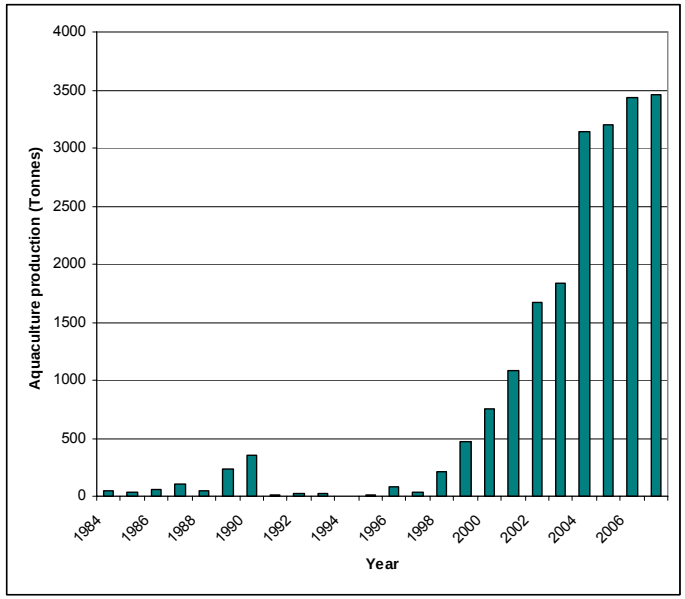
Overfishing including by-catch.	*Atlantic Bluefin Tuna has been fished in the Mediterranean for hundreds of years (Fromentin and Ravier, 2005; Formentin, 2009a).*

Conservation, management and legislation

Management of Atlantic Bluefin Tuna is under the competence of ICCAT, established in 1966. At ICCAT's annual meeting, legislation with management measures is adopted and is binding for the 48 contracting Parties. All bluefin tuna fishing and farming nations in the Mediterranean are contracting Parties.	*Recommendations made by ICCAT shall be applicable to contracting Parties (ICCAT, 2007). EU Member States are contracting Parties through accession of the European Community in 1997.* *Atlantic Bluefin Tuna is listed in Annex I of the 1982 Convention on the Law of the Sea as a highly migratory species (FAO Fisheries Department, 1994).* *Adults showed high rates of natal homing to both eastern and western spawning areas (Block* et al*., 2005; Boustany* et al*., 2007; Carlsson* et al*. 2007; and Rooker* et al*., 2007) although there is also evidence of significant trans-Atlantic movement (east to west) which appears to be size-dependent, with individuals of Mediterranean origin mixing with the western population in the US Atlantic (Rooker* et al*., 2008). The species displays highly migratory behaviours and trans-oceanic movement is well documented (Mather* et al*., 1995; Turner and Powers, 1995; Block* et al*., 2005 and Rooker* et al*., 2006a). There is still debate over the population structure of the species and whether there is a panmictic population, two stocks with overlapping foraging grounds, or a metapopulation. This uncertainty is currently one of the major uncertainties in the stock assessment (Fromentin, 2009b).* *Large-scale movements between foraging and spawning grounds often result in* Thunnus thynnus *crossing international management boundaries. Exchange rates*

Supporting Statement (SS)	Additional information
Management measures ICCAT currently manages Atlantic Bluefin Tuna as two stocks, the West and the East stocks, with the boundary between the two spatial units being the 45°W meridian. ICCAT has consistently set catch quotas for the East Atlantic and Mediterranean stock above levels recommended by its scientists (SCRS). The continuously decreasing population trends of the East Atlantic and Mediterranean stock are evidence of the failure of ICCAT's management measures to date **East** In 2006,scientists advised that the only scenarios which have the potential to address the decline and initiate recovery are those which include, among other measures, the closure of the Mediterranean to fishing during the spawning months (May, June and July) and a TAC of 15 000 t or less. The SCRS estimated that catches were 56% over the TAC. However, in November of the same year, ICCAT, in its plenary session, adopted the first "Recovery plan for bluefin tuna in the Eastern Atlantic and Mediterranean" which did not take into account any of the mentioned essential *Thunnus thynnus* Appendix-I listing proposal requirements for rebuilding the stock. The TAC was fixed at 29 500 t for 2007, decreasing gradually to 25 500 t by 2010; and the seasonal closure included only one month of the three-month spawning season advised. In July 2008, a new stock assessment for the East Atlantic and Mediterranean stock was made by the SCRS (SCRS, 2008a). At this time, the SCRS advised that the maximum TAC should be between 8500 and 15 000 t, and that fishing should be banned during the spawning season (May, June and July). ICCAT established TAC limits of 22 000 t, 19 950 t and 18 500 t for the years 2009, 2010 and 2011, respectively.	*show that US fisheries for bluefin tuna appear dependent, to some extent, upon recruits from the Mediterranean Sea.* ***Management measures*** *ICCAT has set fisheries quotas since 1998. However, ICCAT's SCRS report (p. 75) in 2009 noted that "based on the Committee's analysis, it is apparent that the TAC was overshot during a decade and was largely ineffective in controlling overall catch" (ICCAT SCRS, 2009b).* ***East*** *ICCAT Recommendation [08-05](superseded in 2009)* *TAC* *2007: 29 500 t* *2008: 28 500 t* *2009: 22 000 t* *2010: 19 950 t* *2011: 18 500 t* *Closed seasons have been set for different areas and for gear types.* *Sanctuaries are to be created in the Mediterranean.* *Minimum size 30 kg except for baitboats, trolling boats, artisanal fisheries and for farming where eight kilogrammes is the minimum size.* *In 2009, TAC for 2010 was reduced to 13 500 t with a reduction in fishing season and other increased management measures. TACs for future years will be determined on the basis of SCRS stock assessments in 2010 (ICCAT Secretariat, 2009). Other measures include adjustments to fishing capacity, reporting requirement, measures for farming activities and enforcement measures by contracting Parties. This is the first time the TAC set by ICCAT is within the range of the SCRS recommendations, after more than 10 years of a TAC set far above SCRS recommendations.* ***West*** *ICCAT Recommendation [08-04]* *TAC inclusive of dead discards 1900 t in 2009, 1800 t in 2010. TAC for future years will be determined on the basis of SCRS stock assessments in 2010. No changes were made to these catch limits at the 2009 ICCAT meeting (ICCAT Secretariat, 2009). Minimum size for capture is 30 kg or fish having fork length of less than 115 cm. No directed fishery is allowed in the spawning areas, e.g. Gulf of Mexico.* *Despite over 20 years of strict regulations on fisheries in the Western Atlantic, population estimates are far below reference levels (SCRS, 2003; 2006) in Rooker*

Supporting Statement (SS)	Additional information
	2007). The disparity between the eastern and western population sizes and the continued decline of the western stock suggests that some added level of protection is needed to ensure the sustainability of the smaller western component (Rooker, 2008).
Similar species	
Tuna species are widely traded at the international level, including Pacific Bluefin Tuna *Thunnus orientalis*, Southern Bluefin Tuna *Thunnus maccoyii*, Bigeye Tuna *Thunnus obesus,* Yellowfin Tuna *Thunnus albacares*, Albacore *Thunnus alalunga* and Skipjack *Katsuwonus pelamis*. Morphologically, all three bluefin tuna species look similar, particularly Atlantic and Pacific Bluefin Tuna. As whole adult fish, Bigeye Tuna, Yellowfin Tuna, Albacore and Skipjack are easily identifiable from bluefin tunas, based on external attributes (body shape and other morphometrics, characteristics of the fins, etc.). Trade in these species involves different kinds of presentation: for example, gilled and gutted, or transformed into loins or belly meat. All of these might be fresh/chilled or frozen. Once transformed into loins or belly meat, the three bluefin species, Bigeye Tuna and Yellowfin Tuna are very difficult, if not impossible, to distinguish from each other visually. Genetic techniques provide precise tools to identify Atlantic Bluefin Tuna from any other tuna species and can be used for tissue from fresh or frozen whole individuals, fin clips and even dried tissue and larvae.	*The Commission for the Conservation of Southern Bluefin Tuna has put in place mandatory requirements for tagging of product of Southern Bluefin Tuna in trade so there is no look-alike problem with that species (Sant, 2009). DNA techniques have been developed to differentiate Atlantic Bluefin Tuna from Southern Bluefin Tuna and Pacific Bluefin Tuna (Lowenstein* et al*., 2009).*
Artificial propagation/captive breeding	
East Most tuna caught by the industrial purse seine fleets operating in the Mediterranean are transferred live to farms for farming/fattening purposes (usually for a period of a few months). This activity qualifies as capture-based aquaculture according to FAO Standards, but does not involve the breeding in captivity of the animals. Farming capacity abruptly increased from a few hundred tonnes in 1997 to 30 000 t in 2003 (WWF, 2006) and around 64 000 t in 2008, representing approximately 51 000–57 000 t round weight of (large) fish at time of capture (SCRS, 2008a). As previously noted, the current farming capacity in the Mediterranean is estimated by the SCRS to be around 64 000 t (SCRS, 2008a).	***East*** *Figure 2 shows FAO data on bluefin tuna "aquaculture" (fattening/farming) production. This is not strictly captive breeding according to the CITES definition, rather fish are caught in purse seines and grown on for six to eight months. Fish raised under these conditions have higher oil content and are preferred.*

Supporting Statement (SS)	Additional information
West No harvesting for captive raising, captive breeding, or artificial propagation is currently taking place from the West Atlantic stock. The similar species, Pacific Bluefin Tuna, is subject to true, closed lifecycle captive breeding in Japan, where a small production is entering the local market and known as *kindai*. The EU-funded project SELFDOTT is currently investigating the breeding of Atlantic Bluefin Tuna in captivity.	 ***Figure 2: Aquaculture production of bluefin tuna between 1964 and 2009 Source: FAO Fisheries and Aquaculture Information and Statistics Service. 2009*** *It appears from figures provided in the SS that weight increases by approximately 13% during holding within tuna farms.* *Many problems remain with the development of aquaculture of Atlantic Bluefin Tuna and this will take, if it succeeds, at least 10 to 20 years of intensive research (Fromentin, 2009b).* *Clean Seas, an Australian initiative, is also farming Southern Bluefin Tuna.*

Other comments

Supporting Statement (SS)	Additional information
Appendix-I listing would be accompanied by a Conference Resolution that would mandate the Animals Committee of the Convention to review the status of the East Atlantic and Mediterranean stock and the West Atlantic stock of *Thunnus thynnus* in the light of any intervening actions at ICCAT and, if warranted, ask the Depositary Government (Switzerland) to submit a proposal to a subsequent CoP to downlist the species to Appendix II or remove it from the Appendices. A ruling to this effect by the Animals Committee only requires a simple majority of the Committee members and CoPs have a high rate of acceptance of proposals submitted by the depositary Government at the request of a relevant CITES Committee.	*This would appear not to be in accordance with* Resolution Conf. 9.24 (Rev. CoP14) *Annex 4 A.1 which directs that "no species listed in Appendix I shall be removed from the Appendices unless it has been first transferred to Appendix II, with monitoring of any impact of trade on the species for at least two intervals between meetings of the Conference of the Parties".* *Based on long-term trap data Ravier and Fromentin (2001) showed that the eastern Atlantic Bluefin Tuna population displayed fluctuations with a period of 100–120 years and also cyclic variations of about 20 years.*

Reviewers:
B. Block, B. Collette, J-M, Fromentin, TRAFFIC Oceania.

Inclusion of Satanas Beetle *Dynastes satanas* in Appendix II

Proponent: The Plurinational State of Bolivia

Summary: Satanas Beetle *Dynastes satanas* is a large black beetle found only in the districts of La Paz and Cochabamba in Bolivia, in an overall area indicated to be around 1000 km^2. It is one of a number of rhinoceros beetles in the subfamily Dynastinae, part of the family Scarabeidae. Males have a large pronotal "horn" and can reach 115 mm in length. Little is known about the biology of the species. Females lay between 25 and 40 eggs which go through three larval stages followed by a pupal stage; this process takes approximately two years, before adulthood is finally reached. Longevity of adulthood in the wild is unknown but in captivity individuals are thought to live for approximately nine months.

There are no published population estimates for *Dynastes satanas* and the area of distribution is unknown. However, the species is thought to have suffered from loss of habitat owing to settlement, deforestation and agricultural development.

Dynastes satanas is evidently sought after in Europe, the USA and parts of Asia (particularly Japan) for the pet trade, as fighting animals and for display. Individuals are offered for sale on the Internet as larvae and adults, in dried and live form, and can reach high prices (up to USD220 for a live adult male). Local communities in La Paz are reported to collect this species and the closely related *Dynastes hercules* in order to export specimens for the international pet trade. In recent years, a number of seizures have been made of *D. satanas* and requests documented for the supply of wild *D. satanas* from Bolivia. Further trade data are limited, although the US Fish and Wildlife trade database (LEMIS) reported a small amount of trade in dead *Dynastes* specimens originating in Bolivia in the period 2000–2007, some of which are likely to have been *D. satanas.*

Impacts of collection for trade are unclear; although communities involved in collection report declining yields of *Dynastes satanas* over the past five to six years, despite increased collection effort.

The species is protected in Bolivia and trade is therefore illegal. There are pilot projects under way aimed at the sustainable use of *Dynastes satanas.*

Analysis: There is insufficient information to determine whether *Dynastes satanas* meets the criteria for inclusion in Appendix II. The species has a relatively limited range in which it is likely to be affected by ongoing habitat loss, but information on population densities and overall population trends is lacking. There is anecdotal information of declines in capture rates in areas where the species is (illegally) harvested for trade, but it is unclear how extensive or marked any such declines might be, or whether harvest for trade has any significant impact on the population.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Bolivia	

IUCN Global Category

Not assessed

Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Dynastes satanas is endemic to the "yungas" or moist green forests in the department of La Paz (occurring in Zongo, Suapi, Chairo, Pacallo, Charobamba, Coroico Viejo, Yolosa, Santo Domingo, Florida, Villa Aspiazu Chojlla, Chulumani, Irupana, Apa Apa and San Juan de la Miel) and Yungas del Chapare in the department of Cochabamba, Bolivia.

It is found at altitudes of between 900 and 2 000 m, in a temperature range of seven to 24 ºC and where rainfall is between 1 500 to 6 000 mm per annum.

The map in the supporting statement indicating the geographical location of the range of the species suggests a relatively extensive area of just over 1000 km^2; it is not clear whether the beetle is thought to occur throughout this area or not.

According to Ledezma (2009), Dynastes satanas *occurs in Cañadon, Cristal Mayu and Sehuencas in the department of Cochabamba in Bolivia.*

Lachaume (1985) recorded the highest altitudes for Dynastes satanas *as 2300 m.*

No information was available on total population size or rates of population decline.

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

According to local people, the populations of *Dynastes satanas* have reduced significantly over time.

The proposal states that, using light-traps, Vidaurre and Guerra (2008) captured 500–600 individuals over five nights in one locality within the Nor Yungas province of La Paz.

Dynastes satanas is popular because of its size, horns, attractiveness and harmlessness to humans. These characteristics make it a desirable pet and mean it can be used for fighting in exhibitions. Based on internet searches, the supporting statement indicates that trade poses a major threat to *D. satanas* and that the species is in high international demand, consequently promoting local people to become involved in the illegal collection of specimens. The supporting statement suggests that adult specimens are harvested from the wild.

No population estimates could be found in the literature. However, as mentioned in the supporting statement, Vidaurre and Guerra (2008) attempted to estimate the population size of Dynastes satanas *in Coroico Viejo and Santo Domingo in Nor Youngas province, La Paz. Two light-traps were set up for five consecutive nights, for 11 hours per night. However, no specimens (not 500–600) were captured; this was believed to be because the study was conducted in the first week of June when the beetles are not flying and are therefore difficult to catch (Vidaurre, 2009).*

Internet searches reveal that Dynastes satanas *can be obtained online, both as adults and larvae, and as dried (for display) or living specimens. Prices varied from approximately EUR40-65 per larva, USD120-375 per adult and USD300–475 per pair. Prices for individuals varied depending on the size and sex of the specimens, large males being the most desirable. Prices were higher for* D. satanas *than for* D. hercules*, implying* D. satanas *is rarer and more highly valued.* D. satanas *is said to be preferred by collectors (both adults and children) wanting a pet because they are not noisy or complicated to feed and do not have a strong odour (Jemio, 2007), whilst the larger,* D. hercules *is thought to be preferred by those wanting to use the beetles for fighting (Quispe, 2009).*

On most of the websites viewed, the source of the beetles was not specified. However, on one site wild specimens (seven males and 11 females) were listed and,

In December 2006, two Japanese collectors requested 200 *Dynastes satanas* be collected and transported to the city of Osaka, Japan. The authorities of Bolivia refused permission. In 2007, Hosogushi Masatsugu, a Japanese national, attempted to transport 423 beetles illegally from Bolivia but they were seized in Ecuador; 211 of these beetles were later returned to Bolivia and these are now part of the pilot community project in Nor Yungas province. The supporting statement also details a seizure of *D. satanas* which were transported from the town of Coroico to the city of La Paz where the traffickers were stopped; the planned final destination was unknown.

on another website, seemingly the same provider was advertising specimens from Cochabamba, *Bolivia, where* Dynastes satanas *is endemic. Jemio (2007) suggested* D. satanas *could be obtained on the Internet for USD100, whilst Quispe (2009) and Anon (2009) reported that* D. satanas *could sell for up to USD350 (the source of the specimens was not mentioned). It has also been noted that during the 1980s,* D. satanas *could sell for up to USD1000 each, but they are now cheaper owing to the large numbers being taken from the wild and exported for international trade (Ledezma* et al.*, 2007). "Wanted" adverts were mainly from people residing in Asia, USA and Europe and Vidaurre (2009) stated that wild* D. satanas *were generally illegally exported to Japan and France.*

Data (2000–2007) from the US Fish and Wildlife Service's data reporting system (LEMIS), which records trade import to and exports, including re-exports, from the USA, showed just three imports of Dynastes *from Bolivia. These included one consignment of 16 wild-taken specimens imported to Chile in 2000 (purpose unspecified) and two consignments of five ranched specimens imported to Japan, one in 2004 and one in 2005 (for commercial purposes). All specimens were "bodies" and since they were not identified to species level, could either have been* D. satanas *or* D. Hercules, *both of which occur in Bolivia.*

According to Moore (2006) and Guerra (2005), in order to supply D. satanas *to collectors, Japanese beetle enthusiasts are rearing* D. satanas *in captivity. The breeding of exotic beetles has become increasingly popular in Japan in the past few years and the number of breeders is said to be growing (Kameoka and Kiyono, 2003). Despite this, a study by TRAFFIC did not reveal any records of* D. satanas *for sale, yet four other* Dynastes *species were found for sale (one of which was* D. hercules *from Bolivia) (Kameoka & Kiyono, 2003).*

Of the 423 specimens seized in 2007 and the 211 returned to Bolivia, it is not known how many were Dynastes hercules *and how many were* D. satanas*. Those that died were preserved and are currently in Ecuador (Quispe, 2009).*

A TRAFFIC report (2008) detailed that a "kingpin in the world of illegal butterfly collecting" was apprehended in 2007 for smuggling a number of specimens (including Dynastes satanas*) into Los Angeles.*

A request to export 70 Dynastes satanas *from Bolivia by one trader for commercial purposes has also been documented (Ledezma* et al.*, 2007).*

According to Ledezma et al. *(2007), local collectors get paid approximately 15 Bolivianos (USD2.14) for one* Dynastes satanas*, although another source suggested local people could get around 300 Bolivianos (over USD40) per pair (Jemio, 2007). Money made from selling the beetles is used to subsidize a principal income, which is usually derived from agriculture. As larger specimens are more desirable, it is common practice for collectors to keep them in their houses for up to three months in*

	order to "feed them up" and therefore obtain a higher price (Vidaurre, 2009). *Members of the Santa Rosa community in La Paz who have been involved in collecting beetles from the wild for many years, say that eight years ago they were able to collect 150 beetles per month and are now only managing to find 70 per month. These figures refer to both* Dynastes satanas *and* D. hercules *(Anon, 2009).* *Local communities in Coroico Viejo and Santo Domingo in Nor Youngas province (La Paz), when interviewed, were found to collect 250 pairs of* Dynastes satanas *per year (over four months: February–May). However, they unanimously agreed that the number of specimens collected had decreased over the last five to six years despite a reported three-fold increase in collection effort and an increase in the number of families participating in collection (Vidaurre and Guerra, 2008; Vidaurre, 2009). In Coroico Viejo, 31.4% of families were involved in collecting and selling* D. satanas, *of which 73% had been involved in the trade for three to five years and 27% had been involved in the trade for seven to eight years. In Santo Domingo, only one family was involved in the collection and selling of* D. satanas *and had been so for the past seven to eight years. All those involved in the trade were born in the area and all the families said they collected specimens from February to April and sometimes in May. Only three families used light-traps to collect the specimens, whilst the other families used lights on the exterior of their home to attract and collect the beetles.*
D. satanas lay between 25 and 40 eggs. The egg cycle takes about two months, the larval stages last between one and a half and two years before the pupal stage is reached. The pupa then takes approximately two months before it becomes an adult.	*Information derived from consultation with traffickers suggests* D. satanas *can live approximately nine months in captivity (Vidaurre, 2009). No other information regarding the species's biology could be derived from the literature or from consultation with experts.*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Res. Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

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Other information

Threats

Bolivia has seen considerable deforestation and agricultural development over the last few decades. The proposal implies that *Dynastes satanas* can be found in areas where considerable alteration of vegetation has occurred. Conversion of forests to coca and fruit plantations, slash and burn practices and the resulting soil erosion have all led to a significant loss of habitat for this species.

Similar species

A number of species have been listed in the supporting statement, including: *Dynastes granti* (which occurs in Arizona, USA), *Dynastes hercules* (occurs in Central and South America), *Dynastes hyllus* (occurs in Mexico, Belize, El Salvador, Honduras, Guatemala and Nicaragua), *Dynastes maya* (occurs in Mexico and Guatemala), *Dynastes miyashitai* (occurs in Mexico), *Dynastes neptunus* (occurs in Colombia) and *Dynastes tityus* (occurs in USA).

Of the species listed in the supporting statement, only Dynastes hercules *is found in Bolivia.* D. hercules *is much larger than* D. satanas *and male* D. hercules *have olive green wing covers with brown speckles, while* D. satanas *males are totally black and therefore they should be easily distinguishable.*

Conservation, management and legislation

There are no international laws in place to protect this species. However, trade in *Dynastes satanas* is illegal in Bolivia and the National Environment Competent Authority is responsible for domestic controls, in co-ordination with decentralized departments and other wildlife departments. There are various laws and control/enforcement bodies in place to protect species. Current legislation includes: *Supreme Decrees*, number *22641* and *25458,* which prohibit collection or storing of any wild fauna unless their use is sustainable. The sustainable use of a species is determined through management plans and studies or inventories by taxonomic experts, who must conclude whether sustainable exploitation is possible and, if so, quotas must be established every two years. Scientific research is also controlled by a resolution (number 024).

At present there is no sustainable management plan in place for *Dynastes satanas*, however there are currently pilot community projects focusing on the sustainable use of *D. satanas* currently underway. The aim of these projects is to promote captive breeding of the species and to ensure wild specimens are conserved.

The community project in Santa Rosa began in 2008 and involves 32 families that seek to conserve Dynastes satanas*. They plan to breed and sell live beetles and to produce beetle souvenirs, such as key chains with beetles in resin etc. (Anon, 2009).*

Captive breeding/artificial propagation

As specified above, captive breeding programmes may be implemented if community projects are fully implemented.

Other comments

Reviewers:
J. Ledezma, B. Ratcliffe, T. Sanchez Vidaurre

Inclusion of Coralliidae spp. in Appendix II, with the following annotation: "the entry into effect of the inclusion of species in the family Coralliidae in Appendix II of CITES will be delayed by 18 months to enable parties to resolve the related technical and administrative issues"

Proponents: Sweden, on behalf of the Member States of the European Community, and the United States of America

Summary: Coralliidae spp. are a group of about 31 species of octocorals that occur throughout the world. They are benthic suspension feeders, occurring at depths ranging from seven to 1500 m. They are part of a valuable group known as precious corals, but many species have populations that are too small or scattered to be useful for commercial fisheries. The species that are used commercially include *Corallium rubrum* in the Mediterranean and North-east Atlantic and several species in the North-west Pacific. The axis colour of the various species ranges from white, through various shades of pink and orange, to deep red, and the products are used extensively in jewellery and art objects. Many species, especially those in deeper waters, are slow-growing and long-lived and particularly vulnerable to over-exploitation. *C. rubrum*, which occupies depths from seven to 300 m, reaches maturity relatively quickly and has had sustained extensive exploitation in several areas of the western Mediterranean for many years; however, populations have shown a dramatic decrease in their size, age and reproductive output in recent years and some populations are no longer commercially viable. Genetic studies of *C. rubrum* and some Pacific species have demonstrated significant isolation between some populations and considerable heterozygote deficiencies in some species, but not others.

Trade data show the most important producers of *Corallium rubrum* for the period 1967–2006 have been Italy, Spain and Tunisia, with smaller quantities from Albania, Algeria, Croatia, France, Greece and Morocco. Dredging the seabed in the past to collect *C. rubrum* and other species destroyed large areas of habitat, but these crude methods have largely been replaced by more selective, less damaging ones. The commercial species in the Pacific occur mainly in Japan, Taiwan (Province of China), the USA, and seamounts in international waters. Based on trade data, the most important species are *Corallium secundum*, *C. elatius*, and *Paracorallium japonicum*, with very small quantities of *C. konojoi*. There have also been large quantities of an undescribed species, referred to as “Midway deep coral” but, without taxonomic documentation, this cannot be definitely ascribed to this family. The Pacific species have been subject to rapid exploitation following discovery of commercially viable beds, leading to exhaustion of the resource. After harvesting has been discontinued, the populations have shown signs of recovery but, even after a number of years, have not fully recovered. Much of the trade is in the form of processed beads, traditionally processed and exported by Italy but, more recently, several Asian countries have been involved. The USA is the main importer of Coralliidae products, involving millions of unworked and worked items. Illegal harvesting was a problem in US territorial waters in the past and has been reported with increasing frequency in Spanish waters. The main threat to Coralliidae is over-harvesting, but secondary human impacts include pollution, sedimentation in the Mediterranean and incidental take and habitat degradation, associated with longline fishing and bottom trawling in the Pacific. Climate change may also provide an additional threat; it has been asserted that dense, short-lived populations with a high turnover are likely to be more susceptible to mass mortalities when fishing pressure is combined with global climate change (especially temperature anomalies). Mass mortalities have also been linked to disease.

Harvesting of *Corallium rubrum* is regulated in most countries. The Pacific species are regulated in the Hawaiian Islands, other areas under US jurisdiction, Japan and Taiwan (Province of China). Coralliidae are not managed by any existing fisheries management organizations. *C. elatius, C.* (= *Paracorallium*) *japonicum, C. konjoi* [sic] and *C. secundum* were listed in Appendix III by China, effective from 1 July 2008.There are currently no captive-breeding or propagation programmes for Coralliidae.

Analysis: Coral derived from Coralliidae species is a valuable commodity that is traded in large amounts. Populations of various Coralliidae species, chiefly in the Mediterranean, North-east Atlantic and North-west Pacific, have been exploited for their coral, much of it destined for international trade. This

exploitation has often been intensive and, in recent years, some populations have shown very marked decreases in size, age and reproductive output.

There remain, however, significant uncertainties regarding the impact of harvest for international trade on Coralliidae species, particularly in regard to the Pacific species. These uncertainties include: the proportion of each species that remains inaccessible to harvest and how changing technologies may in future alter that proportion; the proportion of accessible populations that is not harvested (because it is not economic to do so or because of enforced controls on harvest); rates of recovery of harvested populations and the degree to which species can recolonize areas; the age of reproduction of colonies relative to the age at which they are harvested; the impact of other factors, such as sedimentation, pollution and incidental take, on Coralliidae populations; in some cases the identity of the species involved. Given these uncertainties, it is not possible to say with certainty whether or not most Coralliidae species meet the criteria for inclusion in Appendix II set out in *Resolution Conf. 9.24 (Rev. CoP14*).

Considerably more is known about *Corallium rubrum* than about other Coralliidae species, but even in this case it is difficult to apply the criteria in *Resolution Conf. 9.24 (Rev. CoP14)* for inclusion in Appendix II in a straightforward way, largely because they were clearly not established with widely distributed, colonial marine organisms in mind. In attempting to assess this species against the criteria, it may be argued that the “application of decline to commercially exploited aquatic species” set out in the footnote to Annex 5 should apply. In fact, the language in the footnote is derived from conventional fisheries biology and management practice, which itself can only meaningfully be applied to conventional fisheries stocks. It is, arguably, even less relevant to the case of Coralliidae than the general criteria and guidelines in the Resolution. Taking these as set out in Annex 2a of *Resolution Conf. 9.24 (Rev. CoP14)*, two cases apply: is regulation (i.e. inclusion in Appendix II) required to ensure that the species does not become eligible for inclusion in Appendix I in the near future (Annex 2a A.); or is regulation required to ensure that harvest is not reducing the wild population to a level at which its survival might be threatened by continued harvest or other influences (Annex 2a B.)?

The first case requires assessment using the Appendix-I criteria. The species evidently does not have a small population, nor a restricted area of distribution, nor is it predicted to have so in the near future. Regarding any observed or inferred decline in population, if population size is taken to mean number of colonies, then it is unlikely that the species has undergone a recent marked decline or will do so in the near future: most current harvest is agreed to have the effect of reducing the average size of colonies (sometimes drastically) rather than their absolute number. However, were it to be argued that the total number of individual polyps was more indicative of population size, then the overall mass or weight of the population might be a more relevant measure. In this case, because the average size of colonies in exploited areas has decreased, then it is possible that the species has undergone an overall marked decline in these areas (it has certainly done so locally). Exploitation is increasingly targeting deeper waters, where colonies are generally larger but more sparsely distributed, so that such a decline might be expected to continue. However, considerable uncertainties remain because, as with other species of Coralliidae, there is a lack of knowledge of the overall biomass of deeper water colonies and of their current rate of exploitation. Because of these uncertainties, it is not possible to say whether the overall rate of decline of the species (as measured by biomass) is near to being “marked” or not. Interpretation is further hampered by the fact that there is no settled definition of generation time for this species, nor is one likely to be agreed on, although it can assumed to be longer than the earliest reported age at maturity (seven years). The high unit value of the species in international trade would indicate that there is an incentive to target (and deplete) any accessible stocks.

Regarding the second criterion, it has been argued that reduction in average colony size as a result of harvest for trade reduces reproductive potential and makes colonies more liable to destruction from other sources. The evidence that harvest for trade is likely to lead to the survival of the species becoming threatened in either of these ways is weak. No definite link has been established between recruitment rates (as opposed to recruitment potential) and colony size or absolute production of larvae, nor has it been clearly demonstrated that small colonies or those at lower densities are inherently more vulnerable to extinction. The species has a wide distribution and at least some populations are extremely likely to remain inaccessible to exploitation or economically unviable to exploit, and otherwise remote from other direct human influences. This means that the species as a whole is inherently unlikely to become extinct, unless there are wholesale and catastrophic environmental changes throughout its range.

In conclusion, it is conceivable, but by no means certain, that *Corallium rubrum* meets the criteria for inclusion in Appendix II by virtue of regulation of trade being necessary to prevent the species becoming eligible for inclusion in Appendix I in the near future, applying the decline criterion for Appendix-I listing to overall mass of the species rather than colony number, assuming an extended generation time for the species and assuming that deeper water, inaccessible colonies do not represent a significant proportion of the recent overall mass of the species as a whole. The species does not appear to meet any other criterion for inclusion in Appendix II.

Species of Coralliidae in trade resemble each other and it probably will not be possible to identify all specimens in trade to the species level; therefore, inclusion of some but not all species in the Appendices might create implementation problems.

Supporting Statement (SS)	Additional information
Taxonomy	
Recent taxonomic revisions divide the family Coralliidae into two genera, *Corallium* and *Paracorallium*. There are currently 31 recognized species, in addition to several undescribed species and one listed as "*Corallium* sp. nov. Midway deep coral". Note that the taxonomy of the undescribed Midway coral has not yet been clarified, and there are some indications that Midway coral may represent several species.	*Some unresolved taxonomic problems remain concerning the family* Coralliidae, for example that regarding *"*Corallium *sp. nov.": the basis for its inclusion in the genus* Corallium *or the family* Coralliidae *remains unpublished.*
25 species of Corallidae are listed: *Corallium abyssale*, *C. borneense*, *C. ducale*, *C. elatius*, *C. halmaheirense*, *C. imperiale*, *C. johnsoni*, *C. kishinouyei*, *C. konojoi*, *C. lauuense, C. maderense*, *C. medea*, *C. niobe*, *C. reginae*, *C. rubrum*, *C. secundum*, *C. sulcatum*, *C. tricolor*, *Paracorallium inutile*, *P. japonicum*, *P. nix*, *P. salomonense*, *P. stylasteroides*, *P. thrinax*, *P. tortuosum*	*An as yet unpublished molecular study, Ardila and Sánchez (in prep.), identified two strongly supported clades, corresponding to* Corallium *and* Paracorallium*, but* C. rubrum, C. kishinouyei *and* C. niveum *were found to be part of the* Paracorallium *clade rather than* Corallium*.*
Corallium regale is treated as a synonym of *C. lauuense*.	**Corallium regale***: Baco and Shank (2005) stated: '*C. lauuense *was previously misidentified and referred to as* C. regale' *which is not an indication of synonymy. There are, however, still unresolved taxonomic problems concerning these two species.*
A further six species: *Corallium boshuense*, *C. niveum*, *C. porcellanum*, *C. pusillum*, *C. vanderbilti*, *C. variabile* are listed as 'additional species'.	*Bayer and Cairns (2003) differs from the SS species list in a number of ways:* Corallium boshuense*,* C. niveum*,* C. porcellanum*,* C. pusillum*,* C. vanderbilti *and* C. variabile *are not mentioned;* C. regale *is treated as valid.*
It is recommended that the Parties adopt Bayer and Cairns (2003) as an official nomenclatural reference for Coralliidae.	
Range	
Species in the family Coralliidae are found throughout the world in tropical, subtropical and temperate oceans, including the Atlantic Ocean, Mediterranean Sea, Indian Ocean, Eastern Pacific Ocean, and Western Pacific Ocean at depths of 7–1500 m.	*Only six Pacific species of commercial value are listed in the SS Annex. The seventh species in the quoted reference (Grigg, 1982) was 'momo'* Corallium nobile*, but this was subsequently (Grigg, 1984) referred to as* C. elatius*.*
Corallium rubrum: is endemic to the Mediterranean, primarily around the central and western basin (7–300 m depth, but most commonly at 30–200 m) with smaller	Corallium rubrum *(Albania, Algeria, Cape Verde, Croatia, France, Gibraltar, Greece, Italy, Libya, Malta, Mauritania, Monaco, Montenegro, Morocco, Portugal, Senegal, Spain, Tunisia, Turkey)*

Supporting Statement (SS)	Additional information
populations in deeper water in the eastern basin, and to the eastern Atlantic off the coast of Africa. Isolated colonies of Coralliidae also occur off Australia, the Solomon Islands, Vanuatu, Fiji, Kiribati, Tonga, Samoa, and the Cook Islands at 200–500 m depth, in international waters on the New England Seamount Chain (Atlantic Ocean), and in US waters off Florida, California (Davidson Seamount), Alaska (Gulf of Alaska Seamounts), Guam, and three locations in American Samoa.	C. elatius *(Guam, Japan, Mauritius, Philippines, Solomon Islands, Taiwan [Province of China])* C. secundum *(American Samoa, Japan, Taiwan [Province of China], USA, Emperor Seamounts)* C. lauuense *(American Samoa, USA, international waters) C. regale (American Samoa, USA, Vityaz Seamount)* P. japonicum *(Japan, Taiwan [Province of China])* C. konojoi *(Japan, Philippines, Solomon Islands, Taiwan [Province of China])* *Identified range States for the genus are: Bahamas, Brazil, British Indian Ocean Territory, Cape Verde, France, Fieberling Tablemount, Indonesia, Ireland, Japan, Malaysia, Mauritius, Mexico, Morocco, New Caledonia, New Zealand, Portugal, Samoa, Spain, Sri Lanka, USA, US minor Pacific Islands, Vanuatu and Vityaz Seamount.* *Unidentified* Coralliidae *colonies have also been found in the New Zealand region (Consalvey* et al.*, 2006). The species on the New England Seamount Chain has not yet been identified.*
IUCN Global Category	
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
The only known Coralliidae populations large enough to support commercial harvest are found north of 19º N latitude, including seven Pacific species and one Mediterranean species (*Corallium rubrum*). All known species in this family occur at low abundances. ***Information below is that generally applicable to the family, followed by that specifically for species in the Mediterranean, followed by that specifically applicable to species in the Pacific.*** Coralliidae species are primarily K-selected with life-history characteristics typical of low productivity organisms that make them particularly vulnerable to over-exploitation, including extreme longevity (75–200 years), late age of maturity (7–12 years or possibly up to 25 years), slow growth (< 1 cm/yr) and low fecundity. FAO previously suggested *C. rubrum* was a medium-productivity species. In the absence of fishing pressure they can attain heights ranging from 300 mm (*P.*	Coralliidae are considered the slowest growing marine resource, present or past.

Supporting Statement (SS)	Additional information
japonicum, C. konojoi), 500–600 mm (*C. rubrum*), to over 1 m (*C. secundum, C. elatius*). *Corallium rubrum* exhibits average growth rates of 0.2-2 cm/yr in length and 0.24-1.32 mm diameter, with growth rates declining with age. All known Pacific species and deep water populations of *C. rubrum* occur naturally at a relatively low density (typically <1 colony/m^2), and any further reduction in density will double or triple the distance between colonies, which could result in an Allee effect. While low density is less of a problem for *Corallium* species that broadcast their gametes, *C. rubrum* requires internal fertilization which will not occur if a male colony is separated from a female colony by too great a distance.	
***C. rubrum*:** Historically, *C. rubrum* colonies frequently attained masses greater than 2 kg, heights of 500 mm, and basal diameters of 30–100 mm. Previously it was believed that *C. rubrum* colonies with a basal diameter of 7 mm may be attained within 7 years but more recent estimates consider this size to be reached by 30-40 years old. *C. rubrum* colonies with a basal diameter of 5-7 mm with unbranched sticks no more than 20-30 mm tall, each with a maximum of 100 polyps capable of producing tens to no more than a few hundred larvae annually. After a century, they can grow to be 500 mm tall with hundreds of branches and thousands of polyps, which can release hundreds of thousands of larvae each year. For a modular organism that characteristically forms highly complex, branched colonies, a shift from historic measures of 200-500 mm height to >90% of colonies that are less than 50 mm tall equates to a loss of 80-90% of the reproductive modules of individual colonies. Apart from a few known deep-water populations, today colonies of *C. rubrum* rarely exceed 100-200 mm in height and 20 mm basal diameter at depths of 60 m or less, with most populations dominated by 20-50 mm tall colonies as commercial take has removed most large colonies. Restoration of this population structure would require removal of fishing pressure for decades.	**C. rubrum:** *Each polyp only produces a few larvae (one to several larvae per polyp), so "hundreds of thousands of larvae" seems too high an estimate. The actual calculations and conclusions of this paragraph are, however, valid. (Tsounis, 2009).* *Jebali (2006) used an adjusted method of ageing* Corallium rubrum*, based on growth rings, and estimated an average growth rate of basal diameter in Tunisia of 0.35 mm per year, which equated with the results of Marschal* et al*. (2004) in France, but was considerably lower than the results obtained by García-Rodríguez and Massó (1986) in Spain (1.32 mm per year), and by Santangelo* et al*. (1993) in Italy (0.93 mm per year).*
Local populations of Coralliidae spp. are self-seeding and genetically distinct, with occasional long-distance dispersal events maintaining connectivity between sites. Several studies have identified significant genetic isolation and limited larval dispersal between populations, with individual beds relying primarily on local recruitment. New data from Sardinia also show a high degree of genetic differentiation and distinct population segments in deep and shallow water, which reduces the likelihood that these deep populations serve as a refuge for over-exploited shallow populations. Deep-water Coralliidae habitats have been impacted by dredges and trawls used to collect corals and by trawl fisheries targeting seamount and deep sea-associated fishes. In the western Mediterranean, non-selective coral fisheries have degraded the three dimensional structure created by *C. rubrum,* apparent 20 years ago, to a	*No reference was given for the new data from Sardinia, but Casu (2008) is apparently an appropriate one. The study confirmed the use of a simple, inexpensive molecular technique to perform genetic analysis on populations of* C. rubrum*. However, the results did not show a clear cut difference between shallow and deep water populations.*

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"grassplain"-like structure. **Population size**: Most often, colonies occur at low densities (low number of colonies per unit area, generally < one per square metre), a low overall abundance (number of colonies) within an individual bed, and a small area of occupancy within individual areas of suitable habitats. The few larger, commercially exploitable populations reported from the Mediterranean and western Pacific are also characterized by low densities and a relatively small number of mature, economically valuable colonies. The only exceptions are certain shallow-water habitats in the Mediterranean that are no longer considered commercially viable, as these populations are now dominated by small (10–50 mm tall) colonies that never achieve a size large enough to support legal collection. Pacific: Coralliidae beds off Hawaii have been found in 16 areas at depths of 380–575 m, but only three of these are considered large enough to support commercial fisheries. The largest bed off Oahu is dominated by *C. secundum* at densities of 0.3 colonies/m², with a total population size of 120 000 colonies. Keahole Point Bed covers an area of 0.96 km² and contains up to 7000 legal-sized *C. regale* colonies. **Population structure**: Mediterranean: Since recruitment potential is directly linked to the number of polyps per colony, heavily fished populations dominated by young colonies are more likely to be driven to local extinction when compounded by other stressors, unless there is an external source of larvae. Deeper-water Coralliidae populations have become increasingly important targets for fisheries as shallower populations are fished out. At a recent expert consultation held in Italy (Red Coral Workshop: Naples, Italy 2009), consensus was reached that shallow populations in the Mediterranean were over-exploited and should be protected from fishing, while deep areas still contained large colonies that could be harvested. However, it appears that deep populations may exhibit a very short period of high commercial viability, as corals occur at lower densities at these depths, and at more exposed positions, making them more vulnerable to fishing pressure. There are reports that several *C. rubrum* populations located in deep water have been depleted since the 1980s, and have not yet recovered from centuries of heavy dredging. **Population trends**: It is likely that precious corals become economically extinct before they reach biological extinction, as they are widespread colonial animals that are highly resistant to total colony mortality once a large size is achieved. However, exposure to unsustainable fishing pressure can and has resulted in removal of the most critical segments of the population for persistence of those populations (large	***Population size***: Corallium rubrum *can occur at high densities at depths of > 100 m in some areas – photos by ROVs and accounts of professional fishermen in Albania, Algeria and Morocco. The comparison of current densities with those of "Several decades ago" may be misleading due to the differences in sampling strategy and comparison of the different sites (Harmelin, 2007).* *In the eastern Mediterranean* Corallium rubrum *is much scarcer than in the west, e.g. it was only located at one site in the Aegean Sea by Salomidi* et al. *(2009).* ***Population structure****: The population structure of the poorly known eastern Mediterranean populations was studied in Croatia by Krŭzić and Popijač (2009), and they found that protected populations were in much better condition than unprotected ones, and that depth had a significantly positive effect on maximum height of colonies.* *Gandini (2009) studied two populations, one in Italy and one in Spain, and found that the former had a significantly higher reproductive output, which seemed to be mainly influenced by the higher density of the adult colonies, and the size and structure of the sex ratio of the population.* *Despite the restrictions to gene flow at short distances evidenced by microsatellites, a study of intron sequences suggested a general homogeneity of* Corallium rubrum *across its Mediterranean distribution area (Mokhtar-Jamaï* et al.*, 2009).* ***Population trends***: *Bavestrello* et al. *(2009) noted that data about the growth rate of just-settled or juvenile colonies living in shallow waters (< 50 m) were abundant and values of 1 mm year-1 for the base diameter and 1 cm year-1 for the height of the colony were generally accepted. Nevertheless it has been demonstrated that four to five years after the settling, the growth virtually stops or becomes negligible: colonies monitored for more than 20 years along the French coast reached a height of about*

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colonies), followed by continued (illegal) removal of smaller colonies as the demand increases and the resource declines. Global harvest statistics from 1950 to 2001 provide an indication of the rapid decline in abundance of Mediterranean and Pacific species corresponding with the discovery, inception of commercial fishing, increase in landings, over-exploitation, and, ultimately, exhaustion of the resource. A large bed discovered in 1965 (300-500m depth) and a second bed discovered in 1978 (900-1500 m), both on the Emperor Seamounts, were fished by 100s of boats during peak years and production neared or exceeded 300 t during several years. Landings crashed by 1989 and have remained below 5 t/yr for the last 19 years. Recent submersible surveys within these former coral beds identified isolated colonies, many of which were broken, dead, and with no remaining large populations. Mediterranean: In Spain, the mean basal diameter of colonies declined from 7.2 mm to 4.8 mm, with mean height decreasing from 61.8 mm to 27 mm from 1986 to 2003. Even in areas protected from fishing for over 14 years, the largest colonies rarely exceeded 200 mm in height and the average basal diameter was only 4.8 mm, corresponding to an average age of 7.5 years. Colony height increases with depth to 40 mm height at 25–50 m and 60 mm at 50–90 m; the largest colonies (130–160 mm height) are found in non-harvested areas >50 m depth. In contrast, colonies collected in the 1950s and 1960s were frequently up to 500 mm height and 20 mm diameter. A 1962 collection off Costa Brava, Spain, consisted of colonies with basal diameter of 10–45 mm (mean = 16 mm) and height of 100–500 mm (mean = 115 mm), with the largest corals estimated at 50–80 years in age. In France, colony size (basal diameter and height) in non-harvested sites was four times larger and average height was two times greater than that of corals in harvested areas. Relative to historic records of colonies that were 300–500 mm in height and 10–30 mm diameter, colonies in fished areas today are of 30–50 mm height, which equates to a mean of less than 10% of the historic number of polyps per colony and 20–30% of the number of polyps per colony within areas protected from fishing for 10–15 years; these smaller colonies will produce less than 10% of the offspring per colony that was observed historically. The first deep-water study conducted in Spain reported an increase in the size structure of corals that was directly related to water depth from about 30–50 mm height in shallow water (<30 m depth) to 100-150 mm at 80–120 m depth, with larger corals found below areas currently targeted by SCUBA fisheries. More recently, deep areas examined off Sardinia also contained larger corals. More than 50% of the landings were below the minimum recommended diameter (10 mm) established for this location based on a sample size of over 200 colonies. This	*four centimetres and a basal diameter of 0.5 cm. Historical and recent data about the size and density of the shallow water population of Portofino Promontory (Ligurian Sea) indicate important fluctuations of these parameters on banks not subjected to anthropogenic impact. Firstly, the colony size is inversely related to their density, suggesting an intraspecific competition linked to the space availability and trophic inputs. Moreover, it is surprising that in the last ten years the Portofino populations have shown an unusually fast growth rate, reaching the maximal colony size never recorded in the previous 43 years (15 cm in height and 20 DW g). This unusually fast growth rate was recorded after the mass mortality episodes of 1999 and 2003, involving not only red coral but also several other benthic species and provoking a significant change in the structure of the coralligenous assemblage. All this evidence suggests that the growth of the Mediterranean red coral is strongly affected by intra- and interspecific interactions linked not only to local variables but also to stochastic events.* *Historical records either refer to the presence of maximum size colonies (50 cm), or state that large colonies of approximately 30 cm were abundant. Data on early SCUBA harvesting yield in historical records further support these records (Tsounis* et al.*, in press). However, since there are no precise data about the historical population structure in shallow water, it is difficult to estimate the historical abundance of large colonies. Therefore, a value of the relative reduction of polyps in the population has to be considered a rough estimate. The fact that in some reef coral populations the older half of the colonies produce 98% of the oocytes (Beiring and Lasker 2000), or that 22% of the largest colonies produce 80% of the oocytes annually (Babcock, 1984), demonstrates that the removal of large colonies reduces the total number of polyps (and thus fecundity) in a population dramatically, even if these large colonies were not abundant in the natural population* (*Tsounis, 2009).*

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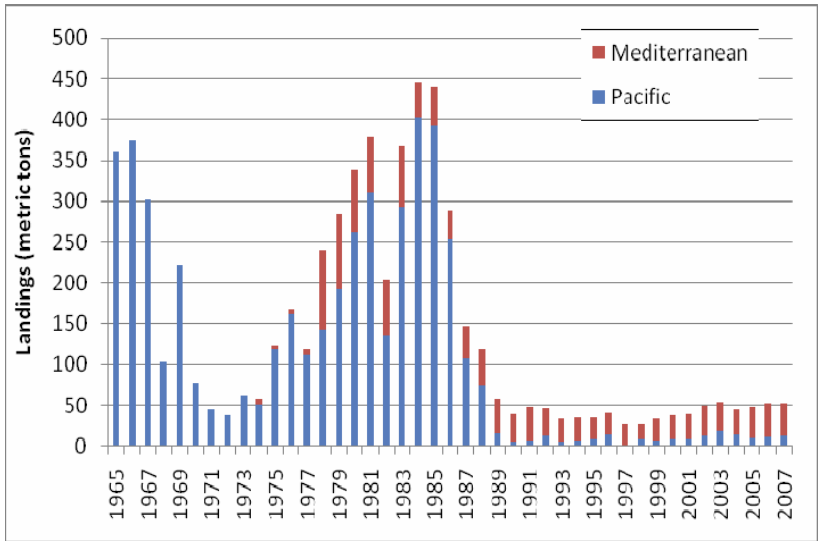
suggests larger colonies, while present, only make up a small proportion of individual populations, and continued pressure on these resources in the absence of more thorough information on population status and trends is likely to result in rapid depletion of these resources, as already experienced in shallow water.	
Pacific: In 1971, following two brief periods of commercial harvest, Makapu'u Bed (off Hawaii) was estimated to contain 79 200 colonies of *Corallium secundum*, with colonies occurring at a mean density of 0.02 colonies/m^2. Between 1974 and 1979, about 40% of the standing stock (17 500 kg) was harvested. Six years after harvesting ceased, colony density was similar to pre-harvest levels (0.022 colonies/m^2), although colonies were younger and smaller, and colonies over 35 years of age were absent. By 2001, the percentage of older size classes (20–45 years) increased, but the oldest colonies (45–55 years) were still under-represented, despite the absence of any fishing pressure over this period.	*Submarine surveys in the French Frigate Shoals (Hawaiian Islands) found an abundance of pink corals* Corallium *sp. leading to plans to renew a harvest in the area (Parrish* et al.*, 2002). It has been clarified that these plans have not been developed, and that the traders in Hawaii are phasing out all use of Coralliidae in their jewellery once existing stocks have been exhausted (Cooper, 2009).*
Harvesting techniques can be highly destructive although some have been banned. Limited low-impact harvesting has been conducted by submersibles off Hawaii and using SCUBA in the Mediterranean since the 1950s. Although most *Corallium rubrum* fishermen are now using SCUBA, they are exploiting increasingly smaller colony sizes and using highly destructive methods affecting the whole size range of populations, completely removing their bases and reducing the chance for re-growth.	*Dredging is often considered the most destructive method of harvesting coral. SCUBA in general is not a destructive harvesting method, but the practice by poachers of removing all colonies of course is, although it causes no collateral damage to non-targeted species (Tsounis* et al.*, in press; Tsounis, 2009).*
Geographic trends: Coralliidae fisheries have displayed boom and bust cycles with rapid increases in effort and landings shortly after a discovery of a new precious coral bed, followed by sharp declines a few years later once the bed is depleted. Since 1990 no new large commercially viable beds have been discovered and landings have remained at historically low levels that are 10–20% of that reported in the late 1980s. Most western Mediterranean populations of *Corallium rubrum* were also depleted within four to five years of their discovery, leading to termination or relocation of fishing effort as new beds were discovered.	***Geographic trends***: *Liverino (1983) and Tescione (1973) describe the historic Mediterranean fishery. The last discovery of an extensive stock was the 14-mile long Scherzi Channel between Sicily and Tunisia. Eighty divers from Italy, France and Spain harvested 70–120 t in 1978, starting at 60 m and gradually working their way down to 130 m. This submarine canyon was described as an oasis for marine fauna and flora, uncontaminated and exceptionally rich in rare species. In 1979, there were 366 boats at work (283 of them were registered in Italy) and 150 divers (Liverino 1983). One stock that appears to be still holding large colonies in deep water (>90m) is located in Sardinia. Apparently, high taxes and the gradual phasing out of dredging, beginning in 1979, contributed to lower the annual yield and thus improve management. Stocks in Morocco (at SCUBA depths) on the other hand, seem to show a similar level of over-exploitation as northern Spain did in 1986 (Tsounis* et al.*, in press; Tsounis, 2009)*
The only instances involving discovery of large, valuable Coralliidae beds occurred from the 1960s to the 1980s in the far west Pacific, primarily around Emperor Seamounts and the Hawaiian Islands. Additional locations with Coralliidae have been identified in Hawaiian waters over the last decade using submersibles and ROVs, although only three of these are large enough to support commercial extraction, including one with an MSY estimated at only 35 kg per year.	*Tsounis* et al. *(2009) noted that there was anecdotal information about commercial diving teams harvesting large colonies of* Corallium rubrum *on international seamounts, where there was currently no regulation. They surmised that these could be the last natural populations that could serve as a baseline for ecological research and that therefore some protection would be warranted.*
While fishing pressure is unlikely to have affected the geographical distribution of individual species, it has resulted in commercial extinction of individual beds and a loss of biodiversity owing to limited connectivity and dispersal between these subpopulations.	*A survey in previously unexplored areas in the far North Western Hawaiian Islands in*

Supporting Statement (SS)	Additional information
Vulnerability: New sources of disturbance to *Corallium rubrum* populations and increased severity of these perturbations have been observed since the late 1990s, including several mass-mortality events linked to elevated temperature anomalies and mechanical disturbance owing to increased recreational diving (Mediterranean) and souvenir collection. Computer simulations show that mass die-offs, which have occurred during recent exceptionally warm summers, can eliminate shallow-water populations already stressed by over-harvesting. Healthy populations will probably recover from such setbacks, but over-exploited ones may not. An event in 1999 caused extensive mortality to shallow-water populations (<30 m depth) along 50 km of coastline in the Provence region of France, with overall losses estimated in the millions of colonies. This unusual die-off was attributed to a disease and linked to temperature anomalies. A comparable mass-mortality event occurred in 1987 on deep reefs (>80 m depth) between Marseille and Nice, and in shallow populations at La Ciotat in 1983.	*2003 found five new sites for* Coralliidae *(Baco, 2007).* ***Vulnerability**: Jabin* et al*. (2008) provided details of a continuous size-structured red coral growth model, which they hoped could be developed to precisely describe mass mortality events and their consequences on red coral dynamics.* *Linares* et al*. (2009) highlighted the need for intensive (long-term) and extensive (large spatial-scale) studies, including photographic monitoring of permanent plots for* Corallium rubrum*, to improve knowledge of the response of coralligenous communities when faced with anthropogenic disturbances.* *Santangelo* et al*. (2009a) developed demographic models, based on life-history tables, to simulate the effects of mortalities on the structure and dynamics of populations of* Corallium rubrum*, which facilitated the projection of population trends over time. They suggested that there had been few studies of the long-term effects of mass mortality because a thorough evaluation of the impact, in terms of mortality, of such events on long-lived species required a long-time series of data collected before and after the event. However, they felt that a demographic approach, based on sound population data, might provide a good prediction of the mass mortality impact on population dynamics.* *These problems have been studied by the Medchange project, which has provided, through detailed and multidisciplinary studies, invaluable data on the resistance, adaptation and evolutionary capacities of long-lived emblematic species of the Mediterranean confronted with temperature regime changes in littoral habitats. This knowledge should provide the proper scientific basis to anticipate marine biodiversity trajectories over mid- and long-term scales in view of the predicted climate change scenario (Garrabou* et al*. (2009).*
Use and trade: Precious corals in the family Coralliidae include species highly valued for jewellery and art objects. They are traded as whole dried colonies; unworked branches and branch fragments; beads and polished stones; manufactured jewellery; and powder, pills, granules, ointment and liquid. Small colonies traditionally were rejected by the high-end fashion jewellery industry, which used neither small-sized corals nor reconstituted coral embedded in epoxy. However, the demand for smaller corals and fragments, available at less cost, has risen owing to their use in both the ethnic and tourism markets. The most valuable species are *Corallium rubrum*, *C. secundum*, *C. elatius*, *C. konojoi*, *Paracorallium japonicum* and "Midway deep coral"*,* and the most valuable specimens are those collected when alive. They are harvested in the Mediterranean Sea, mainly from 30–120 m depth, and in the western North Pacific Ocean, in two depth zones: 200–500 m and 1000–1500 m. Commercial yields (of all species combined from FAO statistics) peaked in 1984 at 450 t, declined to 40 t by 1990 and	***Use and trade:** Powder from* Coralliidae *is sold to India, Pakistan, Japan and Taiwan (Province of China), where it is used in traditional medicine, mostly involving Asian species. Coral pieces are also used as biomaterial in bone transplants (Amel and Noureddine, 2006).* Corallium regale *was referred to by Bayer (1956): "Of all the Hawaiian precious corals,* C. regale *has the best colour and might be of commercial value if it could be fished in quantity". The only indication of trade in this species was 61 kg collected in 2000, but it is not known whether the specimens involved entered international trade. There is no evidence that any of the other 23 species have been involved in trade.* Paracorallium tortuosum *was noted by Bayer (1956) as "appears to be the most abundant precious coral in Hawaiian waters but, due to its small size and usually deformed axis, it probably has no commercial possibilities".* Paracorallium japonicum *is valued at approximately USD6600–8800/kg, and is thus*

Supporting Statement (SS)	Additional information
fluctuated between 28 and 54 t, 1991–2005.	*the most valuable precious coral at the moment.* (*Tsounis, 2009).*
	*There appear to be some inconsistencies in the trade data reported in the SS with those given by the source used (FAO, 2008).*
Mediterranean: A fishery for *Corallium rubrum* has existed in the Mediterranean for about 5000 years, with supplies waxing and waning depending on supply, demand, discovery of new coral banks and political and economic stability of the countries involved.	*No trade has been reported from the Libyan Arab Jamirihiya, although the WWF Mediterranean Programme Office (2005) noted that a licence was about to be issued to an Italian company to exploit their populations. It is not known whether this was taken up.*
Total landings of Mediterranean *Corallium rubrum* reported over a 30-year period (1976–2006) totalled 1250 t with 33.5% from Italy, 17.6% from Spain, 15.3% from Tunisia, and 9.9% from France. Landings from these four major source countries showed a decreasing trend over 15 years (>85% decline from 97 t in 1976 to 12 t in 1992), with the largest declines reported from European countries. For country-specific data see SS.	
Recent yield has been likely to have been maintained by taking a larger number of small colonies.	Corallium rubrum *is sold for high prices; high quality raw colonies are sold for USD 1500 kg. Even thin juvenile branches are bought for USD 230–300 kg, whereas they were practically worthless some decades ago. Manufacturing is time consuming. Prices vary according to species and size. Large jewellery pieces of* C. elatius *that were sold to tribal groups in Nigeria during the 1960s are now being bought back by the industry to be resold to the luxury market, indicating a shortage of large tropical* Corallium *colonies (Tsounis* et al.*, in press).*
Illegal harvesting is reported with increasing frequency in Spanish waters.	
Pacific: *Corallium* fisheries started in the Pacific in 1804 in Japan and expanded over the years, targeting grounds in waters of Japan and Taiwan (Province of China). Landings of *Corallium* and *Paracorallium* from the Pacific reported by Japan and China (island of Taiwan) showed five major peaks over a 45 year period (1962–2007). For species and country-specific data see SS. Significant declines in landings	

Supporting Statement (SS)	Additional information
are noted and less than 10 t have been harvested annually from the Pacific over the last 15 years.	*Illegal harvesting has also been confirmed in Italy and is probably common throughout the Mediterranean. Unofficial estimates by fishermen suggest that there are as many or more poachers active in Spain as licensed divers (Tsounis* et al.*, 2009).*
Currently, all known Coralliidae beds in international waters around Midway Islands and Emperor Seamounts have been depleted and are not supporting any large-scale commercial fisheries, although small amounts of this taxon (< one tonne/year) are reported in FAO landings data and coral harvesting vessels were seen operating in this area as recently as 2007.	*There appear to be some inconsistencies and errors in the trade data reported in the SS. No landings of "C.* sp. nov*" have been reported since 1992 by FAO.*
New beds were discovered north of Midway Island in 1965 and, over the next 20 years, most of the world's harvest came from the Milwaukee Bank and surrounding seamounts. The US harvest figures were not included in the FAO data, but for *Corallium secundum* a total of 1800 kg was harvested in the years 1966–1969, and 6427 kg from 1973 to 1978. The US fishery was revived, 1999–2000, by use of one-person submersibles with 700-m depth range. In 2000, 1216 kg *C. secundum* from the Makapu'u Bed and 61 kg of *C. regale* (*C. lauuense*) were collected from exploratory areas off Kailua, Kona. No harvest occurred from 2001 to 2009.	*Japan currently harvests only three out of 28 coral beds, mostly located off coastal islands. One area is harvested by submarine, while in the other two areas strong currents are presents, and dredges are therefore used. One hundred and twelve to 160 boats are only active for two weeks per year and employ their dredge for four hours a day, harvesting about 12 kg of coral per boat and year. Furthermore, they seem mainly to target deposits of dead coral in sandy bottoms, which are located near rocky habitat where live coral can be found (and is also targeted by the fishery, on separate occasions). Both Japan and Taiwan (Province of China) harvest up to 80% dead coral. Fishery-independent surveys by ROV would greatly assist these fisheries to set optimal yield levels, but do not seem to have been conducted yet. (Tsounis, 2009).*
A smaller fishery in US waters off Hawaii started in 1966, initially with tangle net dredges, followed by manned submersibles until 1978, when this practice was abandoned owing to high operating costs. In 1988, dredging only harvested dead or low-quality pink coral and was discontinued. Illegal harvesting was a problem in Hawaiian territorial waters in the past.	*In 2008, two coral fishing boats from Taiwan (Province of China) were sighted in the waters of the Emperor Seamounts (Fisheries Agency of Japan, 2008).*
In 1969, Hawaii's precious corals industry produced approximately USD2 million in retail sales, partially from domestic harvest and the remainder consisting of jewellery imported from the island of Taiwan (Province of China) and Japan.	*The figure of USD2 million for Hawaii included black corals Antipatharia (Grigg, 1993).*
Much of the trade is in the form of processed beads and Italy has long been the most important processor and exporter. The trade has a very high value; superior beads fetch prices of up to USD50 per gramme and necklaces cost up to USD25 000. In 1988, the value of coral exports from Torre del Greco amounted to nearly USD30 million. Processing centres developed in other countries, particularly China and Japan. The USA is the major consumer importing un-worked skeletons and processed Coralliidae products of precious corals.	*Using additional information such as price, most peaks can be identified and demonstrate the discovery and depletion of specific beds, as described in the SS. The data thus describe the biomass decline of these specific stocks. However, pooled landings data over a longer period summarizing several species and stocks cannot not be used to infer the biomass decline of the total population (Tsounis* et al.*, in press; Tsounis, 2009).*
	Grigg (2007) suggested that most, if not all, trade in the Pacific, i.e. Japan, Taiwan (Province of China) and Hawaii (USA), involved raw material that had been stockpiled for many years; and that there was also a large stockpile in Italy.
	Industry experts note that a delay of implementation of 18 months would not be sufficient to deal with the issue of stockpiles (Tsounis, 2009.)

Supporting Statement (SS)	Additional information
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
Features sufficient for reliable identification at the species level within the family Coralliidae do not exist for skeletons or as manufactured jewellery and curios, which comprise the bulk of the trade. Taxonomic identification of octocorals requires microscopic analysis of shape, size and colour of sclerites (tiny calcified skeletal elements) embedded in the coenochyme and in the organic matrix of the axial skeleton; these are lost when processed for jewellery. Therefore, it may only be possible to identify worked specimens to the family level (Coralliidae), particularly where worked specimens contain multiple species. As the family was recently divided into two genera, and future taxonomic revision may create more, it is difficult to readily identify worked specimens to genus level. As such, it is justified to use higher taxon names on permits for worked specimens. Where raw or dead corals are concerned, these can usually be identified to species level. Reconstituted coral pieces can be identified through either chemical analysis or using a microscope to examine growth rings. For coral powder that might be in trade, species may not be readily recognizable unless labelled as such, in which case it would fall under the provisions of *Resolution Conf. 9.6 (Rev.*).	*Smith* et al. *(2007) referred to distinctive parallel striations that are visible to the naked eye on the surface of unworked pieces of* Coralliidae *and also on worked items such as beads. They described the very different open, porous structure of sponge coral Melithaea ochracea, but made no mention of bamboo corals, family Isididae.* *Cooper (2009) reported on the development of a guide to the identification of precious corals, which will deal with the problems of distinguishing* Coralliidae *specimens from other coral taxa and imitations. In addition, TRAFFIC is collaborating on a project to identify* Coralliidae *products to species level using DNA analysis (Cooper, 2009).*
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	
Other threats	
Coralliidae mortality can be caused by smothering by sand, detachment and toppling caused by organisms that weaken the site of basal attachment, predation by gastropods. Secondary human impacts include pollution, sedimentation, tourism and recreational diving (Mediterranean), and incidental take, or habitat degradation associated with longline fishing and bottom trawling (western Pacific). The benthic impacts of mobile fishing gear have been likened to clear-cutting techniques in old-growth forests.	
Conservation, management and legislation	
In 2008, China included four species of Coralliidae in Appendix III of CITES (*Paracorallium japonicum, Corallium elatius*, *C. konojoi*, *C. secundum*). Coralliidae species are not listed on any other international wildlife or fisheries agreements and has no international legal status.	
Coralliidae species are protected by national legislation in Croatia, Gibraltar,	Corallium rubrum *is fully protected in Malta (*Flora, Fauna and Natural Habitats

Supporting Statement (SS)	Additional information
Monaco, Montenegro, New Zealand and Turkey. In Morocco, harvesting is controlled and a quota system is in place.	Protection Regulations, 2003*) and harvesting is regulated in Greece (Dounas* et al*., 2009) and Tunisia (Chouba and Tritar, 1998).*
The European Union*: Corallium rubrum* is listed in Annex V of the *European Union Habitats Directive*. *C. rubrum* is listed in Annex III of the Bern Convention, and Annex III of the Protocol concerning Special Protected Areas and Biological Diversity in the Mediterranean. In 1994, the European Union banned the use of the *ingegno* or St. Andrew's Cross. (*Council Regulation No. 1626/94*).	*The legislation relating to harvesting in Algeria was summarized by Akrour (1989); subsequently harvesting was strictly controlled in 1995 under* Décret Exécutif no. 95-323*, and then in 2001 under* Décret Exécutif no. 01-56*. The results of a study evaluating the resource are awaited. Belbacha* et al*. (2006, 2009) updated information on the status of the species in Algeria, where harvesting is still apparently suspended.* C. rubrum *is not considered threatened in France (Labarraque* et al*., 2000). However, the fishery there is subject to management and regulation: collection by diving is generally prohibited, but licences are issued on provisional exemptions, which are subject to annual renewal. In Corsica, the numbers of collectors has been limited to eight and they agreed to work below 50 m to allow the stocks in shallower waters to recuperate (Harmelin, 2007). Sardinia (Italy) has regional legislation on coral fishing, issued in 1979 and modified in 1989. In 2009, a maximum of 30 coral fishing permits was allowed for issue (Anon., 2009).*
The Spanish Government has established reserves for the protection of *Corallium rubrum* in the Mediterranean Sea. In 2006, the Spanish Ministry of Agriculture, Fisheries and Food published a new *Ministerial Order for the Integral Fisheries Management of the Mediterranean,* which bans the use of bottom trawling, purse seining and drag netting to 50 m depth.	
The USA*:* The Western Pacific Fishery Management Council's (WPFMC) Precious Corals Fisheries Management Plan (FMP) has regulated the harvest of Coralliidae since 1983. The FMP imposes permit requirements valid for specific locations, harvest quotas for precious coral beds, a minimum size limit for pink coral, gear restrictions, area restrictions, and fishing seasons. The Northwest Hawaiian Islands (NWHI) National Monument prohibits taking of all precious coral within the Reserve. The State of Hawaii prohibits the take or sale of pink coral without a permit and has established a minimum size (254 mm). California prohibits the commercial harvest of Coralliidae.	*Parrish* et al*. (2009) noted that three additional National Marine Monuments were established in 2009, for the USA Line and Phoenix Islands, for Rose Atoll, and for the three islands of the Northern Marianas, along with the Marianas Trench. However, it is not known whether Coralliidae occur in these areas.*
China: Harvest regulations for the island of Taiwan were renewed in January 2009. Vessels harvesting Coralliidae are regulated by licensing and harvest zone and maximum harvest days per year are established. VMS (Vessel Monitoring System) data, daily logbooks, designated landing ports, centralized auction markets, and observer programmes are used to monitor the fishery and to enforce the regulation. Fifty-six vessels are licensed to harvest *Corallium* and *Paracorallium* legally and harvest and export quantities are limited to 200 and 120 kg, respectively, per vessel, per year. Confiscation of fishing gear and suspension of the *Corallium* and *Paracorallium* harvest licence can be imposed for violations.	*Tsounis* et al*. (in press) provide information that "The Taiwan precious coral fishery began in 1929 and in 1983 was limited to 150 vessels. Currently there are 53 vessels harvesting* Corallium *sp. in five regions, each vessel with an annual quota of 200 kg over a 220-day activity limit for each year. The fishermen employ traditional unselective gear consisting of the tangle nets typical for Asia fished at a slow speed of 1.5 knots. Only 2% of the harvested coral in Taiwan is live coral; 83% is dead coral and a further 15% is dead coral that has been on the seafloor long enough to wither.'*
Japan: *Corallium* and *Paracorallium* harvest in Japan is regulated by the prefectural governors (Kochi, Okinawa, Kagoshima, Nagasaki), according to the fishery rule for adjustment under the *Fishery Law and Conservation Policy for Marine Resource*s. Both fishermen and vessels are licensed and legal harvest zones are designated. No specific harvest season or quotas exist.	*Tsounis* et al*. (in press) note that "Red, pink and white corals are harvested by traditional stone weighted unselective tangle nets in Kochi. Since 1983, in waters extending from Kagoshima to Okinawa harvesters have used manned and unmanned underwater vehicles, which follow self-imposed size limits (Iwasaki and Suzuki, 2008). There is no official quota for these fisheries because the research needed to manage the stocks has only recently been initiated. Yields have been stable during the last decade and catches in at least one area (Kochi prefecture) indicate 80% dead coral, which implies a low level of renewal of the resource".*

Supporting Statement (SS)	Additional information
	In the Philippines, precious corals belonging to the genus Corallium *are banned from exploitation and export under the* Fisheries Administrative Order No. 202*, Series of 2000.*
	The SS refers to all species of "red coral" being absolutely protected in New Zealand, implying that this covers Coralliidae *spp. However, the term "red coral" in New Zealand legislation refers to Stylasteridae spp. and there is no specific protection for* Coralliidae *spp. (Consalvey* et al.*, 2006).*
Harvest management Area closures and rotational harvests are effective tools for conservation of reef fishes with pelagic dispersal of larvae. However, for sessile, slow-growing organisms like *Corallium rubrum*, area closures are less effective unless they are permanent, as these species are likely to require up to 100 years or more for full population recovery. There are currently four marine protected areas (MPAs) in the north-western Mediterranean that protect red coral (France: 3, Spain: 1). After 14 years of closure in the Medas Islands MPA off Spain, populations have not rebounded to their natural state, as colonies over 200 mm height are still absent. At this time, there is no evidence that the number, size, and placement of existing MPAs is adequate to protect or sustain populations of *C. rubrum.*	***Harvest management*** *The Scientific Advisory Committee of the General Fisheries Commission for the Mediterranean (GFCM) (2008) recommended that in Northern Spain (GSA 06), owing to the following problems: high fishing mortality; low abundance; over-exploited stock (being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a high risk of stock depletion/collapse); that the following measures be considered: —progressive reduction of number of licences to allow recovery within the next 5–10 years (through not issuing new licences in replacement of existing ones); review of the current allowed quota (400 kg per year/fisherman); closure of the fishery from 15 June to 31 August (reproductive period). A study in the area the GFCM Report is referring to (Montgri coast, northern Spain) showed that a five-year moratorium resulted in only negligible recovery of the stocks (Tsounis et al., 2006). Costantini* et al. *(2007) demonstrated that rotational harvesting was detrimental to the genetic biodiversity of populations (Tsounis, 2009).*
Another harvest measure widely used in the Mediterranean is a minimum basal diameter of 7 mm. It is 10 mm in Sardinia, but a 20% variance is allowed. Recent fisheries landings data showed >50% of the colonies were under 10-mm basal diameter. Since fertility and number of larvae is known to increase with colony size (height and number of branches), the current harvest size for *Corallium rubrum* colonies is inadequate to protect reproductive stocks. These small colonies can reproduce only two to three times at most before harvest, and their small size and relatively limited branching pattern limits their reproductive potential. Scientists have suggested that, owing to the very slow growth rates (and new information on growth rates), legal minimum size should be increased.	*A survey of MPAs in the Mediterranean (Abdulla* et al.*, 2008) found that* Corallium rubrum *occurred in about half of the 85 MPAs that responded to a questionnaire.*
In US waters, MSY was established based on presumed rates of growth and abundance of corals within surveyed areas, with a minimum allowable size (height) of harvest. In the Makapu'u Bed off Hawaii, low levels of selective harvest from 1972 to 1978 caused a decrease in the proportion of large colonies that was still apparent 20 years later, even though no additional harvest had occurred during this period.	*Santangelo* et al. *(2009b) recommended that shallow-water populations of* C. rubrum *should be protected, and that the future of harvesting should be linked with deep-water populations, which would need careful management based on sound population and fishing data, and a reliable analysis of demographic trends that would allow the establishment of a minimal colony size. However, Tsounis* et al. *(2009) felt that exploitation of the deeper populations could be problematic because they could be contributing to the recruitment of shallow water colonies.*
In 2004, the member States of the United Nations (UN) agreed to take urgent action for the protection of vulnerable marine ecosystems (VMEs), such as coldwater corals. The non-binding UN General Assembly resolution measures prohibit destructive fishing practices, including bottom trawling, that have adverse impacts on VMEs.	*Anon. (2008) reported on the identification of VMEs and an assessment of impacts caused by bottom fishing activities on VMEs and marine species.*

Supporting Statement (SS)	Additional information
Few management measures for Coralliidae fisheries have been implemented or enforced in the Pacific, particularly in international waters. Management has been hampered by enforcement and jurisdiction problems, the multinational character of the fishery, presence of precious coral beds in waters not under the jurisdiction of any State, and a lack of knowledge of population status and biology of Coralliidae.	
Captive breeding/artificial propagation	
Currently there are no comprehensive captive-breeding programmes for Coralliidae. A method for coral propagation on artificial substrates has been developed at the University of Pisa, Italy and a small project to rear *Corallium rubrum* on artificial substrates and transplant into the wild has shown relatively high survival, but to date restoration efforts remain in infancy and have not been widely applied.	*Harmelin (2006) discussed the possibilities of propagating* Corallium rubrum*, including via a project in Monaco in 1989 and 1993, but concluded that there was still much to be learnt.*
Other comments	
Bamboo and sponge corals have appeared on international markets as jewellery, often being dyed pink or red and sold as Coralliidae. Unworked Coralliidae have distinct growth patterns that are apparent under microscopic examination. Bamboo coral's nodes with black gorgonin substance and sponge coral's porous structure and distinctive two-colour reticulated pattern exclude their identification as Coralliidae.	*Pedersen (2007) clarified that bamboo corals also had striations but, whereas the striations on* Coralliidae *specimens are very fine—0.25 to 0.5 mm apart—those of bamboo coral are about one millimetre apart, so the two types of coral are easily distinguishable.* *Bamboo coral harvest in Bone Bay, Sulawesi, (Indonesia) appears to have increased significantly in recent years because exports of more than 100 t were reported in 2005. This development may represent the phenomenon called "fishing down the price list", i.e. shifting to the next available resource after depleting the most valuable ones, and indicate changing demand/supply situations for Coralliidae (Tsounis* et al.*, in press; Tsounis, 2009).*

Reviewers:
G.Tsounis, TRAFFIC North America.

Inclusion of *Operculicarya decaryi* in Appendix II

Proponent: Madagascar

Summary: *Operculicarya decaryi*, sometimes known as jabily, is a deciduous thick-stemmed (pachycaul) tree endemic to Madagascar which can grow up to nine metres tall. It is one of eight species in the genus *Operculicarya*, seven of which are endemic to Madagascar, with the eighth (*O. gummifera*) occurring in Madagascar and the Comoros. It is widespread in thorny scrub and degraded semi-deciduous forest at low altitudes in southern Madagascar, with an extent of occurrence variously estimated at 50 000 or 70 000 km^2 and an area of occupancy of 3000 km^2 (300 000 ha) or 8500 km^2 (850 000 ha). Around 30 subpopulations are known. It can be locally abundant, with an estimate of over 30 000 individuals in one subpopulation, and densities of 220–400 individuals per hectare in sample sites. Regeneration, at least in some areas, appears to be good.

The species has a bonsai-like appearance and is in cultivation, mostly grown by hobbyists who specialize in succulent plants. Exports from Madagascar are reportedly mainly of small plants. Recorded exports show a rising trend, from 56 plants in 2003 to just under 2700 in 2006. At least some, possibly all, of these would have been wild-collected plants.

The species is apparently straightforward to propagate from stem or root cuttings, less easy from seed, which may show low viability. Plants are relatively widely available internationally. Most are of moderate price (EUR12–40 in Europe, USD 25–120 in the USA) and are stated to be artificially propagated, although occasionally larger, much more expensive plants (up to USD500) are offered, which are almost certainly of wild origin.

Two other species of *Operculicarya*, *O. hyphaenoides* and *O. pachypus,* have been proposed for inclusion in Appendix II at CoP15 (see proposals Prop. 23 and Prop. 24).

Analysis: *Operculicarya decaryi* is a relatively widespread and common plant in Madagascar. Available information on its extent of occurrence and known population densities indicates that the wild population may well be very large. It is in trade for horticulture, but mainly as small plants and can reportedly be easily propagated. There is no known intensive or extensive harvest for domestic use within Madagascar. It seems very unlikely that harvest for trade is reducing the species to a level at which it might become eligible for inclusion in Appendix I in the near future, or that such regulation is needed to ensure that harvest from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

The species does resemble other *Operculicarya* and particularly one of the two other species proposed for inclusion in Appendix II at the present meeting of the Conference of the Parties (*O. pachypus)*. It is conceivable that, were the latter to be included in Appendix II, inclusion of *O. decaryi* might help regulate trade in it (although several other similar species of *Operculicarya*, at least some of which may be in trade would remain outside the Convention).

Supporting Statement (SS)	Additional information
Taxonomy	
Range	

Madagascar

IUCN Global Category

Not assessed.

Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Operculicarya decaryi has a wide distribution in Tuléar province, from Tongobory Betioky to Amboasary Sud. Around 440 individuals were counted at Tongobory in 2006; other sites have around the same number of individuals.

Rakouth et al. *(2006) calculate its area of occurrence at around 50 000 km^2 and its area of occupancy at around 8500 km. At least 13 different sub-populations have been identified.*

The species is highly sought-after as a "bonsai"-type plant, both nationally and internationally. Trade has been increasing recently, with exports reported by the Malagasy CITES Management Authority as: 56 in 2003, 200 in 2004, 495 in 2005 and 2647 in 2006. Exports are in the form of small plants.

Operculicarya decaryi is regarded as meeting the criteria for vulnerable under the IUCN Red List categories and criteria.

Randrianosolo and Lowry (2006) give an extent of occurrence of around 72 000 km^2 and area of occupancy of around 3000 km^2 in around 30 sub-populations. They consider it would be classified as least concern under the IUCN Red List categories and criteria.

The species occurs in open xerophytic scrub and degraded semi-deciduous forest at low altitudes. Densities of 220–400 per ha have been found at study sites, with one sub-population calculated to comprise over 30 000 individuals. The species generally shows good regeneration (calculated by the ratio of juvenile plants to seed-bearing plants in sample plots) (Rakouth et al.*, 2006).*

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

The species closely resembles and is often confused with Operculicarya pachypus*, also proposed at CoP15 for inclusion in Appendix II (see proposal Prop. 24).*

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Other information

Threats

Fire; some populations have been affected by quarrying (Rakouth et al.*, 2006).*

Conservation, management and legislation

Captive breeding/artificial propagation

The species is reportedly easily propagated from stem cuttings or from pieces of the tuberous root. Seeds are reportedly often unreliable (Desert tropicals website).

Other comments

Reviewers:
TRAFFIC East/Southern Africa

Inclusion of *Operculicarya hyphaenoides* in Appendix II

Proponent: Madagascar

Summary: *Operculicarya hyphaenoides* is a well-branched, deciduous thick-stemmed shrub or small tree, endemic to Madagascar, which can grow up to 1.5m tall. It is one of eight species in the genus *Operculicarya*, seven of which are endemic to Madagascar, with the eighth occurring in Madagascar and the Comoros. It has a restricted range in south-west Madagascar, growing in semi-arid scrub vegetation on limestone notably in and around Tsimanampetsotsa National Park. Estimates of its extent of occurrence are of less than 500 km^2 and 800 km^2 with an area of occupancy of 300 km^2 (30 000 ha) and just under 500 km^2 (50 000 ha), respectively. The distribution is reportedly fragmented; seven sub-populations, some of them small (five to six hectares), are reported. The species can evidently be reasonably abundant locally; two study sites surveyed in 2005 had estimated densities of 370 and 550 individuals per hectare. Regeneration appeared to be good.

The species has a bonsai-like appearance and has appeal to specialist collectors of succulents. It does not appear at present (late 2009) to be readily available in trade, although has been obtainable in the past. Recorded exports from Madagascar are few (25 in 2004, 161 in 2005, 395 in 2006). These exports are likely to have been mainly or entirely of wild-collected plants. Propagation is reportedly by seed and cuttings.

Two other species of *Operculicarya, O. pachypus* and *O. decaryi*, have been proposed for inclusion in Appendix II at the present meeting of the Conference of the Parties (see Prop.22 and Prop. 24); these species are more similar in appearance to one another than to *O. hyphaenoides.*

Analysis: *Operculicarya hyphaenoides* is a localized but apparently locally common plant in Madagascar. Extrapolation from its known area of occupancy and sampled population densities indicates a substantial wild population, although distribution is likely to be patchy within its area of occupancy. There is no known intensive or extensive harvest for domestic use in Madagascar. The species is reported in trade, although apparently at low levels, and can be propagated artificially. It seems unlikely that harvest for trade is reducing the species to a level at which it might become eligible for inclusion in Appendix I in the near future, or that such regulation is needed to ensure that harvest from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Range
Madagascar	
	IUCN Global Category
	Not assessed.

Supporting Statement (SS)	Additional information
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
This endemic species is found only on some sites in the south of Madagascar (Tsimanampetsotsa, Bemananteza, Zohin'i Mitoho and on the Table de Toliara mountain). Its range is fragmented. Five hundred and fifty plants were counted in 2006 on the Table de Toliara mountain at Saint Augustin. It occurs in low arid and semi-arid scrub. Based on field studies in 2006, the species is regarded as meeting the criteria for endangered under the IUCN Red List categories and criteria.	*Randrianosolo and Lowry (2006) give an extent of occurrence of "well under 500 km^2" and area of occupancy of around 300 km^2. They consider it "endangered" under the IUCN Red List criteria.* *Rakouth* et al. *(2006) report an extent of occurrence of just under 800 km^2 and area of occupancy of 460 km^2. Two sampled sub-populations of five and six hectares had population densities of 366 and 550 individuals per hectare. Regeneration, as measured by ratio of young plants to seed-bearing plants, was good.* *Web searches in late 2009 did not find the species currently offered for sale outside Madagascar.*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
Reported exports were 25 in 2004, 161 in 2005, 395 in 2006. Locally, the bark is used to make a tonic to strengthen women after they have given birth.	
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	

Threats

Fire.

Natural habitats in southern Madagascar are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.

Conservation, management and legislation

Part of the population occurs in Tsimananpetsotsa National Park (Randrianosolo and Lowry, 2006).

Captive Breeding/Artificial Propagation

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Propagation is by seed and cuttings (Caudiciform website).

Other comments

Reviewers:
TRAFFIC East/Southern Africa.

Inclusion of *Operculicarya pachypus* in Appendix II

Proponent: Madagascar

Summary: *Operculicarya pachypus* is a short, thick-stemmed (pachycaul) deciduous shrub endemic to Madagascar, which grows to around 1.2 m in height. It is one of eight species in the genus *Operculicarya*, seven of which are endemic to Madagascar, with the eighth (*O. gummifera*) occurring in Madagascar and the Comoros. It has a very restricted range in south-west Madagascar in the vicinity of Toliara, where it occurs in open, semi-arid thicket on calcareous substrates. Its extent of occurrence is estimated at just under 400 km^2 and the area of occupancy at around 100 km^2 (10 000 ha) with three or four sub-populations known. The species can be locally abundant, with around 1000 per hectare recorded in one small (six-hectare) sub-population, and regeneration generally appears to be good.

The species has a bonsai-like appearance and is in cultivation, mostly grown by hobbyists who specialize in succulent plants. Some 1800 specimens have been recorded as exported from Madagascar in the period 2003–2006, most of these (1200) in 2004. At present (late 2009) the species appears to be not widely available outside Madagascar; it can evidently command high prices (USD2540 for a specimen in a 40 cm pot). Recorded exports are likely to have been mainly or entirely of wild-collected plants.

The species is not known to occur in any protected area. Its habitat is reportedly affected by fire and there is some local use, of the bark for the preparation of medicine, but it is not known how intensive this is.

Two other species of *Operculicarya, O. decaryi* and *O. hyphaenoides,* have been proposed for inclusion in Appendix II at the present meeting of the Conference of the Parties (see proposals Prop. 22 and Prop. 23).

Analysis: *Operculicarya pachypus* is a very localized but apparently at least locally abundant plant in Madagascar. Extrapolation from its estimated area of occupancy and sampled population densities indicate a reasonably large wild population (although it is likely to be patchily distributed in its area of occupancy). There is no known intensive or extensive harvest for domestic use in Madagascar. The species has been exported as a horticultural plant, although few exports have been reported in recent years and the species does not appear to be widely available at present. On present information, it seems unlikely that harvest for trade is reducing the species to a level at which it might become eligible for inclusion in Appendix I in the near future, or that such regulation is needed to ensure that harvest from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences. However, given the apparently highly restricted distribution, this cannot be said with certainty.

The species does resemble other *Operculicarya* and particularly one of the two other species proposed for inclusion in Appendix II at the present meeting (*O. decaryi)*. It is conceivable that, were the latter to be included in Appendix II, inclusion of *O. pachypus* might help regulate trade in it (although several other similar species of *Operculicarya,* at least some of which may be in trade, would remain outside the Convention).

Supporting Statement (SS)	Additional information

Taxonomy

Supporting Statement (SS)	Additional information
Range	
Madagascar	
IUCN Global Category	
	Not assessed.

Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

A) Trade regulation needed to prevent future inclusion in Appendix I	
The species has a very localized range in the region of Toliara in south-west Madagascar. Reported export was of 70 specimens in 2003, 1212 in 2004, 312 in 2005 and 259 in 2006.	*Rakouth* et al. *(2006) report estimated extent of occurrence at just under 400 km^2 and area of occurrence at around 100 km^2. They estimated population density at one six-hectare site at just under 1000 per ha. Regeneration rate as assessed by the ratio of young plants to mature individuals was good at one site and moderate at another, the latter being known to be a site at which the species was commercially collected. The species was reported to regenerate easily from rootstock (Rakouth* et al*. 2006). Three (Rakouth* et al*, 2006) or four (Randrianosolo and Lowry, 2006) subpopulations are known.* *Both Rakouth* et al. *(2006) and Randrianosolo and Lowry (2006) consider that the species would be classified as endangered under the IUCN Red List categories and criteria.*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
The bark of the species is used to make an infusion to treat infant diarrhoea.	

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
	The species closely resembles and is often confused with O. decaryi*, also proposed at CoP15 for inclusion in Appendix II (see proposal Prop. 24).*
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	

Supporting Statement (SS)	Additional information

Other information

Its habitat is reportedly affected by fire.

There is some local use of the bark for medicine.

Threats

Conservation, management and legislation

Not known to occur in any protected area.

Captive Breeding/Artificial Propagation

The species is reportedly easily propagated from cuttings from the tuberous roots (Desert tropicals website).

Other comments

Reviewers:
TRAFFIC East/Southern Africa.

Amendment of the annotation to Cactaceae spp. and all taxa with annotation #1

Delete annotations #1 and #4 and replace them both with the following new annotation for plant taxa listed in Appendix II:

All parts and derivatives, except:
a) seeds (including seedpods of Orchidaceae), spores and pollen (including pollinia) except those seeds from Cactaceae spp. exported from Mexico;
b) seedlings or tissue cultures obtained *in vitro,* in solid or liquid media, transported in sterile containers;
c) cut flowers of artificially propagated plants;
d) fruits and parts and derivatives thereof of naturalized or artificially propagated plants of the genera *Vanilla* (Orchidaceae), *Opuntia* subgenus *Opuntia* (Cactaceae), *Hylocereus* and *Selenicereus* (Cactaceae);
e) stems, flowers, and parts and derivatives thereof of naturalized or artificially propagated plants of the genera *Opuntia* subgenus *Opuntia* and *Selenicereus* (Cactaceae); and
f) finished products of *Euphorbia antisyphilitica* packaged and ready for retail trade.

Amend footnote 6 as follows (delete struck-through text):

Artificially propagated specimens of the following hybrids and/or cultivars are not subject to the provisions of the Convention:
– *Hatiora* x *graeseri*
– *Schlumbergera* x *buckleyi*
– *Schlumbergera russelliana* x *Schlumbergera truncata*
– *Schlumbergera orssichiana* x *Schlumbergera truncata*
– *Schlumbergera opuntioides* x *Schlumbergera truncata*
– *Schlumbergera truncata* (cultivars)
– Cactaceae spp. colour mutants ~~lacking chlorophyll~~, grafted on the following grafting stocks: *Harrisia* 'Jusbertii', *Hylocereus trigonus* or *Hylocereus undatus*
– *Opuntia microdasys* (cultivars)

Proponents: Mexico and the United States of America on behalf of the Plants Committee

Background

Currently the following taxa listed in Appendix II are subject to annotation #1: *Caryocar costaricense*, Cycadaceae spp., Didiereaceae spp., *Cibotium barometz, Dicksonia* spp. populations of the Americas*, Dioscorea deltoidea*, *Dionaea muscipula,* Succulent *Euphorbia* spp., *Fouquieria columnaris*, *Oreomunnea pterocarpa*, *Aloe* spp., *Platymiscium pleiostachyum*, *Swietenia humilis, Nepenthes* spp., *Cistanche deserticola, Beccariophoenix madagascariensis*[1]*, Neodypsis decaryi*[1]*, Anacampseros* spp., *Avonia* spp., *Lewisia serrata, Cyclamen* spp., *Orothamnus zeyheri, Protea odorata, Prunus africana*, *Sarracenia* spp., *Bowenia* spp., *Aquilaria* spp., *Gonystylus* spp., *Gyrinops* spp., *Welwitschia mirabilis, Zamiaceae* spp., *Hedychium philippinense* and *Orchidaceae* spp..

Annotation #1 currently reads as follows:

#1 All parts and derivatives, except:
a) seeds, spores and pollen (including pollinia);
b) seedling or tissue cultures obtained *in vitro*, in solid or liquid media, transported in sterile containers;
c) cut flowers of artificially propagated plants; and
d) fruits and parts and derivatives thereof of artificially propagated plants of the genus *Vanilla*.

[1] note: Proposals have been submitted to the present CoP to remove the exemption for seeds of the Malagasy palms *Beccariophoenix madagascariensis* (proposal Prop. 32) and *Neodypsis decaryi* (proposal Prop. 33 as *Dypsis decaryi*). It these are accepted, this would be reflected in any new annotation.

Currently Cactaceae spp. are annotated with #4 and footnote 6.

#4 reads: "All parts and derivatives, except:
a) seeds, except those from Mexican cacti originating in Mexico, and pollen;
b) seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers;
c) cut flowers of artificially propagated plants;
d) fruits and parts and derivatives thereof of naturalized or artificially propagated plants; and
e) separate stem joints (pads) and parts and derivatives thereof of naturalized or artificially propagated plants of the genus *Opuntia* subgenus *Opuntia*".

Footnote 6, which currently only applies to Cactaceae spp.,currently reads:

"Artificially propagated specimens of the following hybrids and/or cultivars are not subject to the provisions of the Convention:
– *Hatiora* x *graeseri*
– *Schlumbergera* x *buckleyi*
– *Schlumbergera russelliana* x *Schlumbergera truncata*
– *Schlumbergera orssichiana* x *Schlumbergera truncata*
– *Schlumbergera opuntioides* x *Schlumbergera truncata*
– *Schlumbergera truncata* (cultivars)
– Cactaceae spp. colour mutants lacking chlorophyll, grafted on the following grafting stocks: *Harrisia* 'Jusbertii', *Hylocereus trigonus* or *Hylocereus undatus*
– *Opuntia microdasys* (cultivars)".

Summaries and analyses

Significant changes proposed are discussed below.

Cactus seeds
At present, seeds of Appendix-II listed Mexican cacti originating in Mexico are not excluded from the Convention, that is they require CITES certificates when traded, unlike all other Appendix-II cactus seeds, which are excluded from the Convention. Under this wording, both exports of seeds of Mexican cacti from Mexico, and re-exports of such seeds from other countries require certificates. However, exports of seeds of non-Mexican cacti originating in Mexico, from cultivated or naturalised plants, are not subject to the Convention.

The proposed amendment refers only to "seeds of Cactaceae spp. exported from Mexico" as not being excluded from the Convention. This means that all cactus seeds exported from Mexico, including those of non-Mexican cacti, will be subject to the Convention and require CITES certificates when traded, but that re-exports of any Appendix-

II cactus seeds, including of Mexican cacti, from countries other than Mexico will not be subject to the Convention.

***Analysis*:** This will simplify implementation both in Mexico and elsewhere and will have no adverse conservation impacts.

Cactus fruits, flowers and stems

At present cut flowers of artificially propagated plants and the fruits and parts and derivatives of fruits of naturalized or artificially propagated plants of all Appendix-II cactus species, as well as the separate stem joints (pads) and parts and derivatives of these joints of naturalized and artificially propagated plants of the genus *Opuntia* subgenus *Opuntia* are excluded from the Convention.

Fruits: The proposed amendment will restrict the exemption for fruits and parts and derivatives of fruits to naturalized or artificially propagated plants of the genera *Opuntia* (subgenus *Opuntia*), *Selenicereus* and *Hylocereus*.

There is an extensive trade in fruits of various cultivated cacti, much of it originating outside the natural range of the species concerned. The most important traded fruits are "dragon fruits" or pitaya, chiefly from *Hylocereus undatus* (Red Pitaya) and *Selenicereus megalanthus* (Yellow Pitaya), and prickly pears or cactus figs of various *Opuntia* species, such as *O. ficus-indica.* There is also some export from Israel of fruits of *Cereus peruvianus,* marketed as koubo (Mizrahi *et al.* 2002). Some other cactus genera, notably *Stenocereus*, are also cultivated for their fruits although apparently only within their natural range and for domestic consumption (Pimienta-Barrios and Nobel, 1994). The current exemption (existing annotation #4) ensures that international trade in any cactus fruits and parts and derivatives from naturalized and artificially propagated plants is exempt. The suggestion made, for example in the supporting statement to proposal CoP14 Prop. 26, that paragraphs d) and e) of existing annotation #4 are somehow linked, so that the reference to genus *Opuntia* (subgenus *Opuntia*) in paragraph e) also applies to paragraph d) is clearly erroneous. If they were linked, then by analogy the exemption in paragraph c) of annotation #1, concerning cut flowers of artificially propagated plants of a wide range of species, most importantly Appendix-II listed orchids, would in fact only apply to plants of the genus *Vanilla* as this is the subject of paragraph d) in that annotation, which it does not.

***Flowers**:* With regard to flowers, "cut flowers of artificially propagated plants" of all Appendix II-listed cacti are already exempt from the Convention under existing para c) of annotation #4, which will remain as para c) of the new annotation. New paragraph e) will, in addition, allow exemption of flowers and flower derivatives of naturalized (as opposed to artificially propagated) plants of the genera *Opuntia* subgenus *Opuntia* and *Selenicereus* (Cactaceae) as well as parts and derivatives of flowers of artificially propagated plants of these genera.

Dried flowers and extracts of flowers of some *Opuntia* and *Selenicereus* species are traded as medicines. The great majority of this trade is believed to originate in naturalized or artificially propagated plants.

Stems: The proposed amendment will widen the exemption for stems to include those of *Selenicereus* and their parts and derivatives. It simplifies the wording for the exemption for stems of *Opuntia* (subgenus *Opuntia*).

Stems ("pads") of typical *Opuntia* species are grown and traded as a vegetable. The great majority of this trade is derived from artificially propagated and naturalized stock; such trade is already exempt from the Convention. Stems and derivatives from stems of some *Selenicereus* species are traded for medicinal purposes. The great majority of this trade is also believed to originate in naturalized or artificially propagated plants.

***Analysis*:** Exempting trade in cactus fruits, flowers and stems from the provisions of the Convention under the terms of the proposed annotations is extremely unlikely to have any adverse conservation impact. The proposed exemption for fruits will no longer cover fruits of artificially propagated *Cereus peruvianus*, which will then theoretically be subject to regulation under CITES. This will increase the burden of implementation and have no conservation benefit. Reversion to the original wording of annotation #4 would solve this problem.

Grafted cacti

Under the existing annotation, grafted specimens of colour mutants of cacti grafted onto three cactus rootstocks are exempt from the Convention provided they are lacking in chlorophyll. The proposed annotation will apply to all such colour mutants whether they contain chlorophyll or not.

***Analysis*:** There is an extensive trade in grafted colour forms of various cacti, particularly *Gymnocalycium mihanovicii.* This trade has nothing to do with wild plants and has no conservation impact. Although most of the forms do indeed lack chlorophyll, some contain small quantities and are therefore in theory not covered by the existing exemption, although there is no reason for them not to be covered. The proposed amendment rectifies this so that all such forms will now be covered by the exemption.

Euphorbia antisyphilitica

The proposed annotation will exempt finished products of *Euphorbia antisyphilitica* packaged and ready for retail trade from the Convention. At present such products are not exempt.

The genus *Euphorbia* is one of the largest, most widely distributed and most variable genera of plants. There are between 1500 and 2000 species, ranging from small annuals to trees, with most species occurring in the tropics. Around 700 species display some degree of succulence. A wide range of species is of horticultural interest. Some are mass-produced and are widely grown as ornamental garden or house plants. Some of these are traded internationally in large quantities. Others, particularly some dwarf, slow-growing succulent forms, are of interest to specialist collectors. Some of these have been traded as wild collected plants, sometimes in substantial quantities. Some species are also used as medicinal plants. The only product derived from succulent euphorbia species known to be in international trade in any quantity is candelilla wax, extracted from *Euphorbia antisyphilitica*, a species native to Mexico and the USA. Candelilla wax is used in a range of products, including cosmetics, dyes, inks, foodstuffs, pharmaceutical compounds, emulsions, wood-polishes and adhesives. The main use at present is in cosmetics. Commercial production of candelilla wax only takes place at present in Mexico, with most production apparently exported in the form of raw material (Schneider, 2009 and CITES trade database).

The entire genus was included in Appendix II of CITES in 1975 undoubtedly because of concern regarding the possible impact of collection for the horticultural trade of wild plants of some succulent species especially from South Africa. In 1997 non-succulent forms were excluded as were artificially propagated cultivars of *Euphorbia trigona*, a taxon only known in cultivation. At CoP13, a number of other forms of succulent euphorbias widely propagated for the horticultural trade were also exempted. With these exceptions, the Appendix-II *Euphorbia* species are currently covered by annotation #1. Currently 10 species of succulent *Euphorbia* from Madagascar are included in Appendix I. All are dwarf forms.

According to the CITES trade database, Mexico has reported exports of just over 2400 t of wax in the period 2001–2008, most of this (ca 1500 t) going to Germany, with virtually all the remainder going either to the USA (ca 700 t) or Japan (ca 200 t). According to other Mexican sources, quoted in Schneider (2009), export is somewhat higher than this, having averaged around 1000 t per year in the period 2002–2004, with just under 40% of this going to the USA, a similar amount to the European Union and most of the remainder to Japan (Schneider, 2009).

At present finished products containing candelilla wax are covered by the Convention, creating in theory a considerable implementation burden. The proposed annotation will place the species on the same footing in the Convention as a range of other Appendix-II listed plants that are traded principally in the form of raw or semi-processed extracts or derivatives and as finished products for the retail trade, currently annotated with annotation #2, which exempts ‘”seeds and pollen” and “finished products packaged and ready for retail trade”. These are *Rauvolfia serpentina, Podophyllum hexandrum, Adonis vernalis, Picrorhiza kurrooa,* various *Taxus* species, *Nardostachys grandiflora* and *Guaiacum* spp.

***Analysis*:** This amendment is extremely unlikely to have adverse conservation impacts, but should help reduce implementation burdens.

Reviewers:
Traffic East/Southern Africa

Inclusion of *Zygosicyos pubescens* in Appendix II

Proponent: Madagascar

Summary: *Zygosicyos pubescens,* also known as *Xerosicyos pubescens,* is a succulent plant from Madagscar in the gourd family or Cucurbitaceae. It has a swollen, tuber-like stem or caudex which may exceptionally reach nearly one metre in diameter from which extend vine-like branches. Known occurrences of the species are confined to five localities in an area of some 400 km^2 in south-east Madagascar, where the species grows in scrub and dry forest in rocky areas with a little shade. The area it occurs in is generally affected by a range of anthropogenic pressures, including fire, overgrazing, fuelwood extraction and charcoal production. It is not known to occur in any protected area. The species is in some demand internationally as a horticultural plant, grown chiefly by specialist collectors of succulents. The CITES Management Authority of Madagascar records the export of some 80 specimens in the period 2003–2006. It may be assumed that most or all of these were wild-collected plants. The species does not appear to be widely available outside Madagascar at present. It can reportedly be propagated by both seeds and cuttings. Specimens were offered for sale by one exporter at EUR95.

Analysis: Available information, which is sparse, indicates that *Zygosicyos pubescens* has a restricted range with a small number of known occurrences. There is no information on its abundance in the wild. The very small number of individuals reported in trade in recent years is unlikely to have an impact on the wild population, but in the absence of any population information this cannot be said with certainty. There is therefore insufficient information to determine whether the species meets the criteria for inclusion in Appendix II or not.

Supporting Statement (SS)	Additional information
	Taxonomy
	Synonym: Xerosicyos pubescens. *Placed in* Zygosicyos *by Rowley (2002); this designation is not universally accepted.*
	Range
Madagascar	
	IUCN Global Category
	Not assessed.

Supporting Statement (SS)	Additional information
Biological and trade criteria for inclusion in Appendix II *(Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
The species is extremely localized with only one known locality, the Ekodida Forest at Amboasary Sud. Around 150 individuals were censused in a 3-ha plot in the forest. Its habitat is restricted to forest remnants. Results of 2006 field work indicate the species would be classified as "endangered" under IUCN Criteria. The species grows in areas that are not protected and that are subject to human pressure. Reported trade: 0 in 2003; 25 in 2004; 25 in 2005; 32 in 2006.	*Rauh (1996) reported the species from five sites contained within an area of around 400 km^2 in south-east Madagascar to the west of Taloagnaro. It grew in scrub and dry forest in rocky areas with a little shade. The main site was near the village of Andrahomana, south-east of Amboasary, where the plant grew in degraded* Didierea *scrub. It also occurred at the base of several small hills in the vicinity and was believed to be confined to this area.* *The species is dioecious (Rauh, 1996).* *One exporter offered the plant for EUR95 on a 2007 list; it was not otherwise found offered for sale, either under* Xerosicyos *or* Zygosicyos*.*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	
Threats	
	Natural habitats in southern Madagascar are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.
Conservation, management and legislation	
Not known to occur in any protected area.	

Captive breeding/artificial propagation

Can reportedly be propagated by cuttings and seeds (Bihrmann, undated.).

Other comments

Reviewers:
TRAFFIC East/Southern Africa

Inclusion of *Zygosicyos tripartus* in Appendix II

Proponent: Madagascar

Summary: *Zygosicyos tripartus* is a succulent plant from Madagascar in the gourd family or Cucurbitaceae. It has a swollen, tuber-like stem or caudex up to 30 cm in diameter from which extend vine-like branches that may reach five metres in length. The plant has a relatively wide distribution in central and southern Madagascar, extending over several thousand square kilometres, and appears to be at least locally numerous, although apparently only occurs in relatively intact forest. The area in which it occurs is affected by a range of factors, including forest clearance for agriculture, overgrazing, fuelwood collection and manufacture of charcoal. It is not known to what extent the species is affected by these. The species is not known to be used locally. It is in some demand internationally as a horticultural plant, grown chiefly by specialist collectors of succulents. The CITES Management Authority of Madagascar records the export of some 5000 specimens in the period 2003–2006. It may be assumed that some or all of these were wild-collected plants. The species has been offered for sale recently in Europe and the USA at moderate prices (EUR30–70, USD150).

Analysis: *Zygosicyos tripartus* is a relatively widespread and at least locally abundant plant in central and southern Madagascar. If local population estimates are at all representative of its range as a whole, the species is likely to have a substantial wild population. The species is in demand in the international horticultural trade and has been recorded as exported in moderate quantities from Madagascar in recent years. Much or all of this export is likely to have been in the form of wild-collected plants. There is no information on the impact of collection for export on wild populations. Collection to meet current levels of export may possibly be leading to local depletion, but it seems unlikely that regulation is required to prevent the species becoming eligible for inclusion in Appendix I in the near future, or to prevent harvest for trade reducing the overall population to a level at which its survival might become threatened by continued harvest or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Range
Madagascar	
	IUCN Global Category
	Not assessed

Supporting Statement (SS)	Additional information
Biological and trade criteria for inclusion in Appendix II *(Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
Has a fragmented distribution in southern and central Madagascar. Known from the upper basin of the Mandrare, the Manambolo valley and Tranomaro. 900 individuals were counted in the Ambarazy and Andrahomana forests in the Tranomaro commune. Grows on rocky ground in dry forests and is only found in relatively intact forest. It grows in unprotected areas, subject to strong pressures. Based on field work in 2006, the species was regarded as meeting the criteria for "vulnerable" under the IUCN Red List Categories and Criteria. Recorded exports are 250 in 2003; 1523 in 2004; 1247 in 2005; 1845 in 2006.	*Records in the GBIF (Global Biodiversity Information Facility) database are from numerous sites in an area of around 4000 km^2 in south-eastern Madagascar (GBIF, 2010). It is not known what proportion of the range of the species this comprises.*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
	No local use of the species is known.
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	
Threats	
	Natural habitats in Madagascar are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.
Conservation, management and legislation	

Supporting Statement (SS)	Additional information
Captive breeding/artificial propagation	
.	*The species may be propagated by seeds or by cuttings (Bihrmann, undated).*
Other comments	

Reviewers:
TRAFFIC East/Southern Africa

Deletion of the Cliff Spurge *Euphorbia misera* from Appendix II

Proponents: Mexico and the United States of America

Summary: Cliff Spurge *Euphorbia misera* is a slow-growing, perennial succulent shrub from north-western Mexico and southern California in the USA. It occurs mainly in coastal scrub habitat at altitudes of 10–500 m but also occurs in central Sonora. The majority of the range lies in Mexico. Detailed information on its status there is lacking although it is described as widespread in some areas of Baja California State and locally common in others. In the USA, 26 known occurrences are reported by the California Department of Fish and Game. In some of these the species is reported as quite numerous (over 1000 plants) while in others it is apparently scarce. The plant is affected by habitat destruction owing to continuing coastal development and in the case of island populations, herbivory from introduced species such as European rabbits *Oryctolagus cuniculus*. Around half of known occurrences in both Mexico and the USA are within protected areas. It is covered by general regulations requiring permits for collection and commercialization of non-woody plants (Mexico) or succulents (California, USA).

The species was included in CITES Appendix II in 1975 in the general listing for the genus *Euphorbia*, amended in 1997 to include succulent species only.

In Mexico, the species is reportedly used locally in traditional medicines, although such use appears to be very limited. It is in cultivation in the USA but is evidently easily grown from both seed and cuttings, and relatively widely available as artificially propagated plants. Minimal trade in the species is reported in CITES trade data (nine specimens in total, the most recent in 1997, all reported as from the USA and as artificially propagated). The species has not been found advertized for sale outside the USA recently, and is unlikely to be in demand.

Euphorbia misera can reportedly be distinguished from other shrubby Appendix-II listed *Euphorbia* species occurring in Mexico and the USA by the characteristic shape of the leaves (heart-shaped at the base). It may be similar to other Appendix-II listed *Euphorbia* species occurring elsewhere. However it is not known to be similar to any Appendix-I listed *Euphorbia* species (all small forms from Madagascar) or to any Appendix-II listed *Euphorbia* that are reported in trade in any quantity as wild-collected plants.

Analysis: Extremely little international trade in *Euphorbia misera* has been recorded since 1975, and none in wild-collected specimens, nor is there expected to be any international demand for wild-collected specimens. There is thus no indication that trade in *Euphorbia misera* needs to be regulated to prevent its becoming eligible for inclusion in Appendix I in the near future, or to ensure that harvest from the wild is not reducing the population to a level at which its survival might be threatened by continued harvesting or other influences.

The species does not resemble any Appendix-I listed *Euphorbia*. It may possibly resemble other Appendix II-listed *Euphorbia* species, but is not known to resemble any whose trade might be a cause of concern and as it itself is not in trade, nor likely to be in trade, there is no reason to retain it in Appendix II for look-alike reasons.

Taking into account the precautionary measure outlined in Annex 4.4 of *Resolution Conf. 9.24. (Rev. CoP 14)*, there is no evidence to suggest that deletion would be likely to result in it qualifying for inclusion in the Appendices in the near future.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Mexico and USA.	
IUCN Global Category	
	Not assessed.

Biological and trade criteria for retention in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

There are no global population estimates available.	
Native to primarily coastal areas of north-western Mexico and south-western USA in xeric scrub or maritime/coastal succulent scrub habitat, at 10–500 m. Maritime scrub is characterized by low to moderate-sized shrubs with patchy or continuous cover. Coastal sage scrub habitat occurs variously on steep slopes, with sandy mudstone or shale soils, and on dunes and moderately-sloped terraces. *Euphorbia misera* grows on cliffs, bluffs, and rock outcroppings, where soils are fragile.	
In Mexico, the species is characterized in Baja California as being “locally common” and as “widespread” on Punta Banda. *Euphorbia misera* is more common in Mexico and occurs in the states of Baja California, Baja California Sur, and Sonora, and on the islands of Guadalupe, Dátil, San Esteban, Tiburón and East and West San Benito Islands.	Euphorbia misera *is not included in Mexico’s list of at risk species (PC 18 Doc 16.1.2). The species has an extensive distribution in Mexico, with non-coastal populations in central Sonora (Felger, 2000; Turner* et al., *1995).*
In the USA, the California Department of Fish and Game reports 26 occurrences in five counties. Population estimates within these vary from “no estimate,” to as few as 20 plants, to more than 1000 plants. Some of the largest populations occur on protected lands in San Diego County. Most populations in Orange County are small and fragmented. However, there are some large populations, including, one which is thought to contain up to 1500 individuals. Catalina Island holds only one known population, which was estimated to total 10–12 plants in 1993. The populations on Point Lomo Naval Base and Cabrillo National Monument have been characterised as “excellent”.	*The California Department of Fish and Game Natural Diversity database (2009) has classified* E. misera *as secure (G5) in the Global Rank, as vulnerable (S3.2) in the state rank and on List 2.2 of the California Native Plant Society’s (CNPS) List meaning the species is regarded as fairly endangered in California but more common elsewhere.*
Populations in the USA were categorised as “stable” in 1994 and extant populations are characterised as slow growing, but stable if undisturbed. Their global status is	

Supporting Statement (SS)	Additional information
secure as they are considered more common in Mexico than in California.	
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
According to the CITES trade database, international trade does not appear to be affecting the status of the species. Minimal international trade has been recorded with only one shipment of five artificially propagated specimens reportedly exported from the USA in the 1990s. In the USA, there is no evidence to suggest that specimens are being harvested from the wild as this species is easily cultivated from cuttings and seeds and seeds are easily harvested and stored. The USA seemingly cultivates *Euphorbia misera* for the domestic trade rather than the international trade. *Euphorbia misera* is a slow growing species and is thought to have a low reproductive output. *Euphorbia misera* is often found in inaccessible areas, assisting in its protection. There have been no reports of illegal collection or international trade in this species.	*According to the import data recorded in the CITES trade database, one shipment of five artificially propagated* E. misera *from the USA to Japan was recorded in 1997. According to the exporters' reports, one specimen was exported from the USA to Canada in 1991 and three specimens were exported from the USA to Hong Kong in 1993. All the specimens recorded were artificially propagated.* *A brief Internet search indicated that* E. misera *was not readily available nor in demand in international trade.*
Retention in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
Euphorbia misera is unlikely to be confused with other Mexican or US native *Euphorbia* that are listed in CITES Appendix II, including *E. antisyphilitica* and *E. Radians,* owing to their differing ranges and distinct morphological characteristics (e.g. the obcordate shaped leaves of *E. misera*).	*Currently 10 species of succulent* Euphorbia *from Madagascar are included in Appendix I.*
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	

Supporting Statement (SS)	Additional information

Threats

Euphorbia misera has a limited and fragmented distribution.

Habitat destruction and alteration is one of the primary threats to *E. misera*, particularly as specimens are found in areas where soils are fragile. Coastal scrub habitat is under development pressure and habitats are changing owing to infrastructure development which is linked to erosion from road construction and trail-building, sand and gravel mining, heavy off-road vehicle use and dumping of litter. Herbivory from introduced species may also pose a threat

Domestic trade was considered a potential threat to *Euphorbia misera* in the USA when discussed by the Plants Committee in March 2009 (18th meeting). However, this is not likely to be a threat as the plants are cultivated rather than taken from the wild. They are easy to propagate from cuttings or seeds and the species is protected from wild-harvest.

In Mexico, populations are threatened by coastal development, especially in northern Baja California. It is used for medicinal purposes in Mexico, e.g. root tea is used for combating stomach ache, dysentery and venereal disease. However, this is highly localised to the Seri people.

Conservation, management and legislation

Listed in Appendix II of CITES in 1975.

In the USA, over half the known occurrences are located on state, federal or privately protected lands and in Mexico over half the distribution for *Euphorbia misera* is located within six protected areas, with the most occurring in Valle de los Cirios.

USA: *Euphorbia misera* is protected from wild harvest (unless granted a permit) by the *California Desert Native Plants Act* and the US *Lacey Act.*

Potential impacts on the species caused by activities such as habitat alteration are taken into consideration under the *California Environmental Quality Act* and by the California Coastal Commission (CCC). The CCC also administers the federal *Coastal Zone Management Act* which, among other things, regulates federal activities throughout the coastal zones.

Euphrasia misera has been on the California Native Plant Society's (CNPS) rare plant programme since 1974 and is currently on CNPS List 2, which includes "plants rare,threatened or endangered in California, but more common elsewhere".

The California Department of Fish and Game Natural Diversity database (2009) has classified E. misera *as secure (G5) in the Global Rank, as Vulnerable (S3.2) in the State rank and on List 2.2 of the California Native Plant Society's (CNPS) List meaning the species is regarded as fairly endangered in California but more common elsewhere.*

Supporting Statement (SS)	Additional information
Because of its status as a List 2 species, the *California Environmental Quality Act* requires, disclosure of occurrences of this species during pre-project reviews and surveys, as well as mitigation for any significant impacts resulting from anticipated land use changes where this species occurs. **Mexico:** *Euphorbia misera* is protected by the *Ley General de Desarrollo Forestal Sustentable,* legislation regulating management and harvest of woody and non-woody plants. The *Ley General del Equilibrio Ecologico y Protección al Ambiente* also provides general protection. *Euphorbia misera* is also protected by enforcement measures, including tracking of legal and illegal trade. There is monitoring in National Protected Areas in place in Mexico but none which is specific to this species.	
Captive breeding/artificial propagation	
Euphorbia misera is cultivated commercially in the USA for domestic trade. It is widely available in private nurseries and plant societies. *E. misera* can be easily cultivated from seeds and cuttings and seed are easily harvested and can be stored.	*An Internet search did not find any specimens of* E. misera *for sale*.
Other comments	

Reviewers:
A.B. Montijo, TRAFFIC North America

Inclusion of Brazilian Rosewood *Aniba rosaeodora* in Appendix II with annotation #11 "Designates logs, sawn wood, veneer sheets, plywood and essential oil"

Proponent: Brazil

Summary: Brazilian Rosewood *Aniba rosaeodora* (also known as Rosewood, Pau-rosa and Palo de Rosa) is a slow-growing hardwood tree reaching a height of up to 30 m and trunk diameter at breast height (DBH) of two metres. It is one of about 40 members of the Neotropical genus *Aniba* and occurs in dense primary wet tropical rainforest at medium and high altitudes in Brazil, Colombia, Ecuador, French Guyana, Guyana, Peru, Suriname and Venezuela. The tree has been extensively felled to harvest its wood which is rich in linalool oil, valued as a fragrance in top-of-the-range perfumes, as a component in a wide range of scents and in aromatherapy. *A. rosaeodora* wood can also be used in furniture and in canoe manufacturing, but is rarely used for these purposes because of the high commercial value of its essential oil.

The species grows at low densities and discontinuously. Little detailed information exists on its current status as there are virtually no known forest inventories. The highest density population is believed to be in the central Amazon predominantly in the state of Amazonas, Brazil. In this area there are reported to be usually fewer than two trees per ha, but locally densities may be higher: in one, unexploited population in a 10 000-ha forest reserve in the Manaus region of Amazonas, there are three to four adult trees per hectare. Accessible stocks are believed to have been largely exhausted through overexploitation in French Guyana, Guyana and Peru, as well as Amapá, Pará and a significant area of Amazonas in Brazil. It is included in lists of threatened tree species of Colombia and Suriname. Remaining stands are reportedly in remote forest areas where access is difficult. Evidence of natural regeneration has been found recently, but it takes place slowly, irregularly and infrequently.

Brazil is now apparently the only producer of *A. rosaeodora* essential oil, which is derived almost entirely from natural stands. Although all parts of the tree are oil rich, the oil is extracted almost entirely from the wood as this is the most valued for the fragrance industry and in aromatherapy. Current extraction methods require the tree's destruction. Typically trees over 30 cm diameter at breast height and on average 30 to 35 years old are cut down, due to the higher quality aroma allegedly obtained from older trees. Now smaller trees are also being harvested because of the shortage of readily accessible older *A. rosaeodora* trees.

It is estimated that between 1937 and 2002, a large number (825 000) of trees were logged, believed to correspond to harvest from more than four million ha of forest. The harvesting and distillation processes are highly inefficient, partly because very old equipment is used. Some illegal mobile distilleries may still be operating, although most or all may have been recently closed by the Brazilian Institute of Environment and Natural Resources (IBAMA).

It is estimated that 15% of oil is used in the perfume industry in Brazil, with the remainder exported. There is some disagreement about recent oil production volumes; figures from the 1990s and early 2000s varied from 38 t per year to 100-130t per year. It appears that since 2000 export has been less than 39 t and has reportedly failed to meet demand, in spite of increasing prices.

A comparison of the volume of logs authorized for extraction (equivalent to between 1000 and 2000 trees annually) and the quantity of oil exported between 2003 and 2008 indicates that a large proportion of the oil exported must have come from unauthorized felling. Over five times more raw material than was legally harvested would be needed for the total level of export reported in the period (although the annual discrepancy between recorded oil export and authorized volume of logs has been much less since 2006). In recent years the USA has been the chief international buyer of oil. In the period 2000–2003, it accounted for just under half of reported exports, with France, Belgium and the UK accounting for almost all the remainder. The oil is expensive, with advertised retail prices of up to ca USD2 per ml in importing countries.

Cheaper, synthetic linalool oil, and Ho wood *Cinnamomum camphora* and Ho leaf oils are substitutes for that obtained from *A. rosaeodora* in low price and mid-

range perfumes, but *A. roseaodora* oil is still much in demand for fine perfumes because of its superior aroma. Adulteration or substitution of A. *rosaeodora* oil with oil from other *Aniba* species, synthetic linalool, Ho wood and Ho leaf oils, and linalyl acetate is reported to occur. However, the extent of this, and the extent to which other *Aniba* species (none of which is listed in the CITES Appendices) are harvested for oil extraction, remains the subject of controversy. Adulteration can only be detected by chemical analysis.

The Brazilian Government has many laws and general measures designed to help conserve the species, and while there has been some success, there are difficulties in enforcing the regulations. In 2006 an electronic Document of Forest Origin system was introduced which is necessary for the domestic transport of the oil.

Only a small number of plantations of *A. rosaeodora* exist and it is likely to take a few decades for these to produce oil acceptable to the market. There is high potential for the sustainable production of oil from *A. rosaeodora* leaves and stems. Two drums of oil from this source were exported in 2008, but it will be an estimated six to eight years before substantial quantities are available for export and widespread approval from the fragrance industry of oil from this source is still needed.

A. rosaeodora was assessed by IUCN as Endangered (A1d+2d) in 1998; this assessment is regarded as in need of updating. It was listed as endangered in Brazil in 1992.

The proponent seeks to list *A. rosaeodora* in Appendix II, in accordance with Article II, paragraph 2a) of the Convention and *Resolution Conf. 9.24* Annex 2a, Paragraph A, with Annotation #11 designating logs, sawn wood, veneer sheets, plywood and essential oil. However the current annotation #11 lists "powder and extracts" and not "essential oil".

Analysis: *Aniba rosaeodora* is a wide-ranging, heavily exploited and slow-growing tree known to be depleted in many parts of its range. Exploitation is very largely driven by export trade, although this trade, as far as is known, is now confined to one country—Brazil—albeit the one where most of the surviving population is found.

The species certainly does not have a restricted range or a small population under the guidelines for inclusion in Appendix I provided in *Resolution Conf. 9.24 (Rev. CoP14)*. There is insufficient information on historical trends to determine whether the overall population has undergone a marked recent decline or not. There is therefore insufficient information to determine whether regulation in trade is needed to ensure that the species does not meet the biological criteria for inclusion in Appendix I in the near future (Criterion Annex 2 a A).

While harvesting for trade has certainly depleted accessible populations, it is not evident that regulation is required to ensure that harvest is not reducing the total wild population to a level at which its survival might be threatened by continued harvesting or other influences (Criterion Annex 2 a B).

Supporting Statement (SS)	Additional information
	Taxonomy
Synonym *Aniba duckei*	*There is some disagreement as to the exact botanical status of* A. rosaeodora *and* A. duckei*. In Brazil, where most of the research on* Aniba *has been carried out, some groups regard* A. rosaeodora *as a synonym of* A. duckei *while others take the*

Supporting Statement (SS)	Additional information
	opposite view. A third opinion holds that morphological differences that exist within the genus are insufficient to justify separation of the two species. Oil producers themselves recognize two plant sources, but make no attempt to keep the distilled oils separate (Coppen, 1995).
Range	
Recorded in Brazil, Colombia, Ecuador, French Guyana, Guyana, Peru, Suriname and Venezuela.	
IUCN Global Category	
Listed as Endangered	*Assessed in 1998 as Endangered A1d+2d; assessment in need of updating (IUCN, 2009).*
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
	The supporting statement does not provide any quantitative indications that the species may meet the biological criteria for inclusion in Appendix I in the future. *Santos* et al. *(2008), citing Leite* et al. *(1999), May and Barata (2004) and Loureiro* et al. *(1979) report that the highest density population is found in the central Amazon, predominantly in the State of Amazonas, and usually comprises fewer than two trees per hectare.* *A 1978 survey in the 10 000-ha Adolphe Ducke Forest Reserve in Manaus found between three and four adult trees per hectare (Alencar and Fernandes, 1978, cited in Santos* et al.*, 2008).*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
A. rosaeodora is heavily exploited and in international trade for its essential oil with high prices on the international market promoting the exploitation of the species. The oil, which is chiefly extracted from the wood, is rich in linalool, and used as a fragrance in fine perfumes and as a perfume fixative. *A. roseaodora* is now included in the official list of species threatened with extinction for Colombia and Suriname.	*In addition* A.rosaeodora *is used in aromatherapy (e.g. Aroma Medical, undated; Falsetto, 2008).* *According to the Spanish version of the proposal as submitted the species is included in the official extinct species lists for Colombia and Suriname. This appears to be in error and these lists are in fact of endangered species in these countries. In Colombia*

Supporting Statement (SS)	Additional information
Natural regeneration of *A. rosaeodora* is slow.	*there are only three locations recorded with actual occurrence of* A. roseadora *(Cárdenas. D.* et al., *2006). Freyre (2003) reports for Peru that* A. roseadora *is rare or its distribution restricted due to historical exploitation.*
In Brazil it is present in the Estados Federados de Amazonas (federated States of Amazonas), Pará and Amapá. At present, rosewood can be found in the interior of Amapá, close to the Guyana border. The highest concentration of trees is found in the strip that stretches from the source of the river Curua-Una to the border with Peru, on the south, and from the river Trombetas to Colombia in the north.	*It grows mainly in upland forests in the Amazon, although in Venezuela it has also been recorded in lowland forests of white sand. It has been found associated with clay soils and forest clearings. Recently it has documented the strong fruit predation by wild parrots during harvest time (Varty 1996).*
There are no known forest inventories for *A. rosaeodora*. It is estimated that between 1937 and 2002, a minimum of 825 000 trees were logged, which amounts to over 4 million hectares of forests exploited. This estimate is based on the following data. Almost 13 000 t of rosewood essential oil were exported during the period. In order to produce a drum of oil (180 kg), 18–20 t of wood are needed. An average tree extracted weighs approximately 1.75 t and the diameter at breast height ranges from 30 to 60 cm. Oil yield estimates vary between 0.7% and 0.1% of the weight of trunk wood. Therefore one tonne of rosewood trunk is needed to produce 10 kg of its essential oil.	*Varty (1998) reported that populations throughout the species' range have seriously declined because of rosewood oil extraction. The species is considered endangered throughout its range in the Guiana Shield which extends from eastern Venezuela, to north-eastern Brazil (covering parts of Colombia and Venezuela, the whole of Guyana, Suriname, French Guiana, and the states of Roraima, Amapá, and parts of Amazonas and Pará in Brazil (van Andel* et al.*, 2002). No further details on the decline of* A. rosaeodora *in Ecuador or Venezuela or the current status of the species in these countries could be located.*
Exhaustive extraction severely depleted populations of the species in the Guyanas. In Peru the species was exploited later, during the 1940s and 1950s, but efforts halted due to the lack of available material, suggesting that stocks in Peru are also depleted.	*There is little rosewood remaining in easily exploitable areas up to two km from riverbanks in most of Amazonia. Nowadays scout units who precede harvesting units often must penetrate four hours into the forest to locate suitable* A. rosaeodora *trees for extraction. Researchers at the Agricultural and Forestry Sciences Faculty of Para´ (FCAP) found there are still considerable populations of the species in areas more distant from streams, and from the existing distillation industry, such as in the Tapajo and Xingu river basins. (May and Barata, 2004).*
Brazil is now the only producer of *A. rosaeodora* oil. By the 1960s, extraction methods had led to the exhaustion of the most accessible and productive stocks of the species. From the 1970s the introduction of the chain saw and the creation of new roads allowed access to areas which had previously been inaccessible. In the 1980s the increase of forest clearing for agriculture made new populations vulnerable to extraction. Intensive exploitation has led to the loss of natural populations from Amapá, Pará and also a significant portion of Amazonas, where there is a greater presence of the species. Extraction formerly took place in Pará until the 1980s and Amazonas, but nowadays remaining populations in Pará are in inaccessible areas and extraction is restricted to Amazonas. The current species status in Amapá is unknown. Now *A. rosaeodora* is located in the most "central" regions of the forest which are preserved due to their difficult access. Mature trees of the species, which are the most highly prized for extraction, are found at increasing distances from rivers. There are indications that small trees are being logged in previously exploited areas.	*There is some disagreement regarding total production volume. Barata (2007) gives a figure of 38 t per year, with gross sales of USD2.8 million. Mitja and Lescure (1996) in May and Barata (2004) suggest the oil production level may be 100–130 t per year. May and Barata (2004) calculated the number of trees harvested per year averages 1700, based on current oil production levels. The Brazilian Institute of Environment and Natural Resources (IBAMA) has accepted an annual extraction rate of 1000–2000 trees (IBAMA, 1997 in May and Barata, 2004). The industry suggests that total consumption is only 1000–1500 trees and asserts a need for restraint on extraction of younger trees, indicating that this has occurred (May and Barata, 2004).*
During the 1960s production of rosewood oil was around 500 t per year. With the introduction of cheaper synthetic linalool the demand decreased as synthetic linalool substituted rosewood's oil in the low-cost perfume industry. In the 1980s there was a	*Today the only port of export is that of Manaus in the State of Amazonas, Brazil (May and Barata, 2004). Osava (1998) maintains that illegal export of the oil occurs via a variety of unknown routes.*
	Historically trade in Brazil also originated from Amapá [as well as Pará and Amazonas] (May and Barata, 2004), but has been virtually wiped out there by intensive exploitation (Barata, 2005).

Supporting Statement (SS)	Additional information
further fall in demand due to the introduction of cheaper Ho *Cinnamomum camphora* oil into the market which replaced rosewood as a natural source of linalool in the mid-range-price perfume industry. Since then the use of *A. roseaodora* oil has been restricted to top-of-the-range perfumes. During the1980s extraction matched demand of around 100 t of oil per year. Subsequently extraction decreased again and for the first time did not meet demand. Since 2000, export has been less than 39 t. In recent years, in spite of increasing prices, there are only seven working distilleries in Amazonas and extraction has continued to be smaller than demand, due to the depletion of stocks. The proponent therefore considers that the conservation of this species is necessary and urgent, in order to avoid further genetic erosion and population reductions. The proponent is of the opinion that there may be intact populations of *A. rosaeodora* still to be discovered in inaccessible areas of the Amazon forest, far from navigable rivers. This hypothesis is yet to be verified. It is estimated that 15% of *A. rosaeodora* oil extracted is used in the perfume industry in the southern states of Brazil, and the remaining 85% is exported. There is also a small traditional market for “baths” and “aromas” in northern Brazil, selling pieces of rosewood cork and wood. Recently the leaves and sprouts of adult trees and young plants have been used for oil extraction; almost two drums of essential oil from the leaves were exported in 2008. A comparison of the volume of logs authorized for extraction and the quantity of oil exported between 2003 and 2008 revealed a large discrepancy, even without taking into account the oil extracted which is used internally. The following data were used in the calculations: conversion factor of one tonne of wood per 10 kg of oil, wood density of 850 kg per m^3, and oil density 0.87 g per cm^3. Even if the possible existence of stocks is taken into consideration, the magnitude of the discrepancy—around 513% on average—suggests that some of the oil exported was derived from illegally felled trees.	*The USA was the chief international buyer of rosewood oil between 1987 and 2003, accounting for 65% of exports from 1985–1987, 75% from 1997–1999 and 47.5% from 2000–2003. The other three main international buyers between 2000 and 2003 were France (17.8% of exports), Belgium (16.8%) and the UK (10.9%) (May and Barata, 2004). Major purchasers of rosewood oil are believed to be local representatives of fragrance sector multinationals. Fragrance launches have continued to feature* A. rosaeodora *e.g. Presence d’une Femme by Montblanc, 2002, and Trussadi Skin by Trussadi, 2002. Successful Brazilian companies such as Natura have featured traditional Brazilian ingredients, such as rosewood oil in developing home-market cosmetic product ranges (Burfield, 2009). The principal Brazilian buyer, Firmenich, produces compositions for the food and cosmetics industry for sale in São Paulo; a share of these compositions is exported (May and Barata, 2004). The UK cosmetics company "Lush" used over 500 kg of rosewood oil in 2008 at a cost of GBP50–80 per kg (Anon., 2009).* *The online Chemical Industry Purchasing News (ICIS), lists 31 suppliers of rosewood oil internationally. The oil is advertised online at USD1.51–USD1.55 per ml in the USA (Aroma-pure, 2009; Maya-Ethnobotanicals, 2009); GBP0.22–GBP1.33 per ml in the UK (Holistic Living, 2009; Natural Touch Aromatherapy, 2009; Twenga, 2009) and GBP0.12–GBP0.4 per ml on Amazon. However there is no guarantee of the purity of these products.* *Samples derived from oil of distinct populations have shown a substantial range in the fragrance of the oil obtained, suggesting substantial genetic variation in the raw material, and/or adulteration of the oil with other species of* Aniba*. This variation has been recently verified through gas chromatography-mass spectrometry (CG-MG) analysis of samples of rosewood leaves obtained from distinct populations (May and Barata, 2004). Several sources e.g. Coppen (1995) suggest that other* Aniba *species are being used by industry to “increment” their oil sales. In a producer’s opinion this practice is not widespread. It is possible that other* Aniba *species are being used to produce rosewood oil of inferior quality, but this would not be easily saleable as pure rosewood due to the latter’s distinctive bouquet (May and Barata, 2004).* *Producers and technicians agree that the aroma of rosewood oil can vary from batch to batch, although they disagree on the reasons for this variation. Producers argue that buyers mix pure rosewood oil with the inferior synthetic linalool. Technicians infer that the species is nearing extinction, thus making it necessary for producers to exploit other species or to adulterate the oil to meet demand (May and Barata, 2004).* *Typically only trees over 30 cm diameter at breast height (dbh) are cut, due to the higher quality aroma, as alleged by the industry, obtained from older trees; although trees over 20 dbh may also be harvested (see Conservation and legislation section for more details) (May and Barata, 2004). Coppen (1995) reports that trees as small as*

Supporting Statement (SS)	Additional information
	15 cm dbh are (illegally) harvested and occasionally branches over four cm thick may be collected. Shawe (2002) also observes that smaller trees than before are being harvested, as well as other Aniba *species that were previously left untouched.* *Some 60% of the wood biomass is left on site and therefore wasted. Young branch wood provides the highest oil yields, but is rejected on site in favour of the more readily portable trunk wood. At the distillery, significant losses occur in sawing and chipping wood prior to distillation, and owing to a lack of investment in equipment (now mostly very old) oil recoveries are sub-optimal (Shawe, 2002). Yields of oil vary according to the quality of the wood feedstock (collection area and species mix) and its moisture content (Coppen, 1995).*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

.

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Other information

Threats

Extraction of the best phenotypes from natural populations for essential oils has led to a negative selection pressure on the species.	*Santos* et al. *(2008) found populations of the species in central Amazonia to be genetically diverse. Polymorphism was highest in the unexploited population in the Adolphe Ducke Forest Reserve, but differences between this and other (exploited) populations were not statistically significant.*
The growth of large-scale economic activities based on the resources of the Brazilian Amazon has caused a population reduction of *A. rosaeodora.* Vast areas of the Amazonian forest are degraded by habitat fragmentation, selective logging, fires, spread of agriculture, mining and road building.	*In 1992 the Natural Resource Institute, UK, published a survey showing that illegal crude stills for rosewood extraction were being floated down rivers on rafts in order to access remote jungle areas where immature trees were being cut and the oil distilled on site (Green, 1992).* *Rosewood extraction has a low impact on the overall local ecosystem because it is carried out by manual labour, and individual trees are dispersed. The volume of* A. rosaeodora *wood extracted is only about 0.03% of total wood extracted in the Amazon in recent years (May and Barata, 2004).*

Similar species

A.fragrans and *A. parviflora*, also aromatic, are occasionally confused with *A. rosaeodora* but there is still no certainty as to whether they are in commercial use	*Van der Werff (2009) believes that* Aniba *species are difficult to identify due to their small and uniform flowers and identification is scarcely possible without flowers. He*

Supporting Statement (SS)	Additional information
or not.	*considers that as these species also have fragrant oils, such species will be harvested as well. However Shawe (2002) points out that the scouts who are sent out to locate* A. rosaeodora *for harvesting in the forest are very experienced in identifying and distinguishing the various* Aniba *species by their appearance and odour.*
Captive breeding/artificial propagation	
Studies have been carried out on the artificial propagation of the species since the 1960s, but field development has been considered slow. Seedlings can be produced by seeds, cuttings and natural regeneration. Seed germination occurs at five to eight weeks and the rate is generally low. The species propagates well by cuttings especially when these come from forests and are transplanted on rainy days.	*The FCAP recently identified specific evaluation needs for formal cultivation, including the selection of superior germplasm and management regimes (Burfield, 2003).*
Scattered plantations of *A. rosaeodora* are found all around the Brazilian Amazon, but currently they do not contribute to oil extracted from wood.	*May and Barata (2004) describe several attempts that have been made to plant rosewood in homogenous stands. However there is insufficient knowledge of genetic variation to assist in selection and yield improvement; research is needed to correlate oil characteristics with source material. Significant variation has been found in the percentage and aroma of oil from different plantations, reaffirming the chemical variability of the species. Production systems organized around plantations could be feasible but would take several decades to yield a product currently acceptable to the market (May and Barata, 2004).*
Experiments demonstrated that rosewood trees showed high numbers of buds/trunk after the tree tops were pruned. The capacity of sprout reappearance, together with the greater oil productivity of sprouts and leaves compared with wood of the trunk indicated that *ex situ* plantations could be managed by pruning.	*In 1998 the State University of Campinas (UNICAMP) began to develop a project for the extraction of oil from rosewood leaves; this project has resulted in yield and quality similar to that obtained from wood (Barata, 2005; Ereno, 2005). UNICAMP has created a plantation consisting of 10 000 rosewood seedlings intercropped with other aromatic species in an area of 30 ha. Production is expected to yield 1000 L (=945 kg) of rosewood leaf oil, with sales of USD50 000 (Barata, 2007). Chemical profile definition and sensorial evaluation of oil derived from wood and leaf sources confirmed that the leaves are a potential substitute for wood in the extraction of rosewood essential oil, representing a sustainable natural source of natural linalool (Zellner* et al., *2006). Barata (2009) believes it will take six to eight years to supply rosewood oil from leaves if conditions remain the same as today. This time period is much shorter than that needed to extract oil from plantations for wood, enhancing the attractiveness of rosewood leaf oil plantations to investors. If such plantations could be established as intercrops with shorter cycle crops such as cassava or other aromatic plants, the basis exists for a diversified community enterprise (May and Barata, 2004). WWF AVIVE in the Silves area of Brazil is another rosewood leaf oil project (Cavaliere, 2007; Wildwood, 2002).*
There is an incipient trade of the oil extracted from leaves and young shoots produced by pruning, thus removing the need to cut down the tree. Although there are good prospects for this trade, oil from the leaves cannot be considered a direct substitute of oil from the wood, since they have different olfactory characteristics.	*Opinions vary on the attractiveness of the oil to perfumists. Barata (2007) believes that rosewood leaf oil will replace the wood oil in fragrance creation eventually. Some perfumists consider this oil much more fragrant than oil from the wood, although physio-chemical and sensorial experiments are needed to confirm the quality and character of the leaf oil (L.E.S. Barata, 2009). However Burfield (2004) commented "it remains to be seen whether the oil will be attractive to essential oil buyers". Wildwood*

Supporting Statement (SS)	Additional information
	(2002) reports that some aromatherapists regard its fragrance as inferior.
Other comments	
All range States of this species were consulted. Colombia, Ecuador and Peru have expressed their support. Others have not yet responded to the consultation.	Aniba *species in general are known to have aromatic characteristics. Due to depletion of accessible rosewood trees by exploitation, other* Aniba *species may have been substituted for rosewood. Field studies have found that various species are "confused" with rosewood and extracted in its place, whether purposefully or by accident. A purported decline in quality of oil due in all probability to increased usage of different species, younger trees and mixing with synthetic linalool attest to the over-exploitation of* A. rosaeodora *(May and Barata, 2004).* *Burfield (2003) considers that wholesale adulteration of rosewood oil occurs; adulterated oils being termed "US quality" in the trade. Aroma Medical (undated) believes that it is easy to manufacture a fake oil by mixing rosewood oil with linalool and that only analysis done by an expert could detect this adulteration. Choices (2009) notes that rosewood is often adulterated with Ho wood, Ho leaf oil, synthetic linalool and linalyl acetate.* *A new commercial substitute for rosewood essential oil has been discovered: Basil* Ocimum basilicum *which is easier to cultivate and propagate than several other species tested (Anon., 2003; Maia* et al., *2004).* *Coppen (1995) reported that where there has been exploitation, the population is devoid of mature trees and significant signs of regeneration are absent. However, more recent field studies made by the National Institute for Amazonian Research (INPA) and the Center for Agroforestry Research of Amazonas (EMBRAPA-CPAA) found evidence of natural regeneration (May and Barata, 2004); although it is irregular and infrequent (Sampaio* et al., *2003).* *It is proposed that* A. rosaeodora *be included in Appendix II with the following annotation:* *#11 Designates logs, sawn wood, veneer sheets, plywood and* ***essential oil.*** *However the current annotation #11 reads as follows:* *#11 Logs, sawn wood, veneer sheets, plywood,* ***powder and extracts.*** *Therefore the annotation proposed by Brazil would need to bear a different number if the purpose of the proposal is to cover 'essential oil' and not 'powder and extracts' and therefore essential oils would be covered as "extracts".*

Reviewers:
B. Hawkins, S. Oldfield, TRAFFIC South America

Inclusion of *Senna meridionalis* in Appendix II

Proponent: Madagascar

Summary: *Senna meridionalis* is a deciduous much-branched shrub or shrubby tree, two to five metres tall found only in Madagascar. It is one of 250 or so species of *Senna*, a genus of leguminous plants widespread in the tropics. The species has a relatively extensive but fragmented distribution in southern and western Madagascar, growing mainly on calcareous soils in arid and semi-arid areas in deciduous forest and thorny scrub. Its extent of occurrence is likely to exceed 12000 km^2. It appears to be at least locally common and is reported from at least two protected areas (Tsimanampetsotsa National Park and Cap Sainte Marie Special Reserve). Regeneration from seed is said generally to be good.

Senna meridionalis has a bonsai-like appearance and is in some demand for the international horticultural trade, chiefly grown by hobbyists. It does not appear to be widely available at present (late 2009). The plant is reported to be collected particularly from the Table de Toliara mountain near Toliara in south-west Madagascar. Malagasy authorities report the export of some 700 in the period 2003–2006, most of these (just under 400) in 2004. It may be assumed that some or all of these were wild-collected plants. The species can reportedly be propagated from both seeds and cuttings.

Analysis: *Senna meridionalis* has a wide but apparently fragmented distribution in southern and western Madagascar. Data on population status are sparse, but the species appears to be at least locally common. It is in international trade as a horticultural plant, with at least some of that trade in wild collected plants. However, reported volumes of trade are low and the plant is reportedly easy to propagate. It seems unlikely that harvest for trade is reducing the species to a level at which it might become eligible for inclusion in Appendix I in the near future, or that such regulation is needed to ensure that harvest from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Formerly known as Cassia meridionalis*; placed in Senna by Du Puy (1995).*
	Range
Madagascar	
	IUCN Global Category
	Not assessed

Supporting Statement (SS)	Additional information
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
The species has a very fragmented distribution in the south (Table de Toliara mountain) and south-west (Tsingy de Bemaraha). In a 2006 survey, around 420 individuals, of which 150 were mature, were counted at Ahaviro on the Table de Toliara mountain. The species regenerates easily by seed, but collectors tend to take all the specimens they find at a given site, without leaving young plants to ensure succession. This may lead to long-term decline in the population. The form from the Table de Toliara is particularly highly sought after and occurs in unprotected areas subject to considerable pressure, including fire. On the basis of fieldwork carried out in 2006, the species is considered to meet the IUCN Criteria for Vulnerable. Recorded exports are: 0 in 2003; 483 in 2004; 166 in 2005; 23 in 2006.	*Du Puy (2002) reported the species's distribution as south-west Madagascar, where it occurred on the Mahafaly Plateau from Toliara through Tsimanampetsotsa and Itampolo south to Cap Sainte Marie. Its habitat was xerophytic scrubland, usually on limestone but also on sand over limestone, often near the coast, at altitudes of up to 200 m. On the basis of this distribution, its extent of occurrence is likely to exceed 12 000 km^2.* *The species is thought likely not to be threatened at present (McGough, 2009).* *Tsingy de Bemaraha is considerably north of the above range; it is possible that the reference is in error for another protected area (Tsimanampetsotsa).*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
	The branches are used as poles in house construction (Du Puy, 2002).
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	
	Threats
Fragmented distribution.	*Natural habitats in southern Madagascar are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.*

Supporting Statement (SS)	Additional information
Conservation, management and legislation	
Occurs in the Tsingy de Bemaraha National Park.	*This may be in error for Tsimanampetsotsa, which is also a national park and where the species is known to occur. Cap Ste Marie, where the species is also recorded, is a special reserve.*
Captive breeding/artificial propagation	
.	*Can be propagated by seed and cuttings (Bihrmann, undates.).*
Other comments	

Reviewers:
TRAFFIC East/Southern Africa.

Amend the annotation to the listing of Orchidaceae included in Appendix I, as follows:

Delete the current annotation, which states:

For all of the following Appendix-I species, seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers are not subject to the provisions of the Convention.

Replace with the following new annotation:

For all of the following Appendix-I species, seedling or tissue cultures obtained in vitro, in solid or liquid media, and transported in sterile containers are not subject to the provisions of the Convention only if the specimens meet the definition of 'artificially propagated' agreed by the Conference of the Parties

Proponent: The United States of America

Summary: Two genera (*Paphiopedilum* and *Phragmipedium*) and six other species in the family Orchidaceae are included in Appendix I. These and hybrids involving them are in considerable demand in horticulture and are traded in large quantities (particularly *Paphiopedilum* and *Phragmipedium*). Much of the trade is in "flasked" specimens. These are defined more formally in the annotations to the Appendices as: seedlings or plantlets raised from tissue culture grown in a sterile medium and transported in flasks, tubes or other small containers.

The Convention allows for the commercial trade in Appendix-I plant species in Article VII, paragraph 4 which states: "Specimens of [….] a plant species included in Appendix I artificially propagated for commercial purposes, shall be deemed to be specimens of species included in Appendix II." However, no definition of artificially propagated is provided in the Convention text itself.

On the understanding that flasked specimens of orchids are artificially propagated, the Parties have gone one step further and in 1995 exempted such specimens from the provisions of the Convention, as described in the annotation which currently states:

For all of the following Appendix-I species, seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers are not subject to the provisions of the Convention.

In parallel to this, the Parties have established quite a strict set of criteria for the definition of "artificially propagated", contained in *Resolution Conf. 11.11 (Rev. CoP14)*. Under these criteria, it is not necessarily the case that all flasked orchid specimens would meet the definition of artificially propagated under CITES. In particular, seed or tissue must be obtained from specimens exempt from the provisions of the Convention or cultivated parental stock (itself subject to definition in the Resolution). It recommends that an exemption to this, that is the use of seeds from wild plants, only be granted as long as such collection was legal and the relevant Scientific Authority had determined both that collection was non-detrimental to the wild population and trade in specimens would have a positive effect on conservation of wild specimens (entailing reintroduction and establishment of cultivated sources of propagules for the future).

The Parties have specifically drawn attention to this in *Resolution Conf. 11.11 (Rev. CoP14)* in the following paragraph:

> *"**Regarding flasked seedlings of Appendix-I orchids***
> RECOMMENDS that flasked seedlings of orchid species included in Appendix I obtained *in vitro*, in solid or liquid media, and transported in sterile containers, be interpreted as being exempt from CITES control only if they have been artificially propagated in accordance with the definition provided

above, taking into account the provisions of Article VII, paragraph 4, and Article I, paragraph (b) (iii), and agreeing to a derogation from *Resolution Conf. 9.6 (Rev.)* for this exemption;"

However, this understanding is not explicit in the relevant annotation text in the Appendices. The current proposal aims to rectify this.

Analysis: This proposal aims to ensure that the annotation in the Convention regarding specimens of Appendix-I listed orchids is in accordance with a Resolution that refers to the same specimens.

Its effect is to underline the fact that Parties should only treat flasked specimens of Appendix-I listed orchids as exempt from the provisions of the Convention if they are satisfied that they are "artificially propagated" as defined in *Resolution Conf 11.11. (Rev. CoP14).* This provision is theoretically already in force. In practice, it is unlikely to be adhered to and indeed its strict implementation seems likely to cause enforcement problems. A flasked specimen is clearly distinguishable from any other kind of specimen, and is clearly not a wild-collected plant in any conventional sense. It is thus easy to enforce a simple exemption for flasked specimens. However, assessing whether such specimens meet the definition of "artificially propagated" outlined above and set out in detail in *Resolution Conf 11.11. (Rev. CoP14)* (see below) is far from straightforward and cannot be done merely by inspecting a specimen or shipment. This may place a considerable onus on enforcement and implementation agencies.

Exemptions for "flasked" specimens using the same wording apply to Appendix-II listed plants covered by annotations #1 and #4. These are not specifically referred to in *Resolution Conf 11.11 (Rev. CoP14)*, nor are they specifically referred to as "artificially propagated" and so there remains ambiguity about whether these too may be expected to be covered by the definition of "artificially propagated" adopted in that Resolution.

Additional Information

***Resolution 11.11 (Rev. CoP14)* provides the following text:**

"Regarding the definition of 'artificially propagated'

ADOPTS the following definitions for terms used in this Resolution:

a) 'under controlled conditions' means in a non-natural environment that is intensively manipulated by human intervention for the purpose of plant production. General characteristics of controlled conditions may include but are not limited to tillage, fertilization, weed and pest control, irrigation, or nursery operations such as potting, bedding or protection from weather; and

b) 'cultivated parental stock' means the ensemble of plants grown under controlled conditions that are used for reproduction, and which must have been, to the satisfaction of the designated CITES authorities of the exporting country:

i) established in accordance with the provisions of CITES and relevant national laws and in a manner not detrimental to the survival of the species in the wild; and

ii) maintained in sufficient quantities for propagation so as to minimize or eliminate the need for augmentation from the wild, with such augmentation occurring

only as an exception and limited to the amount necessary to maintain the vigour and productivity of the cultivated parental stock;

DETERMINES that the term ‘artificially propagated’ shall be interpreted to refer to plant specimens:

a) grown under controlled conditions; and

b) grown from seeds, cuttings, divisions, callus tissues or other plant tissues, spores or other propagules that either are exempt from the provisions of the Convention or have been derived from cultivated parental stock;

DETERMINES that plants grown from cuttings or divisions are considered to be artificially propagated only if the traded specimens do not contain any material collected from the wild; and

RECOMMENDS that an exception may be granted and specimens deemed to be artificially propagated if grown from wild-collected seeds or spores only if, for the taxon involved:

a) i) establishment of a cultivated parental stock presents significant difficulties in practice because specimens take a long time to reach reproductive age, as for many tree species;

ii) the seeds or spores are collected from the wild and grown under controlled conditions within a range State, which must also be the country of origin of the seeds or spores;

iii) the relevant Management Authority of that range State has determined that the collection of seeds or spores was legal and consistent with relevant national laws for the protection and conservation of the species; and

iv) the relevant Scientific Authority of that range State has determined that:

A. collection of the seeds or spores was not detrimental to the survival of the species in the wild; and

B. allowing trade in such specimens has a positive effect on the conservation of wild populations;

b) at a minimum, to comply with paragraph iv) A. and B. above:

i) collection of seeds or spores for this purpose is limited in such a manner such as to allow regeneration of the wild population;

ii) a portion of the plants produced under such circumstances is used to establish plantations to serve as cultivated parental stock in the future and become an additional source of seeds or spores and thus reduce or eliminate the need to collect seeds from the wild; and

iii) a portion of the plants produced under such circumstances is used for replanting in the wild, to enhance recovery of existing populations or to re-establish populations that have been extirpated; and

c) in the case of operations propagating Appendix-I species for commercial purposes under such conditions they are registered with the CITES Secretariat in accordance with *Resolution Conf. 9.19 (Rev. CoP13)* on Guidelines for the registration of nurseries exporting artificially propagated specimens of Appendix-I species"

Reviewers:
TRAFFIC East/Southern Africa

Inclusion of seeds of *Beccariophoenix madagascariensis* in Appendix II

Proponent: Madagascar

Summary: *Beccariophoenix madagascariensis* is a palm from Madagascar that was included in Appendix II in 2002. The listing was unannotated, so that all readily recognizable parts and derivatives were included in the listing. At CoP14 in 2007 a proposal (no 27) was put forward to amend, amongst other things, annotation #1. *B. madagascariensis* was erroneously included in a list of species that already had this annotation. When the proposal was discussed in Committee I at CoP14, the Secretariat sought clarification on the inclusion of this species in the proposal. The only recorded intervention was from Germany, who recommended that it be retained (CoP14 Com. I Rep. 5 (Rev. 1), p. 1). This part of the proposal being approved, *B. madagascariensis* was then included in the Appendices with new annotation #1, namely:

> All parts and derivatives, except:
> a) seeds, spores and pollen (including pollinia);
> b) seedling or tissue cultures obtained *in vitro*, in solid or liquid media, transported in sterile containers;
> c) cut flowers of artificially propagated plants; and
> d) fruits and parts and derivatives thereof of artificially propagated plants of the genus *Vanilla*.

This change represented a substantive change in the listing for *Beccariophoenix madagascariensis* with no, or at best extremely limited, consultation with the range State, and based on an error in a proposal. The supporting statement for the original proposal to list *B. madagascariensis* (along with a number of other Malagasy palms) submitted at CoP12 makes it clear that seeds (and possibly seedlings) are the only items known to be in trade from wild populations and were as such intended to be covered by the listing.

Beccariophoenix madagascariensis is a very rare palm known from a few sites in eastern Madagascar. The genus is endemic to Madagascar, and includes two other taxa, *B. alfredi* and an unnamed form. Neither is currently included in the CITES Appendices. *B. madagascariensis* is sought after in the international horticultural trade and is propagated by seed. Currently there are not known to be any seed-bearing plants outside Madagascar, nor any in cultivation in Madagascar, although cultivated plants have recently begun to flower abundantly and may be expected to seed soon (Dransfield, 2010). Virtually all trade recorded in the CITES trade database in the period 2003–2007 was in seeds, with Madagascar reporting the export of just over 70 kg, most in 2007 and 2008 (the latter probably based on permits issued in 2007 before the exemption resulting from the CoP14 decision came into force). All this was of wild origin. Importing countries, chiefly the USA, have reported import of a few kilogrammes of seeds and a few thousand seeds, almost all in the period 2003–2006 (presumably having stopped recording seeds from 2007 onwards).

In addition to being used in the horticultural trade, Dransfield and Beentje (1995) report that the species has been used locally in house construction and (destructively) harvested for the extraction of palm hearts, eaten locally. Young leaflets were sought after for the production of “manarano” hats which were formerly exported in quantity, harvest for this being believed to be a major cause of the present rarity. A very small number of leaves has been reported in trade under CITES, all for scientific purposes.

Analysis: This proposal restores what appears to have been the original intent of the listing of *Beccariophoenix madagascariensis*, in that it would now cover what is evidently the main part and derivative in trade. Seeds of *Beccariophoenix* spp. are relatively easy to distinguish from those of other palms, but not from each other. However under the terms of *Resolution Conf. 9.6 (Rev.)* seeds of *B. madagascariensis* would fit the definition of readily recognizable.

Reviewers:
W. Baker, J. Dransfield, TRAFFIC East/Southern Africa.

Inclusion of seeds of *Dypsis decaryi* in Appendix II

Proponent: Madagascar

Summary: *Dypsis decaryi*, known in CITES standard taxonomy as *Neodypsis decaryi,* is a palm species endemic to Madagascar, where it is found in one small area in the south-east. Part of the population occurs in a protected area covering 500 ha (a parcel of land forming part of the much larger Andohahela National Park complex), the remainder just outside the protected area. The palm grows on slopes in dry forest or bush on stony soil at altitudes of 80–600 m.

Neodypsis decaryi is very widely grown as an ornamental in tropical and subtropical countries around the world, including in Madagascar itself. It is propagated by seed, which has been collected from the wild population and exported in large quantities. Seed from plants cultivated outside Madagascar is also widely available and is almost certainly in international trade. Within its range the leaves are used for thatching and the fruits eaten by children (Dransfield and Beentje, 1995). In the mid-1990s, the population outside the protected area was reported to be declining, chiefly because of fire and grazing by livestock. Inside the protected area, the population appeared secure (Ratsirarson *et al.*, 1996).

The species was included in Appendix II in 1975. The listing did not have an annotation, meaning that under the terms of the Convention, all parts and derivatives were included. In 1985, it was annotated with the general annotation applied to Appendix II-listed plants at that time, which amongst other things excluded seeds. This may have been unwitting, as seeds were, and always have been, the only wild specimens regularly in trade. The listing is currently covered by annotation #1. There is no indication of any large-scale collection of wild plants for international trade.

Despite their being exempted from the provisions of the Convention, some trade in seeds is included in the CITES trade database. Madagascar reported the export of 700 kg of seeds in the period 1989–1990 and 570 kg in the period 2006–2008 (the latter declared as of wild origin, with no source provided for the former), and the USA reported export of 1500 seeds to Colombia in 1989.

Analysis: This proposal is to alter the scope of an Appendix-II listing in terms of the parts and derivatives to which it applies. It does not alter the species listing itself, so that the criteria in *Resolution Conf. 9.24 (Rev. CoP14*) are not relevant.

Seeds are the primary commodity in international trade from the wild population and harvesting of seed could, in theory, have an impact on the population (although is believed not to be detrimental at present). There is trade in seed harvested from artificially propagated plants in non-range States. This trade has no impact on wild populations. To ease enforcement, the proposal could be amended to refer only to Madagascan populations.

Six other species of palm from Madagascar are currently included in Appendix II without an annotation, so that all their parts and derivatives (including seeds) are covered by the provisions of the Convention. A seventh, *Beccariophoenix madagascariensis,* is currently covered by annotation #1, which exempts various parts and derivatives, including seeds. It is the subject of proposal Prop. 32, to remove the annotation, at CoP15. Annotation #1 is also the subject of a proposal (Prop. 25) to be considered at the present CoP.

Seeds of *Neodypsis decaryi* are similar to those of several other *Neodypsis* (or *Dypsis*) species, but under the terms of *Resolution Conf 9.6 (Rev.)* would be classifed as readily recongizable.

Reviewers: TRAFFIC East/Southern Africa.

Inclusion of *Adenia firingalavensis* in Appendix II

Proponent: Madagascar

Summary: *Adenia firingalavensis* is a succulent plant from Madagascar. It is one of 100 or so members of *Adenia*, a genus widespread in Madagascar and Africa, and is reportedly widespread in the western part of Madagascar from the far north to the south, growing in shade in dry forest, scrub and rocky areas at altitudes of 0–500 m. It produces a bottle-shaped trunk up to two metres tall and 30 cm in diameter, from which grow vine-like branches up to 3.5 m in length. It is reportedly slow-growing and at least locally shows poor regeneration rates. It can be locally common and occurs in a number of protected areas. It is in some demand internationally as a horticultural plant, grown chiefly by specialist collectors of succulents. The CITES Management Authority of Madagascar records the export of some 550 specimens in the period 2003–2006, most of these (around 360) in 2004. Only 10 were recorded in trade in 2006. It may be assumed that most or all of these were wild-collected plants. The species can be propagated by both seeds and cuttings.

The species resembles *A. olaboensis*, which is proposed for inclusion in Appendix II (see Prop. 35), and a number of other Malagasy *Adenia* species, which are not proposed for inclusion in the Appendices, some of which are very rare and some of which may be exported under its name.

Analysis: *Adenia firingalavensis* is a widespread and apparently at least locally common species in Madagascar. The species is in apparently limited trade for horticulture. There is no evidence of extensive or intensive harvest for domestic use. Given its widespread distribution, its presence in a number of protected areas and the limited recorded amount of export trade, it seems very unlikely that harvest for trade is reducing the species to a level at which it might become eligible for inclusion in Appendix I in the near future, or that such regulation is needed to ensure that harvest from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Range
Madagascar	
	IUCN Global Category
	Not currently listed

Supporting Statement (SS)	Additional information
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
Reported from the Mikea and Andoharano forests north of Toliara and in the Ankarana and Analamerana Special Reserves and Montagne d'Ambre National Park in Antsiranana Province. One population of 150 specimens is known from north of Toliara. The species grows slowly and appears to show poor regeneration. Following field studies in 2006, the species was regarded as meeting the criteria for vulnerable under the IUCN Red List categories and criteria. Reported exports: 18 in 2003; 358 in 2004; 168 in 2005; 10 in 2006. Populations have been reduced in areas where the species is collected for export; because there is no control, collectors tend to take all the specimens they come across and it is difficult to distinguish between young specimens and mature ones in the field.	*Occurs to 500 m (Eggli, 2002). Hearn (2009) reports the species to be locally common and more widespread than is indicated in the supporting statement.*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
The population is not significantly exploited locally. The bark, which is toxic, is used to treat scabies.	
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	

Supporting Statement (SS)	Additional information
Threats	
A. firingalavensis is a shade-loving species, therefore it is more sensitive to habitat disturbance than others.	
Conservation, management and legislation	
Reported from protected areas of Montagne d'Ambre,'Ankarana and Analamerana in the far north.	*Also reported from the Tsingy de Bemaraha and Tsingy de Namoroka, both of which are protected areas (website www.madagaskar.com)*
Captive Breeding/Artificial Propagation	
.	*Can be propagated from cuttings and seed (Bihrmann, undated).*
Other comments	
	Offered for sale in the USA at USD30–60 retail, a comparatively low price compared with other Adenia *species offered by the same supplier. Specimens were also observed for sale at EUR89.* *Currently around 18 species of* Adenia *native to Madagascar are recognized, all endemic (efloras website).* *Hearn (2006) reports that morphological and molecular evidence suggest that the form often known as* Adenia firingalavensis *var.* stylosa *is in fact a separate species,* A. stylosa. *Hearn (2009) notes that there are Malagasy* Adenia *species (*A. epigea, A. litoralis, A. stylosa, A. boivinii, A. lapiazicola, *and* A. metamorpha*) resembling* A. firingalavensis *and* A. olaboensis *that are exceptionally rare and/or locally endemic. Based on his observations of the succulent trade, many very rare* Adenia *are imported as* Adenia sp. *or* Adenia firingalavensis

Reviewers:
TRAFFIC East/Southern Africa.

Inclusion of *Adenia olaboensis* in Appendix II

Proponent: Madagascar

Summary: *Adenia olaboensis* is a large, trunk-forming vine from Madagascar. It is one of around 100 species in *Adenia,* a genus that is widespread in Africa and Madagascar, of which around 18 species are endemic to Madagascar. It has a generally trailing main stem, which may reach a length of around four metres and diameter of 40 cm, from which grow secondary trunks and lianas that may reach lengths of several metres. The species is reported to be widely distributed in central and western Madagascar, with records from the provinces of Mahajanga in the north-west, Toliara in the south-west and Fianarantsoa in the south-east. It apparently grows on a wide range of substrates, including both calcareous soils and sandstones, in dry forests, scrub and secondary forest, and grassy savanna. The species is regarded as a fetish plant by the Sakalava people and is cultivated around houses and tombs. It is in some demand internationally as a horticultural plant, grown chiefly by specialist collectors of succulents. The Malagasy CITES Management Authority has recorded limited export in the period 2003–2006 (approximately 100 in 2003, 400 in 2004, 200 in 2005 and none in 2006). A significant proportion and possibly all of these are very likely to have been wild-collected. It is currently available internationally, though not widely, at moderate prices (EUR50, USD 50–175). The species resembles *A. firingalavensis*, which is proposed for inclusion in Appendix II (see Prop. 34), and a number of other Malagasy *Adenia* species, which are not proposed for inclusion in the Appendices, some of which are very rare and some of which may be exported under its name.

Analysis: *Adenia olaboensis* is a widespread and locally common plant, known to occur in at least one protected area and probably others. It is cultivated locally and is recorded as exported in relatively small numbers, almost certainly as wild plants, for the international horticultural trade. It reaches a considerable size, and large mature specimens are highly unlikely to be collected for export. It seems unlikely that regulation of international trade is needed to ensure that the species does not become eligible for inclusion in Appendix I, or to ensure that harvest for trade does not reduce the population to a level at which its survival might be threatened by continued harvesting or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Range
Madagascar	
	IUCN Global Category
	Not assessed

Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Widely distributed in Madagascar; found in the provinces of Toliary, Mahajanga and Fianarantsoa. Recorded in the district of Betioky at Ampandrandava, north of Belo sur Tsiribihina and at Antsalova.

Reported exports: 109 in 2003; 387 in 2004; 184 in 2005; 0 in 2006.

Occurs to 1000 m, possibly 1500 m (Eggli, 2002).

The species is locally common and more widespread than is indicated in the supporting statement (Hearn, 2009).

It occurs in secondary forest (www.madagaskar.com).

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

The plant is cultivated by the Sakalava people, who regard it as a fetish plant, of symbolic importance.

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Other information

Threats

Natural habitats in Madagascar in general are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.

Conservation, management and legislation

Known to occur in Andohahela National Park in the south-east of Madagascar.

Captive Breeding/Artificial Propagation

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Propagation is reportedly by seed (caudiciform website).

Other comments

The Sakalava people believe that this species should be cultivated on the eastern side of a house (www.madagaskar.com).

Currently around 18 species of Adenia *native to Madagascar are recognized, all endemic (efloras website, Hearn, 2004).*

Hearn (2009) notes that there are Malagasy Adenia *species* (A. epigea, A. litoralis, A. stylosa, A. boivinii, A. lapiazicola, A. metamorpha) *resembling* A. firingalavensis *and* A. olaboensis *that are exceptionally rare and/or locally endemic. Based on his observations of the succulent trade, many very rare* Adenia *are imported as* Adenia sp. (*or* Adenia firingalavensis).

Reviewers:
TRAFFIC East/Southern Africa

Inclusion of *Adenia subsessifolia* in Appendix II

Proponent: Madagascar

Summary: *Adenia subsessilifolia* (the name *subsessifolia* in the proposal is evidently a typographic error) is a succulent found in Madagascar, one of around 100 species of *Adenia,* a genus widespread in Madagascar and Africa, of which around 18 species are endemic to Madagascar. It produces stems up to 1.5 m long from a tuberous rootstock up to 30 cm in diameter. It grows on rocky substrates in open scrub and is reasonably widespread in south and south-west Madagascar at altitudes of up to 300 m. At least one population is known in a protected area (Cap Ste Marie). The number of mature individuals recorded at three sites in field work in 2006 was low (100 at one site, fewer than 50 at each of the other two), although the species has also been reported as at least locally common. The species is in international trade as a horticultural plant, chiefly grown by specialist collectors of succulents. The CITES Management Authority of Madagascar has recorded a small number of specimens (126) exported in the period 2003–2006, virtually all (115) in 2004. Collection of wild specimens reportedly takes place on the Table de Toliara Mountain where there are apparently indications of local depletion. Propagation is by seed. The species is available as artificially propagated plants at relatively low prices in both the USA (USD8) and Europe (EUR12).

Analysis: *Adenia subsessilifolia* is a reasonably widespread plant in south and south-west Madagascar. There are conflicting reports regarding its abundance. The species is in trade, although reported volumes of trade are small, and artificially propagated plants are available at relatively low prices in market countries. Although there are reports of local depletion at one locality, it seems unlikely that harvest for trade is reducing the species to a level at which it might become eligible for inclusion in Appendix I in the near future, or that such regulation is needed to ensure that harvest from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Range
Madagascar	
	IUCN Global Category
	Not assessed.

Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Known from south and south-west Madagascar, from the Table de Toliara Mountain, Cap Ste Marie Special Reserve and Behara Amboasary Sud. Three sub-populations are known. The wild population is believed to be small. Around 100 specimens have been counted on the Tulear Plateau and there may be fewer than 50 mature individuals at both Cap Ste Marie and Behara Amboasary Sud. Regeneration is poor because of habitat disturbance. Collection takes place on the Table de Toliara Mountain, where there is evidence of depletion of wild populations. It is difficult to distinguish juvenile from mature plants in the wild and collection may reduce the number of seed-bearing plants in the population. Assessed as meeting the IUCN criteria for Vulnerable on the basis of field studies carried out in 2006. Reported exports: none in 2003; 115 in 2004; three in 2005; eight in 2006.	*Hearn (2009) reports the species to be at least locally common and to be more widespread than is indicated in the supporting statement.*

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

The tuber is not edible. Powdered stem is used to treat wounds.	

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Other information

Threats

Natural habitats in southern Madagascar are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.

Conservation, management and legislation

Occurs in Cap Ste Marie special reserve.

Captive Breeding/Artificial Propagation

Propagation is by seed, which is commercially available.

Other comments

There are currently around 18 recognized species of Adenia *native to Madagascar, all of which are endemic (efloras website, Hearn, 2004).*

Reviewers:
TRAFFIC East/Southern Africa.

Deletion of Marsh Rose *Orothamnus zeyheri* from Appendix II

Proponent: The Republic of South Africa

Summary: Marsh Rose *Orothamnus zeyheri* is a rare and localized plant that occupies around 23 km^2 in two small areas in the southwestern Cape, South Africa. It is an erect shrub, up to five metres tall, and has attractive pink flowers that last well when cut. During the first half of the 20th century, large-scale and indiscriminate cutting of flowers for the domestic market killed off most of the plants. Harvesting was prohibited in 1938 but, evidently because of inappropriate fire management, the population did not recover and, by 1967, the species was thought to be on the brink of extinction. Protection and improved management measures have subsequently been put in place which appear to have been successful. Currently, *O. zeyheri* is protected by the *Cape Nature and Environmental Conservation Ordinance 19* of 1974. Public access to the Kogelberg, where the main population occurs, is strictly controlled to ensure that no wild-harvesting for the cut-flower market or other human disturbance takes place. Fire frequency is restricted to a 15–20 year period, favoured by the species, and any invasive plants are removed. Currently a fungal root pathogen *Phytophthora cinnamomi* is the most serious known threat to the species. Cape Nature monitors the population annually and has found no evidence of decline in known populations. The geographic range has not changed in the last 150 years. The taxon is listed in the African Proteaceae Red Data List (in prep.) as "vulnerable", assessed according to the IUCN Categories and Criteria. This assessment will be submitted for inclusion in *The IUCN Red List of Threatened Species*. It is not listed in the Threatened and Protected Species List of South Africa's *National Environment Management: Biodiversity Act* and is not specifically protected under this legislation.

Orothamnus zeyheri was listed in Appendix I in 1975 because of an initial misunderstanding by the South African Management Authorities regarding the purpose of CITES. The transfer to Appendix II in 1997 was a precautionary measure as specified in Annex 4 (A. 1.) of *Resolution Conf. 9.24 (Rev. CoP14)*. According to the CITES trade database there has been only one record of international trade since 1975 (in 1981). There are domestic protection measures in place to control any trade that might occur as a result of removal from the Appendices. Illegal trade is considered very unlikely to occur. Grafting has been found to be a successful propagation method and it would be feasible to set up a commercial propagation programme to meet any future demands for flowers and plants.

Analysis: *Orothamnus zeyheri* has a restricted range. At one time considered to be on the brink of extinction, the population has increased through strict control. There has been almost no recorded trade since the species was listed in Appendix I in 1975. In 1997 the species was moved to Appendix II in accordance with the precautionary measures in *Resolution Conf 9. 24 (Rev. CoP14)* that specify that, in order to remove a species from Appendix I, it shall first be transferred to Appendix II. Since that time no international trade in wild specimens of this species has been reported. It is unlikely that removal from the CITES Appendices will stimulate trade. Effective domestic protection measures are in place: access to the natural populations is strictly controlled and harvesting from the wild continues to be prohibited. The species therefore no longer appears to meet the criteria for inclusion in Appendix II.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
South Africa.	

Supporting Statement (SS)	Additional information
IUCN Global Category	
	Not assessed
Biological and trade criteria for retention in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
Orothamnus zeyheri is known only from two small areas in the southwestern Cape, South Africa: the high peaks of the Kogelberg Mountains (southern portion of the Hottentots Holland range) and a single small population on the Klein River Mountains near Hermanus, some 40 km to the east. It is not certain whether the latter population is natural or the result of a reintroduction. The species occurs within an area of approximately 196 km^2 and occupies an area of 23 km^2. No regulation is needed to prevent future inclusion in Appendix I. According to the CITES trade database, the only trade record was one shipment of live plants and 60 seeds in 1981. No trade has been recorded since. Illegal trade is very unlikely to occur given the current domestic controls on the species. Potential trade that may occur as a result of delisting should be controlled by the effective domestic protection measures in place. Such trade would be purely of artificially propagated material. In the African Proteaceae Red Data List which is currently in preparation, the proposed IUCN status is Vulnerable B1a(i)b(ii, iv, v)c(iv), B2a(i)b(ii, iv, v)c(iv) and C2a(i)b.	
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
No trade regulation is needed as strict domestic controls prevent harvest from the wild.	*Hilton-Taylor (2009) confirms that adequate domestic controls are in place to stop harvesting from the wild. The measures adopted have been very well enforced for many years and he does not consider there to be any reason for the situation to change.*
Retention in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under Res. Conf. 9.24 (Rev. CoP14) Annex 2 a or listed in Appendix I	
No other species could be confused with *Orothamnus zeyheri.*	

Supporting Statement (SS)	Additional information
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
There are no reasons to continue to include *Orothamnus zeyheri* in Appendix II as there is no trade in the species and any future trade that may occur would be purely of artificially propagated material.	

Other information

Threats

The most serious current threat is from *Phytophthora cinnamomi,* a fungal root pathogen which has been found in a number of populations. During the first half of the 20th century, the attractive flowers and their exceptional lasting qualities in a vase led to indiscriminate picking and peddling of *Orothamnus zeyheri,* which killed the plants. Trampling and disturbance around the plants causes root damage and soil compaction leading to the death of plants. Picking and peddling were largely stopped by the *1938 Cape Provincial Wild Flower Protection Ordinance No. 15*. Around the same time, the Department of Forestry enforced a policy of strict fire protection in Fynbos, with the object of protecting the Cape flora. Populations of *O. zeyheri* continued to decline alarmingly. In the late 1960s it was realized that fires were necessary at suitable intervals (during hot summers once every 15 years is the optimum) to ensure regeneration and good recruitment. The marsh rat *Otomys saundersiae* was responsible for the destruction of more than half of the plants in one population, although later some re-sprouted.	*Potential visitor pressure as the species is highly charismatic. Seasonal fire and predation of the seed bank by baboons are given as additional threats by Rebelo* et al. *(2009). Boucher (1997) and Brits (1997) observed that occasional illegal picking of single blooms takes place for private purposes. As the exact localities of the populations are confidential and access is restricted, the likelihood of illegal collection is low (Brits, 1997).*

Conservation, management and legislation

Both populations occur within conservation areas: the Kogelberg Biosphere Reserve and the Maanskynkop Nature Reserve which are managed by Cape Nature. Strict controls imposed in 1938 by the Department of Forestry and now maintained by Cape Nature ensure that no harvesting from the wild takes place. In 1967 when the species was thought to be on the brink of extinction, the Kogelberg reserve was closed to the public for five years and the known sites were fenced off. Regular patrols were implemented to safeguard the surviving plants and a series of controlled block burns were started. Hoeing of the fenced area resulted in the appearance of seedlings, and bee hives were introduced into the area to enhance pollination. In 1971, the closure was extended indefinitely, except by permit for research purposes. Access to the Kogelberg has since increased, but the plants are still strictly protected. All these measures have been successful. At present, fire frequency is restricted to 15–20 year intervals, wildfires are controlled, invasive alien plants are cleared from the area and access is still strictly controlled.	Orothamnus zeyheri *was listed as Rare in* the Red Data List of Southern African Plants *(Hilton-Taylor, 1996), and also listed in the* Red List of South African Plants 2009 *(Raimondo* et al. *in press; Foden, 2009).* *Newton (2009) points out that* Orothamnus zeyheri *is not listed in* the Threatened and Protected Species List of South Africa's National Environment Management: Biodiversity Act *and so is not protected by this legislation.* *The exact localities of the populations are confidential, in addition to access being restricted (Brits, 1997).*

Supporting Statement (SS)	Additional information
Orothamnus zeyheri was protected from international trade by its listing on CITES. Appendix I from 1975 to 1997 and on CITES Appendix II from 1997 onwards. The species is listed as 'Endangered Flora' in terms of the 1974 *Cape Nature and Environmental Conservation Ordinance 19.* This means no person without a permit may possess, sell, donate, receive as a donation, pick, or import into, export from, or transport through the province the species. Protection programmes have been so successful that the conservation status of the species was changed from Endangered to Rare in the 1996 Red Data List of southern African plants. The proposed status for the latest Red Data list is Vulnerable. The Kogelberg populations are now annually monitored by Cape Nature.	
Captive Breeding/Artificial Propagation	
Much research has been carried out on *Orothamnus* propagation, including grafting onto other members of the Proteaceae e.g. *Leucospermum conocarpodendron* and *L. cordifolium*, which are less susceptible to trampling and fungal attack. Many hundreds of grafted plants were produced and distributed by the then Cape Nature Conservation Department's nursery in the late 1970s, to interested commercial growers. Grafted plants do not live more than a few years, but as regrafting is a relatively straightforward procedure, a continuous supply can be maintained. It would be quite feasible to set up a commercial propagation programme to meet demands for flowers and plants. Grafted plants are in cultivation at Kirstenbosch National Botanical Garden and the Agricultural Research Council at Elsenburg.	*At the present time there appears to be no demand for wildflowers or grafted flowers.* *Hilton-Taylor (2009) notes that flowers of cultivated* Orothamnus zeyheri *are equally as attractive and colourful as wild flowers.*
Other comments	
It is unlikely that removal from CITES will stimulate trade because access to the natural populations is strictly controlled and there is adequate domestic legislation to protect this species. As such, CITES listing is not necessary.	*Given the limitations on public access to the areas where this species grows, the largely inaccessible nature of these areas, plus the domestic legislative measures in place which are well enforced, Hilton-Taylor (2009) believes it is highly improbable that the removal of the species from CITES will stimulate any trade in this species.*

Reviewers:
C. Hilton-Taylor, TRAFFIC East/Southern Africa.

Deletion of Swartland Sugarbush *Protea odorata* from Appendix II

Proponent: The Republic of South Africa

Summary: Swartland Sugarbush *Protea odorata* is an extremely rare shrub that occurs only in the Western Cape Province, South Africa. Currently the only known population, estimated in 2002 at 27 plants, is restricted to a single location. Historically it was known from five populations between the towns of Paarl and Malmesbury in the west coast lowlands. The species has specific habitat requirements, being found only in West Coast Renosterveld, a vegetation type, which has been severely reduced and highly fragmented by agricultural activities. The few remaining fragments are all either heavily over-grazed or densely invaded by the Australian tree *Acacia saligna.* The single location where the species now occurs is privately owned and there is very little likelihood that this land will be purchased for conservation. The taxon is difficult to propagate and artificially propagated material is scarce. Recent attempts to establish the species at nature reserves have failed. Seed is stored in the Millennium Seed Bank at the Royal Botanic Gardens, Kew and is available for reintroduction programmes. The South African National Biodiversity Institute and Custodians for the Rescue of Endangered Wildflowers are actively involved in monitoring *P. odorata*, and are liaising closely with South African conservation authorities to implement an action plan to conserve the species.

As it is fairly nondescript, without any scent and with very small flowers, *Protea odorata* has attracted very little attention from horticulturalists or cut-flower growers. One very limited attempt to commercialize the species in South Africa in the early 1980s failed because there was no demand for it. There has been no recorded legal or illegal international trade. The species was listed in Appendix I in 1975 because of an initial misunderstanding by the South African Management Authorities regarding the purpose of CITES. It was transferred to Appendix II in 1997 under the precautionary measures specified in Annex 4 (A. 1.) of *Resolution Conf. 9.24 (Rev CoP14).* National legislation is regarded as sufficient to protect the species from any collection or trade pressure that may occur in the future. If removed from the Appendices, the species would remain in the “Protected Species” category of the Threatened and Protected Species list of the *National Environment Management Biodiversity Act*. It would also still be protected by the Cape Nature and Environmental Conservation Ordinance 19 of 1974, and so be subject to strict controls, including the need for permits in order to pick or sell specimens. The Department of Agriculture has agreed not to issue any permit allowing further transformation into agricultural land of remaining natural vegetation in the area where the species occurs. The taxon is listed in the African Proteaceae Red Data List (in prep.) as “Critically Endangered”, assessed according to the IUCN Categories and Criteria and will be submitted for inclusion as such in *The IUCN Red List of Threatened Species*.

Analysis: *Protea odorata* has a highly restricted range and very small population size, occurring in a threatened habitat type on private land that is not formally protected. However, the species itself is legally protected and has never been recorded in trade, either legal or illegal. It is extremely unlikely that there will be any international demand for *P. odorata*, and its continued survival is dependent on the conservation of its habitat, rather than on control of trade. National legislation would appear to be sufficient to protect it from any collection pressure that may arise in the future. No other *Protea* species are listed in the CITES Appendices. More than two intervals between meetings of the Conference of the Parties have now passed since the species was transferred from Appendix I to Appendix II and it is highly unlikely there will be any future trade in this species. It would therefore be unlikely to qualify for inclusion in the Appendices in the near future. The species therefore does not appear to meet the criteria for inclusion in Appendix II.

Supporting Statement (SS)	Additional information
Taxonomy	

Supporting Statement (SS)	Additional information
Range	
South Africa	
IUCN Global Category	
	Not assessed.

Biological and trade criteria for retention in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Past distribution is poorly known; historically it was probably limited to an area of 30 km² on the lowlands between Paarl and Malmesbury towns in Western Cape Province of South Africa. How much of the former range it occupied is difficult to estimate, but it was fairly common at sites where it occurred. Now it only occurs at one of the five originally known sites (Joostenbergkloof) and occupies a couple of square metres in total. Six plants were recorded here in 1975. An initial count in 1998 revealed 22 plants and additional surveys increased this number to 34 plants. This declined to 27 plants in 2002.	*The taxon is difficult to transplant from the wild owing to its specific habitat requirements (Simpson, 1997).*
In the 1970s, the overall population may have numbered just over 1000 plants.	*There are no records of* Protea odorata *in the CITES trade database. The absence of international trade in* P. odorata *was confirmed by Western Cape Nature Conservation authorities (Simpson, 1997).*
In the African Proteaceae Red Data List, which is currently in preparation, the proposed IUCN status is Critically Endangered A2c, B1a(ii)b(i,ii,iii,v)c(iv), B2a(ii)b(i,ii,iii,v)c(iv), C1, C2a(i,ii) and D.	*Hilton-Taylor (2009) also confirms there is no trade for this species and never has been. He considers that as the flowers are small and largely nondescript, they are never likely to be in demand. Rebelo* et al. *(in prep.) describes the flowers as scentless, despite the plant's name.*
No regulation of trade in *Protea odorata* is necessary. There is no record in the CITES trade database of any trade in the species. No parts or derivatives are in trade. Illegal trade is highly unlikely, as the species is not sought after for horticulture or the cut-flower trade.	*The Botanical Society of South Africa does not advertize seeds of the species in its internationally distributed seed catalogue (Botanical Society of South Africa, 2009).*

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

No regulation of trade is necessary because *Protea odorata* is not harvested from the wild and is not sought after for horticulture. National regulations adequately protect the species.	*Hilton-Taylor (2009) is of the opinion that adequate domestic controls are in place and, as there is no demand for* P. odorata, *it is unlikely to ever be traded.*

Retention in Appendix II to improve control of other listed species

Supporting Statement (SS)	Additional information
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
There are no species in trade which could be confused with *Protea odorata.*	*No other* Protea *species are included in the CITES Appendices.*
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
There are no reasons to continue to include *Protea odorata* in Appendix II, as there is no trade in the species.	

Other information

Threats	
The main threats have been habitat loss owing to agriculture and invasion of remaining habitat remnants by the alien *Acacia saligna*. Road works at one site are known to have destroyed a population. Invasion of a fungal pathogen at another site (probably because of increased disturbance) also killed many plants. Brush-cutting to improve cattle grazing has had a negative impact. Although this species does require fire at 10–15 year intervals to ensure recruitment and regeneration, many of the remnants have been burnt at far more frequent intervals to create grazing for cattle and this is an additional threat.	*Other threats are browsing by sheep and cattle, causing destruction of the plants as well as soil compaction, dumping, water table depletion, habitat change leading to the development of a grassy understory, agriculture (planting of oats on one site) and possible golf course development (*Rebelo et al.*, in prep.).*
Conservation, management and legislation	
The single site where *Protea odorata* occurs is privately owned and there is very little likelihood it will be purchased for conservation purposes. One former site (Riverlands) is a proclaimed provincial nature reserve and active measures are being taken by Cape Nature to remove all alien vegetation and restore the reserve. The threat at all the sites caused by *Acacia saligna* invasion is slowly being reduced by the introduction of gall rust *Uromycladium tepperianum* as a biocontrol agent. An *ad hoc* reintroduction of around 10 plants that had been artificially propagated into a former site was attempted in 1990, but as there was no follow-up, the reproduction failed. *P. odorata* was protected from international trade by its listing in CITES Appendix I from 1975 to 1997 and in CITES Appendix II from 1997 onwards. Because of its CITES listing, this species is listed as “Endangered Flora” in terms of the 1974 *Cape Nature and Environmental Conservation Ordinance 19*. This means no person without a permit may possess, sell, donate, receive as a donation, pick, or import into, export from, or transport through the province the species. If removed from CITES completely, the species would fall into the “Protected Flora” category and would still be subject to strict controls, including the need for permits to pick or sell.	Protea odorata *is listed as Endangered in the* Red Data List of Southern African Plants *(Hilton-Taylor, 1996) and is also listed in the 2009 Red List of South African Plants (Raimondo* et al., *in press; Foden, 2009).* Protea odorata *is listed under the “Protected Species” category in the Threatened and Protected Species List of South Africa’s* National Environment Management: Biodiversity Act *(Newton, 2009).*

Supporting Statement (SS)	Additional information
Written permission is also required from the land owner concerned. The Department of Agriculture has agreed not to issue a permit allowing any further transformation of remaining natural vegetation into agricultural lands. There is adequate domestic legislation to protect the species. No controls on harvesting are necessary as the species is not sought after. Currently the South African National Biodiversity Institute and Custodians for the Rescue of Endangered Wildflowers (CREW) are actively involved in the monitoring, and are liaising closely with the conservation authorities to implement an action plan to save the species from extinction.	
Captive Breeding/Artificial Propagation	
Horticulturists at Kirstenbosch National Botanical Garden developed a successful method to germinate the species and to grow it from cuttings. Plants established from seeds obtained from the last remaining site are being propagated and it is intended to introduce them into the Durbanville and Briers Low Nature Reserves, the only suitable areas under conservation. A commercial wild flower farmer at Kaimansgat Nursery grew approximately 10 plants from seed in the early 1980s, but as there was no demand for the species in cut-flower form, he abandoned the plants. No plants are known to be in cultivation outside South Africa. Seeds and seedlings were originally included in the Fynbos genebank at Elsenberg (Dept of Agriculture) and seeds were collected for propagation at Kirstenbosch, but none survived.	Protea odorata *can be propagated and is usually grown from seed, but with difficulty. The taxon does not root easily and it sets few seeds, therefore artificially propagated material is scarce (Brits, 1997). Plants only produce seed in their third season of growth, and few viable seeds are produced, making seed collection rather difficult.* P. odorata *seeds are stored in the Millennium Seed Bank at the Royal Botanic Gardens, Kew and are available for reintroduction programmes for the species (Cowell, 2006; 2007).* *According to Rebelo* et al. *(in prep.), although there were 32 plants at Kirstenbosch National Botanic Centre in 2000, none remained in 2005. Attempts to establish a population at Riverlands Nature Reserve from seeds failed in 1990. At Briers Low Nature Reserve plants that were planted in winter 2005 and 2006 did not survive the following summer (Rebelo* et al.*, in prep.).*
Other comments	
The listing of *P. odorata* in Appendix I was because of an initial misunderstanding by the South African Management Authorities regarding the purpose of CITES. The downlisting to Appendix II in 1997 was a precautionary measure as specified in Annex 4 of *Resolution Conf. 9.24*. There is no reason to keep the species listed in any CITES Appendix, despite its being threatened with imminent extinction, as its continued survival is dependent on the conservation of its habitat, not control of trade in the species.	*More than two intervals between meetings of the Conference of the Parties have now passed since the species was transferred from Appendix I to Appendix II.*

Reviewers:
C.Hilton-Taylor, TRAFFIC East/Southern Africa.

Inclusion of *Cyphostemma elephantopus* in Appendix II

Proponent: Madagascar

Summary: *Cyphostemma elephantopus* is a succulent plant from Madagascar. It is one of 250 or so species of *Cyphostemma,* a genus in the grapevine family or Vitaceae that is widely distributed in the tropics, of which around 23 species occur in Madagascar. It forms a swollen trunk up to one metre in height and 20 cm in diameter at the base, from which extend vine-like branches up to two metres in length. Underground there is a large flattened tuber that may reach 1.3 m in diameter. It has a relatively restricted distribution in south-west Madagascar, where it is believed to occur over an area of 800 km^2, with known populations occupying some 20 km^2 (20 000 ha). It can be locally common, with densities of up to 400 plants per hectare. At one site sampled in 2005, the proportion of young plants in the population was low, indicating poor regeneration there. The habitats in some parts of its range are reported to be under threat from activities such as construction. It may occur in at least one protected area, although this is unconfirmed. No local use for the species is reported.

The species is in trade as an ornamental plant, grown chiefly by specialist collectors of succulents. Recorded exports from Madagascar in the period 2003–2006 amounted to around 750 plants, most of these (563) in 2004. It seems very likely that a large proportion, if not all of these, were wild-collected. Propagation is by seed and the plant is available, though apparently not widely, both as artificially propagated small plants and large, almost certainly, wild-collected specimens outside Madagascar.

Two other species of Malagasy *Cyphostemma* (*C. laza* and *C. montagnacii*) have been proposed for inclusion in Appendix II (see proposals Prop. 40 and Prop. 41). *C. elephantopus* bears some resemblance to *C. montagnacii*.

Analysis: *Cyphostemma elephantopus* has a restricted range in southern Madagascar where at least some populations are under pressure from habitat loss. It is in some demand in the international horticultural trade. Numbers reportedly exported from Madagascar are not large, although a high proportion, if not all of these, are likely to have been wild-collected. Limited data on wild populations indicate that it may be reasonably numerous in the wild – extrapolation from the known area of occupancy and observed population densities indicate there may be a substantial wild population, although it is not known whether the species occurs continuously throughout this area. Collection for export may lead to local depletion, but it seems unlikely that current levels of trade are such that regulation is required to prevent the species becoming eligible for inclusion in Appendix I in the near future, or to prevent harvest for trade reducing the population to a level at which its survival might become threatened by continued harvest or other influences.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Madagascar	
IUCN Global Category	
Not assessed	*Not assessed*

Supporting Statement (SS)	Additional information
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
Known from south and south-west Madagacar in the region of Toliara and Tsimananpetsotsa. Around 500 individuals were counted at Andatabo and at Tsingoritelo north of Toliara.	*Extent of occurrence estimated at just over 800 km^2, with area of occupancy around 20 km^2. Population densities in 2005 at two sites were 270 and 400 individuals per hectare. The proportion of young plants at one of these sites was low (approximately 20%) indicating poor regeneration (Rakouth* et al*., 2006).*
Its habitat on the Ifaty road is in an area of hotel construction and that at Ankalibe Andatabo is on private property. Habitat destruction means that the species is in danger of disappearing.	*Habitat at the type locality (Ankalibé, just south of Toliara) is threatened by coastal development, but the species occurs south of this and is probably more common than is generally supposed (Corman, 2008).*
The species was classified as "vulnerable" in 2006 using the IUCN Criteria.	
Recorded exports are: 0 in 2003; 563 in 2004; 116 in 2005; 70 in 2006.	
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	
Threats	
The species grows in unprotected areas that are subject to considerable pressure from human activities.	*Natural habitats in southern Madagascar are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.*
Conservation, management and legislation	
	Tsimananpetsotsa is a protected area, although it is not clear whether populations of the species here occur within the protected area.

Supporting Statement (SS)	Additional information
	Captive breeding/artificial propagation
.	*Propagation is by seed. Propagation of* Cyphostemma *species from cuttings is reportedly difficult or impossible (Desert tropicals website).*
	Other comments

Reviewers:
TRAFFIC East/Southern Africa.

Inclusion of *Cyphostemma laza* in Appendix II

Proponent: Madagascar

Summary: *Cyphostemma laza* is a succulent plant from Madagascar. It is one of 250 or so species of *Cyphostemma,* a genus in the grapevine family or Vitaceae that is widely distributed in the tropics, of which around 23 species occur in Madagascar. It forms an elongated, thickened trunk or caudex up to 50cm in diameter and 1.2 m in height, from which extend vines up to five metres or so in length. The species typically grows in partially shaded areas in semi-deciduous dry forest and has a wide distribution in Madagascar, being recorded in locations in the south, south-west, west and north. Its extent of occurrence has been estimated at around 35 000 km^2 within which its area of occupancy is thought to be more than 5 000 km^2. Population densities, based on surveys at three small sites, varied from 60 to 730 plants per hectare. There were few young plants at these sites. The species is recorded from at least four protected areas and probably occurs in others.

The species is in trade as an ornamental plant, grown chiefly by specialist collectors of succulents. Recorded exports from Madagascar in the period 2003–2006 amounted to around 12 000 plants, with a rising trend. It seems very likely that a large proportion, if not all of these, were wild-collected. Propagation is by seed. The plant is available outside Madagascar, though apparently not widely, both as artificially propagated small plants and large, almost certainly, wild-collected specimens. The species is in some use as a medicinal plant in Madagascar.

Two other species of Malagasy *Cyphostemma* have been proposed for inclusion in Appendix II at CoP15: *C. elephantopus* and *C. montagnacii*, the subjects of proposals Prop. 39 and Prop. 41, respectively,

Analysis: *Cyphostemma laza* has a wide distribution in Madagascar and is evidently not uncommon in areas where it occurs. Taking lower estimates for population densities of 60 plants per hectare and an area of occupancy of over 500 000 ha indicates that the population is likely to be very numerous, even though occurrence within its area of occupancy is probably patchy. Although the population is likely to be declining owing to general pressures on its habitat from fire, over-grazing and conversion to agriculture, it is known to occur in at least four protected areas and probably occurs in others. The species features in the Malagasy pharmacopeia although there is no evidence for intensive or extensive local use in Madagascar. Reasonable numbers of plants have been recorded as exported in recent years, a large proportion, if not all of which, may have been wild-collected. This may well have led to local depletion of populations, but in view of the wide range and almost certainly large or very large wild population, it is unlikely that regulation of trade is necessary to prevent the species becoming eligible for inclusion in Appendix I in the near future, or to prevent harvest for trade reducing the population to a level at which its survival might become threatened by continued harvest or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Range
Madagascar	

IUCN Global Category

Not assessed.

Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

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

Recorded in the north of Madagascar (Antsiranana province) and the south (Toliara province). Around 250 individuals were counted in the Andoharano forest north of Toliara, in the Tongobory Betioky forest and in the forest of Elomaka Amboasary Sud. All these are areas where the plant is collected.

Its habitat is threatened by anthropogenic factors. It has been assessed as "vulnerable" under IUCN Criteria.

Number exported: 419 in 2003; 1177 in 2004; 2487 in 2005; 7814 in 2006.

The species typically occurs in partially shaded areas in semi-deciduous dry forest. Extent of occurrence has been estimated at 35 000 km^2 and area of occupancy at around 5300 km^2 (530 000 ha). A number of different populations are known. Population densities of between 60 and 730 plants per hectare were recorded at three different sites in field surveys in 2005. Regeneration as indicated by the proportion of young plants was generally poor at these sites. Around 50 young plants a year were reported as collected (Rakouth et al., *2006).*

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

The species is reportedly used locally, in south-east Madagascar at least, for its narcoleptic qualities (Anon., undated).

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved

Other information

Threats

Natural habitats in Madagascar in general are affected by fire, charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.

Conservation, management and legislation

Recorded from at least four, widely separated protected areas (Andohahela, Tsingy de Bemaraha, Kirindy and Massif de l'Ankarana) (Anon, 2009).

Captive breeding/artificial propagation

Reportedly straightforward to cultivate; propagated by seeds (Corman, 2008).

Other comments

Reviewers:
TRAFFIC East/Southern Africa.

Inclusion of *Cyphostemma montagnacii* in Appendix II

Proponent: Madagascar

Summary: *Cyphostemma montagnacii* is a succulent plant from Madagascar. It is one of 250 or so species of *Cyphostemma,* a genus in the grapevine family or Vitaceae that is widely distributed in the tropics, of which around 23 species occur in Madagascar. The species forms a thickened tuber-like stem or caudex with distinctive tubercular bark from which extend vine-like stems up to 1.5 m in length. As far as is known, the species has a restricted distribution in south-west Madagascar, with an extent of occurrence estimated at around 260 km^2 and an area of occupancy of just under 100 km^2 (10 000 ha). Survey of one small population estimated a density of 25 plants per hectare. Regeneration, as assessed by the proportion of young plants in the population, was judged to be good. It is not known if the species occurs in any protected areas and at least one population is believed affected by quarrying and fire. As with other *Cyphostemma* the species is in some demand in the international horticultural trade, grown chiefly by hobbyists who specialize in succulent plants. Authorities in Madagascar have reported the export of just over 200 specimens in the period 2003–2006, all except two in 2004. Internet searches did not reveal the species currently for sale, though evidently wild-collected plants have been offered for export from Madagascar in the recent past.

Two other species of Malagasy *Cyphostemma* have been proposed for inclusion in Appendix II at CoP15: *C. elephantopus* and *C. laza*, the subjects of proposals Prop. 39 and Prop. 40, respectively. *C. montagnacii* bears some resemblance to *C. elephantopus*.

Analysis: The very limited available information suggests that *Cyphostemma montagnacii* has a small range and may occur at a relatively low density within this. Extrapolation from the estimated area of occupancy and known population densities indicate it may have a reasonably large wild population, although it is not known if the species occurs continuously within this area. At least some populations are reported to be affected by factors such as fire and quarrying of stones. The species has featured in international trade, with relatively small quantities of plants exported by Madagascar in recent years, but it does not appear to be readily available, if at all, at present outside Madagascar. Collection for export may lead to local depletion, but given the small numbers in trade it seems unlikely that current levels of trade are such that regulation is required to prevent the species becoming eligible for inclusion in Appendix I in the near future, or to prevent harvest for trade reducing the population to a level at which its survival might become threatened by continued harvest or other influences.

Supporting Statement (SS)	Additional information
	Taxonomy
	Range
Madagascar	
	IUCN Global Category
	Not assessed.

Supporting Statement (SS)	Additional information
Biological and trade criteria for inclusion in Appendix II (*Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)	
A) Trade regulation needed to prevent future inclusion in Appendix I	
The species has a very restricted distribution, being known only from the Table de Toliara mountain in Toliara Province, south-west Madagascar. Around 50 individuals were counted on the Table de Toliara Mountain and its surroundings in 2006. The area where the species occurs is subject to considerable pressure from fire and quarrying. Recorded exports are: 0 in 2003, 200 in 2004, 0 in 2005, 2 in 2006. Application of the IUCN Criteria indicated that the species would be classified as "critically endangered".	*The species has an area of occurrence estimated at around 260 km^2 and an area of occupancy of just under 100 km^2 (10 000 ha) in south-west Madagascar. Survey of one small population estimated a density of 25 plants per hectare. Regeneration, as assessed by the proportion of young plants in the population, was judged to be good (Rakouth* et al., *2006).*
B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences	
	Internet searches revealed the plant offered for export from Madagascar in 2007 as wild-collected tubers at EUR92 at one site, and possibly more recently at another. The plant was not found offered for sale by suppliers outside Madagascar.
Inclusion in Appendix II to improve control of other listed species	
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
	Two other species of Cyphostemma *(*C. elephantopus *and* C. laza*) are proposed for inclusion in Appendix II (see proposals Prop. 39 and Prop. 40, respectively).* C. montagnacii *bears some resemblance to* C. elephantopus*. Around 23 other species of* Cyphostemma*, some of which are in trade, occur in Madagascar, and there are some 250 species in total (www.madagaskar.com).*
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	
Other information	

Supporting Statement (SS)	Additional information
Threats	
Fire and quarrying	*Natural habitats in southern Madagascar are also affected by charcoal and fuelwood extraction, over-grazing and conversion to agriculture. It is not known to what extent these affect this species.*
Conservation, management and legislation	
Captive breeding/artificial propagation	
.	*May be propagated by seed. (Some horticulturalists report that propagation of* Cyphostemma *species is difficult or impossible [www.desert-tropicals.com]).*
Other comments	

Reviewers:
TRAFFIC East/Southern Africa

Inclusion of Palo santo *Bulnesia sarmientoi* in Appendix II with annotation #11 Designates logs, sawn wood, veneer sheets, plywood, powder and extracts.

Proponent: Argentina

Summary: Palo santo *Bulnesia sarmientoi* is a large slow growing tree, reaching 10-20 m in height and 30-80 cm diameter at breast height (DBH). It is confined to the Gran Chaco region in Bolivia, Paraguay, Argentina and a small part of Brazil. Within the region it is found in isolated or continuous stands mainly in the semi-arid Chaco subregion, with scattered individuals in other subregions. It may once have occurred in an area of around 100 000 km^2 and is the dominant species in some areas. FAO's Forest Resource Assessment estimated the Argentine stock in 2000 at 19.4 million m^3. One study in Argentina in 2004–2005 found an average of 58 adult trees per ha (DBH>20 cm) with average number of individuals of 227/ha. Older studies (1979) in Argentina of productivity for this species estimate standing volume of wood at 0.75–0.78^3 per ha. Average growth rate was estimated at 0.022–0.025 m^3/ha/yr. The species has the ability to re-sprout from cut stumps and can be one of the commonest species in re-growth forest. One study found it to be one of the most frequent species in an area of secondary forest in the Argentine Chaco at a volume of 3.31 m^3 per ha.

The Gran Chaco has been subject to land-use changes for agriculture and stock-farming and is intensively logged for timber and charcoal production. It has been estimated that between 1998 and 2006 at least 20 000 km^2 (2 million ha) of "chaqueño" forest have been deforested in Argentina. Extensive and more recently intensive stockbreeding systems has reportedly resulted in degradation and the loss of restoration ability of approximately 15 million hectares of native forest. Forest destruction has also reduced the species' habitat in Paraguay. In Bolivia, overall rates of deforestation in the Gran Chaco have slowed somewhat from an estimated 260 km^2 (26 000 ha) per year in 1992–2000 to ca 190 km^2 (19 000 ha) in 2001–2004, believed to be due in part to a reduction in rates of agricultural conversion because of recurrent drought.

The wood of *Bulnesia sarmientoi* is heavy (density 0.990–1.280 kg/dm³), very strong and decay-resistant, even underground, because of its resin content, which also gives it aromatic properties. It has a wide range of uses including furniture, flooring, lathe work, manufacture of propeller shaft bearings for ships, and (fence) poles. The essential oil derived from *B. sarmientoi* wood, known as "Guayacol", "Guajol" or "Guayaco" is used in the perfume cosmetics industry and in mosquito repellents. Palo santo resin, derived from the residue of the distillation process can be used to produce dark varnishes and paints. The tree is also used for charcoal production and the leaves have been used for medicinal purposes.

Trade data, especially from Bolivia, are limited for this species. Argentina and Paraguay are known to export *B. sarmientoi* wood with recorded exports increasing rapidly from approximately 100 t in the early 2000s to 40 000 t in total by 2006. The majority of Argentinean exports for 2006–2008, estimated at almost 53 000 t, were of roundwood, cylinders and posts (87%), with 12.6% sawn wood and a very small amount of firewood and charcoal. China was the main importing country, with small amounts destined for Uruguay and other countries. Between 2000 and 2006 most exports from Paraguay were of sawn wood, logs, cylinders and poles with "less than 1% destined for extracts and other items" (although it is not clear whether this is by weight and whether it was already in the form of extract). The destination of exports from Paraguay, based on data for the period 2000–2004, was primarily China (90%). The main destinations for extract are said to be France and Spain. The extent of trade in essential oil or "Guayacol", for the perfume cosmetics industry, is difficult to estimate although it appears to be met by exports from Paraguay. In the early 1970s an estimated 75 and 100 t of guaiac wood oil were produced each year. Production of extract is said to be from damaged branches and trade from Paraguay is reportedly a by-product of land clearing. There may be some limited trade in artisanal crafts to Europe and North America, although this apparently only uses dead wood because felled wood tends to crack. There is some local use for furniture.

Significant areas of the Gran Chaco are within protected areas in Bolivia, Argentina and Paraguay and initiatives are under way to prevent further deforestation. Argentina listed the species in App. III in 2008, which has reportedly had a significant effect on trade volume and control.

Bulnesia sarmientoi shares the common names lignum-vitae and guaiac with the *Guaiacum* species, which were listed in Appendix II in 2003. *Bulnesia arborea* is also referred to as lignum-vitae and guaiac and can be used for the same purposes. Identification of *Bulnesia* to the genus level through wood anatomy is relatively straightforward; however *B. sarmientoi* and *B. arborea* are almost indistinguishable at the macroscopic and microscopic level.

Analysis: *Bulnesia sarmientoi* has a wide range and evidently a very large global population. Given the reported extent of forest clearance in the Chaco region, it is possible that its overall population has undergone a considerable decline, although given the lack of quantitative historical data, and uncertainty as to what an appropriate generation time for this species is, it is not possible to say whether such a decline is near one that might qualify it for inclusion in Appendix I in the near future. Moreover, historical declines were driven by land-use change, not by harvest for international trade. The species is now harvested for international trade, but it is not clear to what extent this is leading to population declines over and above those brought about by land-use change. If it were doing so to any extent, then it could be argued that regulation of trade was required to prevent the species becoming eligible for inclusion in Appendix I in the near future (Criterion in Annex 2 (a) A in *Resolution Conf. 9.24 (Rev. CoP14)*). The large number of small trees present in surveyed areas, its presence in re-growth forest, and current information on standing stocks and increment rates, at least in Argentina, imply that it is not doing so, although this cannot be said with certainty.

Similarly it Is not clear that regulation of trade is necessary to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences (Criterion in Annex 2 (a) B in *Resolution Conf. 9.24 (Rev. CoP14*)).

The annotation suggested appears to cover the main parts and derivatives in trade. However it would not cover handicrafts, which are also apparently in trade but are normally made from dead wood, nor would it cover furniture. It appears that manufacture of furniture takes place within importing countries and therefore the annotation would cover the main parts exported from range States.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Argentina, Bolivia, Brazil, Paraguay. Endemic to the Gran Chaco.	
IUCN Global Category	
	Lower Risk/Conservation Dependent (Assessed 1998 ver. 2.3) – needs updating.

Biological and trade criteria for inclusion in Appendix II *(Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a)

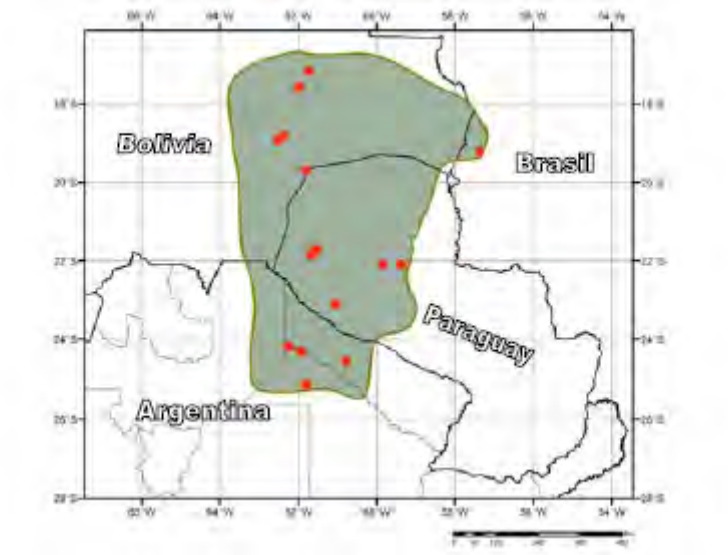
A) Trade regulation needed to prevent future inclusion in Appendix I

Supporting Statement (SS)	Additional information

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

Endemic to the Gran Chaco, which is distributed from southeastern Bolivia (17°S), in western areas bordering Paraguay and Brazil, to northern Argentina, where it reaches its southern limit at approximately 25°S.

- Argentina: North and North-west (provinces of Chaco, Salta, Formosa, and, marginally, Santiago del Estero).
- Estero).- Bolivia:Bolivia: South-east (departments of Oruro, Santa Cruz and Tarija).
- Paraguay:Paraguay West (Departments of Alto Paraguay, Boqueron and Presidente Hayes).
- Brasil:Brazil: South-west (isolated sites in the State of Mato Grosso do Sul).



The semi-arid Chaco is home to numerous edaphic communities, one of which is formed by relatively continuous stands of *Bulnesia sarmientoi* known as 'palosantales'. The species has the ability to produce new shoots by means of gemmiferous roots and to sprout from stumps, which contributes to the maintenance of the population in harvested areas. It is common to find isolated or clustered areas of regrowth in the forest, which form islets ensuring the continuity of the species.

On the basis of the distribution map for B. sarmientoi *provided in the SS, the region where the species is present in Bolivia may extend to a similar size as that in Paraguay. According to Meneses and Beck (2005),* Bulnesia sarmientoi *is endangered in Bolivia. Overall rates of deforestation in the Gran Chaco in Bolivia have slowed somewhat from an estimated 256 km^2 per year between 1992–2000 to 191 km^2 between 2001 and 2004, believed in part to be due to a reduction in the conversion of these landscapes to the cultivation of row crops because of recurrent*

Supporting Statement (SS)

No information is available on the historical range of the species in Bolivia. There are no current population data or rates of habitat destruction and land use change.

In 1987 in Paraguay the subregion containing *Bulnesia sarmientoi* was approximately 37 000 km^2. The species is included in the list of endangered species and is protected from harvests in principle (Ministerial Resolution 2534/06).

In Argentina the species was estimated to occur in approximately 25 000 km^2.

Old studies (1979) show productivity of 0.77 m3/ha of the species' wood plus 1.75 m^3/ha of branches suitable for firewood were present at its distribution centre in the province of Formosa (town of Las Lomitas), with an average growth rate of 0.025 m^3/ha/yr. Similar studies in the province of Salta, department of Las Antas, at 24° 10' S - 63° 50' W, showed similar values, 0.75 m^3/ha of wood, 1.10 m^3/ha of firewood, with an average growth rate of 0.022 m^3/ha/yr.

The species has a slow growth rate and estimated age of 100 at 45 cm DBH.

Essential oil, also know as "guayacol", "guajol" or "guayaco", is distilled and widely used in the perfume industry, due to its soft and pleasant odour, similar to that of a rose and less intense than that of a violet.

It is used in the manufacture of varnishes and dark paints.

Wood is used for flooring and is in great international demand. The SS states that furniture is one of its most lucrative uses of the wood since the fine furniture produced is valued very highly internationally. Historically used for lathe work for products such as: canes, cigar boxes, ashtrays, fine pencils, gourds, napkin holders, tobacco boxes, fans, chests, cups, sweets boxes, sewing boxes, flower containers, pedestals for sculptures, and for the manufacture of propeller shaft bearings for ships.

Its high resin composition makes it rot-proof below ground and this has led to young

Additional information

drought.

In Paraguay, the species is widely distributed, being found in virtually three-quarters of the Paraguayan Chaco region (Mereles, 2006). Paraguay has conducted only one census. In the other range States, the B. sarmientoi *population can only be estimated. Forest destruction has also reduced the species' habitat in Paraguay, although mostly for small scale farming by local people (Adámoli, 2009).*

Giménez et al. *(2007) found the species to be one of the most frequent in one sampled area of secondary forest (Miramar-Bermejito) in the Argentine Chaco at a volume of 3.31 m^3/ha. In 2000 the stock in the forest was estimated at 19.4 million m^3 (FAO, 2005). Where Palo santo is located it is found as almost pure forests in the north-west of the Chaco region and is also associated with quebracho (*Aspidosperma quebracho-blanco *and* Schinopsis quebracho*). A study looking at the use of* Bulnesia sarmientoi *for crafts found average densities from five sample sites to be 58 adult trees per ha (DBH.20 cm) with average number of individuals 227/ha and evidence of harvest for construction (i.e. cut trunks) at nine individuals per ha (Brient, 2006). Only 15% of original forest cover is believed to remain in the Argentine Gran Chaco, 85% having been cleared in only 30 years, equating to a loss of Chaco forests of 2.2% per year, which is consistent with, or even exceeds, global trends. Forest vegetation now persists as fragments (Zak* et al., *2004).*

Studies by UMSEF-PINBN (1998–2005) in the Provinces of Salta, Chaco and Formosa in Argentina found densities of 25–54 individuals per hectare in areas of where the species was present, although the majority of trees were below 30 cm DAB. The population may be substantial.

		Existence (ind/ha) by type of DBH				
stratum	Surface Area (ha)	0-10 cm	10-30 cm	30-50 cm	50-70 cm	Total
Bosque alto	2550843	0	0.5	0	0	0.5
Bosque ribereno	183784	0	0	0	0	0
Colonizadores	2433585	37.5	8.8	4.1	3.4	53.8
Quebrachal	16110190	14.4	9.5	0.7	0	24.6
Regional	21278400	15.2	8.3	1	0.4	24.9

Regeneration is good, but growth is very slow (Mereles, 2006).

It is one of the hardest and heaviest of woods (1100–1280 kg/m^3); it is very strong and decay-resistant, even underground, because of its resin content (Mereles, 2006).

Supporting Statement (SS)

trees also being used for fencing poles. In the past years charcoal production from this species has been registered.

Recorded exports appear to have been increasing from the early 2000s. Argentina listed the species in Appendix III in 2008.

Argentina and Paraguay have been important exporting countries of this timber species.

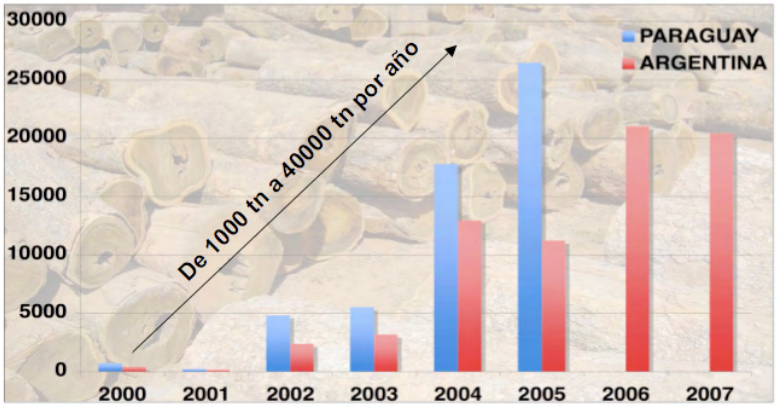
The majority of Argentinean exports from 2006–2008 were of raw (rollo) wood, "cilindros" and posts (87%) with 12.6% sawn wood and a very small amount of firewood and charcoal. China is the main importing country, with small amounts destined for Uruguay and other countries.

Figure 1: Exports from Argentina in tonnes. 2006 value is estimated as records were only available from June onwards.

Significant illegal or irregular trade has been identified through increased enforcement activities in Argentina, particularly since the listing of *B. sarmientoi* in Appendix III.

In Paraguay, in principle it is protected from harvest (Ministerial Resolution 2534/06). However, the fact that changes in land use from forest to agriculture are allowed authorizes the clearing and harvest of the species and is believed to be the source of the timber in international trade. Primary production increased significantly from 2002. Between 2000 and 2006, 33% of exports were of sawn wood, while 66% belonged to logs, cylinders and poles, with less than 1% destined for extracts and

Additional information



PY: SFN-MAG; AR: DB-SAyDS

(Fundacion Biodiversidad, 2009)

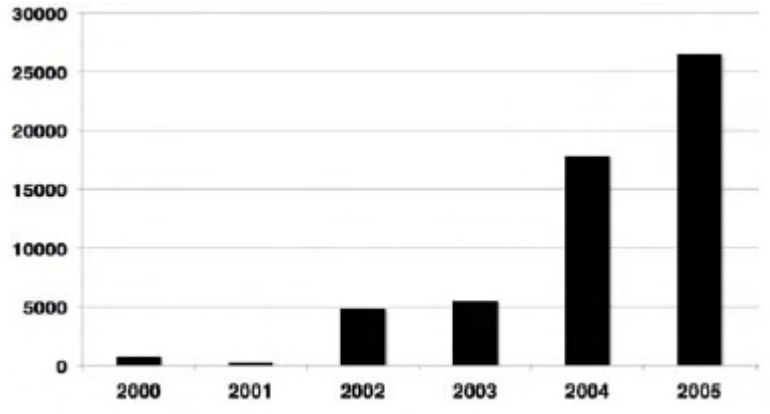
Primary production in Argentina increased from approximately 2000 t in 2002 to just over 20 000 t in 2006 and 2007 (DB-SAyDS).Similar increases to around 20 000 t have been seen in Paraguay. At a density of 1100–1280 kg/m ^{3} this is equivalent to a volume of around 36000 m^3. However, without data on conversion ratios and recovery rates, it is not possible to relate this with any accuracy to standing stock of trees.

Wood has been exported in large quantities as wood flooring to Taiwan Province of China from Paraguay (Mereles, 2006). In Paraguay, large lots of planed logs have been observed, stacked by diameter, starting at a diameter at breast height (DBH, measured at a height of 1.40 m) of less than 10 cm (Mereles, 2006).

Distillation is sometimes hampered by lack of water in the rather dry Chaco region, but between 75 and 100 t of guaiac wood oil were estimated to be produced each year in the early 1970s (Robbins and Matthews, 1974). No information was found on the quantities of wood needed to produce each kg of extract. Although Mereles and Perez de Molas (undated) cite Jacobs (1990) that the heartwood extract content is between 3–4%.

It was reported in 1974 that there had been a major surge in demand for the oil at the end of the 1960s, following an increase in popularity of a leather-type aroma in "men's line" products, but that the market had since stabilized (Robbins and Matthews, 1974).

Extract is offered for sale on the internet. Dulsan Organica SRL state that its annual

Supporting Statement (SS)	Additional information
other items. The destination of exports, based on data for the period 2000–2004, was primarily China (90%).  Figure 2: Paraguay primary production in tonnes. The main destinations for palo santo or "guayacol" essence as a base in perfume making are France and Spain.	*shipment volume is 5000 kg of Essence of Palo Santo (from* Bulnesia sarmientoi*).* *It is unclear from the SS whether the 1% of exports that is destined for extract is of raw wood or in extract. In addition, there is no indication as to whether percentages are by weight or volume. According to Mereles and Perez de Mola (undated) Paraguay provides 85% of world production of extract. Production of extract is said to be from damaged branches and as a by-product of land clearance.* *According to the CITES trade database, Germany re-exported 1710 kg of extract originating from pre-Convention stock from Paraguay to India in 2008. Switzerland has reported importing 6300 kg of pre-Convention* Bulnesia sarmientoi *extract from Paraguay in 2008 (Caldwell, 2009).* *UK imports of oil seem to be coming from Paraguay to Hamburg and then broken up to go to Felixstowe (UK CITES Scientific Authority for plants, 2009).* *Since Argentina listed the species in App III in 2008, trade reported in the CITES trade database has been of 2.1 m^3 of sawn wood imported from Argentina by Germany. Germany also re-exported 1710 kg of extract originating from pre-Convention stock from Paraguay to India.* *No information was available on harvest or export of this species from Bolivia or Brazil.*

Inclusion in Appendix II to improve control of other listed species

Supporting Statement (SS)	Additional information
A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I	
"The technological characteristics of "palo santo" timber are very similar to those of "lignum vitae" (*Guaiacum officinale* L.) [listed in CITES Appendix II in 2003]. "Lignum vitae" is widely used in North America and Europe to make propeller shaft bearings for planes and ships, pulley wheels, screws, and for other similar purposes; according to these technical verifications, our "palo santo" could be tested for the uses mentioned, with great chances of success". Years later these predictions were fulfilled. Some species of genus *Guaiacum*, and *B. sarmientoi*, belonging to the Zygophyllaceae family, are used for oil extraction and shares the common names of "palo santo" and "guayacán", as well as some of their commercial names such as "ligum vitae" or "guaiac". This, together with the difficulty to differentiate between them during the Customs controls, leads to species of the genus *Guaiacum* to be considered "similar species".	Bulnesia sarmientoi *and* Bulnesia arborea *share the common names lignum-vitae and guaiac with the* Guaiacum *species.* *The PC recommended that attention should also be given to possible identification difficulties between this species and* Bulnesia arborea*. Identification of* Bulnesia *to the genus level through wood anatomy is relatively straightforward (UK CITES Scientific Authority for plants, 2009). However,* B. sarmientoi *and* B. arborea *are almost indistinguishable at the macroscopic and microscopic level (Richter and Dallwitz, 2009).* Bulnesia *extract imported into Europe and other countries also comes from the species* Bulnesia arborea*. If so, it might be necessary to draft a proposal encompassing the entire* Bulnesia *genus, in addition to highlighting the issue of 'similar species' (Mereles, 2006).*
B) Compelling other reasons to ensure that effective control of trade in currently listed species is achieved	

Other information

Threats

Since the 90s, Argentina and Paraguay increased land use change for farming and agriculture caused the large-scale decline of the remaining Chaco. It has been estimated that between 1998 and 2006 at least two million hectares of "chaqueño" forest have been deforested in Argentina, a process that has also been observed in Paraguay. Extensive and more recently intensive stockbreeding systems has resulted in degradation and the loss of restoration ability of approximately 15 million hectares of native forest. Use of in pasture management affects the growth of trees. In Argentina, the main impacts affecting the Gran Chaco until recently were forest activities mainly involved production of joists, posts, logs, firewood and charcoal and extensive goat and bovine stockbreeding. Twenty percent of Argentina's cropland is located in the Chaco region. In Paraguay, the species was badly affected by increasing farming and agricultural activities. The species has medicinal properties and has been used medicinally locally.	*The main threat to the species in Paraguay is land use change, which is not stopping. In the process they extract Palo Santo (Mereles, 2009).*

Supporting Statement (SS)	Additional information
Conservation, management and legislation	
In 2007, the CITES Management Authority of Argentina requested the CITES Secretariat to include the species in Appendix III with annotation # 11 Designating logs, sawn wood, veneer sheets, plywood, powder and extracts. This came into effect in February 2008.	*The listing of* B. sarmientoi in Appendix III *in 2008 by Argentina has reportedly resulted in a significant effect on trade volume and control.*
Various national laws are in place in Argentina for the protection of forest resources The following provincial laws exist:	
Formosa: Allows the export from the province of timber species which have been previously industrialized, protecting local resources but also local labour and industry. Sets special rules for the use of *B. sarmientoi* species, requiring technical marking and a minimum cutting diameter. Instructs 20% of harvestable individuals to be left standing, per surface unit, as seed trees. Hammering must be carried out by professionals and rangers. The silvicultural plan must include aspects on natural regeneration, possibility of enriching of the native forest through strips or thickets, thinning, etc.	*In the Province of Formosa (North Argentina, on the border with Paraguay), Provincial Government has established the Program Land Use Planning which aims to retain between 80 and 90% of the forests (Adámoli, 2009).*
Salta: Felling of *B. sarmientoi* is forbidden in State lands while it is permitted, along with its sale and commercialization, in private properties which are subject to clearing due to changes in land use.	
Chaco: Allows selective logging of *B. sarmientoi.* Santiago del Estero: The export from provincial territory of untransformed forest products is banned.	
The species is protected within the Reserva Natural Formosa protected area in Argentina which covers a 10 000 ha of Dry Chaco.	
Populations of the species are found in two other large protected areas in the Gran Chaco region: Defensores del Chaco National Park (780 000 hectares) in Paraguay and Kaa-Iyá National Park (3 441 115 hectares) in Bolivia.	*A large subpopulation of* B. sarmientoi *occurs in Kaa-Iya del Gran Chaco National Park, Bolivia (WCMC, 1998). In Paraguay 11.3% of the Dry Chaco is within protected areas, although investment in the protection and management of the system began to decrease to its present state (Catterson and Fragano, 2004).*
In Paraguay the species is included in the list of endangered species and is protected from harvests in principle (Ministerial Resolution 2534/06). However, the fact that changes in land use from forest to agriculture are allowed authorizes the clearing and harvest of the species and is believed to be the source of the timber in international trade.	
There is no information available on legislation or management of the species for Bolivia and Brazil.	

Supporting Statement (SS)	Additional information
Captive breeding/Artificial propagation	
There is no artificial propagation of this species.	
Other comments	

Reviewers:
TRAFFIC South America

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CoP15 Prop. 25 Amendment of the annotation to Cactaceae spp. and all taxa with annotation #1

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CoP15 Prop. 27 Inclusion of *Zygosicyos tripartus* in Appendix II

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CoP15 Prop. 30 Inclusion of *Senna meridionalis* in Appendix II

Du Puy, D.J. (1995). *New Combinations in Senna Miller and Chamaecrista Moench (Leguminosae: Caesalpinioideae) from Madagascar*. Royal Botanic Gardens, Kew.
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CoP15 Prop. 31 Amend the annotation to the listing of Orchidaceae included in Appendix I

CoP15 Prop. 32 Inclusion of seeds of *Beccariophoenix madagascariensis* in Appendix II

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CoP15 Prop. 33 Inclusion of seeds of *Dypsis decaryi* in Appendix II

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CoP15 Prop. 34 Inclusion of *Adenia firingalavensis* in Appendix II

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CoP15 Prop. 35 Inclusion of *Adenia olaboensis* in Appendix II

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CoP15 Prop. 36 Inclusion of *Adenia subsessifolia* in Appendix II

Hearn, D.J. (2004). *Adenia (*Passifloraceae) and Its adaptive radiation: phylogeny and growth form diversification. *Systematic Botany* 31: 805–821.
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CoP15 Prop. 37 Deletion of Marsh Rose *Orothamnus zeyheri* from Appendix II

Boucher, C. (1997). *In litt.* to IUCN Species Survival Commission, Cambridge, UK.
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ANNEXES:

ANNEX 1. Appendix I and Appendix II Biological Criteria (Resolution Conf. 9.24)

ANNEX 2.1. Summary of the IUCN Red List Categories and Criteria version 2.3 (IUCN, 1994)

ANNEX 2.2. Summary of the IUCN Red List Categories and Criteria version 3.1 (IUCN, 2001).

ANNEX 1. APPENDIX I AND APPENDIX II BIOLOGICAL CRITERIA (*Resolution Conf. 9.24 (Rev. CoP14*))

***Note*: The numbers presented below are meant to serve as guidelines and not as thresholds (see *Res Conf 9.24 (Rev. CoP 14)* Annex 5)**

CRITERIA FOR INCLUSION OF SPECIES IN APPENDIX I – Use of at least one of the A-C criteria for species that are or may be affected by trade.

A. Small Wild Population

Small number of individuals and at least one of the following occurs:	<5 000
i) decline in number of individuals or area and quality of habitat	20%or more in last 5 years or 2 generations
ii) each subpopulation very small	<500
iii) majority of individuals concentrated geographically during one or more life-history phase	
iv) large short-term fluctuation in population size	
v) high vulnerability to either intrinsic or extrinsic factors	

B. Restricted Distribution

Restricted area of distribution and at least one of the following occurs:
i) fragmentation/occurrence at very few locations
ii) large fluctuation in area or number of subpopulations
iii) high vulnerability to either intrinsic or extrinsic factors
iv) a decrease (observed, inferred or projected) in any one of the following:
- area of distribution
- area of habitat
- number of subpopulations
- number of individuals
- quality of habitat
- recruitment

C. Declining Wild Population

Marked decline in the number of individuals in the wild which has been either:

historic decline to 5%-30% (5% -20% for commercially exploited aquatic species) of the baseline population; recent rate of decline 50% or more in last 10 years or 3 generations

i) observed as ongoing or having occurred in the past (but with a potential to resume); or
ii) inferred or projected on the basis of any one of the following:
- decrease in area of habitat
- decrease in quality of habitat
- levels/patterns of exploitation
- high vulnerability to either intrinsic or extrinsic factors
- decreasing recruitment

CRITERIA FOR THE INCLUSION OF SPECIES IN APPENDIX II

In accordance with Article II, Paragraph 2(a)

Species should be included in Appendix II when at least one of the following criteria is met

A. Regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future

B. Regulation of trade in the species is required to ensure harvesting of specimens from the wild is not reducing wild populations to a level at which its survival might be threatened by continued harvesting or other influences.

In Accordance with Article II, Paragraph 2(b)
Species should be included in Appendix II if it satisfies one of the following criteria

A. The specimens of the species traded resemble specimens of a species included in Appendix II or Appendix I, such that enforcement officers are unlikely to be able to distinguish between them.
B. There are compelling reasons other than those given above in criterion A to ensure that effective control of trade in currently listed species is achieved.

Annex 2.1 Summary of the IUCN Red List Categories and Criteria Version 2.3 (IUCN, 1994)

Use any of the A-E criteria

	Critically Endangered	Endangered	Vulnerable
A. Population Reduction in 10 years or 3 generations at least:	80%	50%	20%
Using either 1 or 2			
(1) Population reduction observed, estimated, inferred, or suspected in the past, based on any of the following:			
a) direct observation			
b) an index of abundance appropriate for the taxon			
c) a decline in area of occupancy, extent of occurrence and/or quality of habitat			
d) actual or potential levels of exploitation			
e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites			
(2) Population decline projected or suspected to be met in the future based on b) to e) under (1)			
B. Geographic range in the form of one of the following:			
Extent of occurrence	<100km^2	<5000km^2	<20 000km^2
Area of occupancy	<10km^2	<500km^2	<2000km^2

	Critically Endangered	Endangered	Vulnerable
And 2 of the following 3:			
(1) Severely fragmented:(isolated subpopulations with a reduced probability of recolonisation, once extinct) OR known to exist at # locations	# = 1	< 5 #	< 10
(2) Continuing decline observed, inferred or projected at any rate in any of the following: a) extent of occurrence b) area of occupancy c) area, extent and/or quality of habitat d) number of locations or subpopulations e) number of mature individuals			
(3) Extreme fluctuations in any of the following: a) extent of occurrence b) area of occupancy c) number of locations or subpopulations d) number of mature individuals	>1order/mag	>1order/mag	>1order/mag
C. Small Population Size and Decline			
Number of mature individuals	< 250	< 2500	< 10 000

	Critically Endangered	Endangered	Vulnerable
AND either C1 or C2:			
(1) A rapid continuing decline of at least	25% in 3 yrs or 1 gene	20% in 5 yrs or 2 gene	10% in 10 yrs or 3 gene
(2) A continuing decline observed, projected, or inferred at any rate in numbers of mature individuals AND (a) or (b): a) population severely fragmented or b) # of mature individuals in each subpopulation	< 50	< 250	< 1000
D. Very Small or Restricted population Either: (1) # of mature individuals	< 50	< 250	< 1000
OR (2) population is susceptible	(not applic)	(not applic)	area of occupancy $100km^2$ or # of locations < 5
E. Quantitative analysis Indicating the probability of extinction in the wild to be at least	50% in 10 yrs or 3 gene	20% in 20 yrs or 5 gene	10% in 100 yrs

Annex 2.2 Summary of the IUCN Red List Categories and Criteria version 3.1 (IUCN, 2001)

Use any of the A-E criteria

	Critically Endangered	Endangered	Vulnerable
A. Population Reduction in 10 years or 3 generations at least:			
A1	90%	70%	50%
A2, A3, A4	80%	50%	20%

(1) Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased, based on and specifying any of the following:
a) direct observation
b) an index of abundance appropriate for the taxon
c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
d) actual or potential levels of exploitation
e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites

(2) Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction may NOT have ceased OR may not be understood OR may not be reversible, based on (a) and (e) under (1)

	Critically Endangered	Endangered	Vulnerable
(3) Population reduction projected or suspected to be met in the future (up to amaximum of 100 years) based on (b) to (e)under (1)			
(4) Population reduction observed, estimated, inferred, projected or suspected (up to a maximum of 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on (a) and (e) under (1)			
B. Geographic range in the form of either B1 (extent or occurrence) AND/OR B2 (area or occupancy)			
B1 Extent of occurrence	<100km^2	<5000km^2	<20 000km^2
B2 Area of occupancy	<10km^2	<500km^2	<2000km^2
AND at least 2 of the following:			
(a) Severely fragmented, OR: # of locations	= 1	<5	< 10
(b) Continuing decline in any of the following:			
i) extent of occurrence			
ii) area of occupancy			
iii) area, extent and/or quality of habitat			
iv) number of locations or subpopulations			
v) number of mature individuals			
(c) Extreme fluctuations in any of:			
i) extent of occurrence			
ii) area of occupancy			

	Critically Endangered	Endangered	Vulnerable
iii) number of locations or subpopulations			
iv) number of mature individuals			
C. Small Population Size and Decline			
Number of mature individuals	< 250	< 2500	< 10 000
AND either C1 or C2:			
(1) An estimated continuing decline of at least:	25% in 3 yrs	20% in 5 yrs	10% in 10 yrs
(up to a maximum of 100 years)	or 1 gene	or 2 gene	or 3 gene
(2) A continuing decline AND (a) and/or (b):			
(a) i) # of mature individuals in each subpopulation:	< 50	< 250	< 1000
ii) OR % individuals in one subpopulation at least	90%	95%	100%
(b) extreme fluctuations in the # of mature individuals			
D. Very Small or Restricted population			
Either:			
(1) # of mature individuals	< 50	< 250	< 1000
AND/ OR			
(2) Restricted area of occupancy	(not applic)	(not applic)	area of occupancy 20 km^2 or # of locations < 5
E. Quantitative analysis			
Indicating the probability of	50% in 10yrs	20% in 20 yrs	10% in 100
Extinction in the wild to be at least	or 3 gene (< 100 yrs)	or 5 gene (<100 yrs)	yrs

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TRAFFIC, the wildlife trade monitoring network, works to ensure that wildlife trade is not a threat to the conservation of nature. TRAFFIC is a joint programme of IUCN, the International Union for Conservation of Nature, and WWF, the world conservation organization. **Website: www.traffic.org**

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SSC
Species Survival Commission

TRAFFIC
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