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

Fifteenth meeting of the Conference of the Parties
Doha (Qatar), 13-25 March 2010

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Inclusion of *Sphyrna lewini* (scalloped hammerhead shark) in Appendix II in accordance with Article II paragraph 2(a) of the Convention and satisfying Criterion A in Annex 2a of Resolution Conf. 9.24 (Rev. oP14).[1] Inclusion of *Sphyrna mokarran*, (great hammerhead shark), *Sphyrna zygaena* (smooth hammerhead shark), *Carcharhinus plumbeus* (sandbar shark), and *Carcharhinus obscurus* (dusky shark) in Appendix II in accordance with Article II paragraph 2(b) of the Convention and satisfying Criterion A in Annex 2b of Resolution Conf. 9.24 (Rev. CoP14).

Inclusion in Appendix II, with the following annotation:

The entry into effect of the inclusion of these species in Appendix II of CITES will be delayed by 18 months to enable Parties to resolve the related technical and administrative issues.

Annex 2a, Criterion A. *It is known, or can be inferred or projected, that the regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future.*

Sphyrna lewini qualifies for inclusion in Appendix II under this criterion because it is over-exploited for its fins, which are large, have a high fin ray count, and are highly valued in trade. This low-productivity species is also harvested as bycatch in global fisheries. The greatest threats to this species worldwide are harvest for the international fin trade and bycatch, which have caused historic declines of at least 15-20% from the baseline for long-term time 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. Based upon rates of exploitation, this species is likely to become threatened with extinction unless international trade regulation provides an incentive to introduce or improve monitoring and management measures to provide a basis for non-detriment and legal acquisition findings.

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

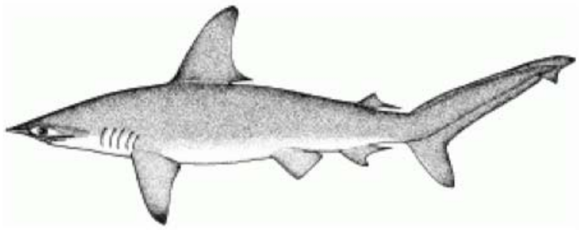
[1] The United States believes that, where indicated, the criteria and definitions must be applied with flexibility and in context. This is consistent with the "Note" at the beginning of Annex 5 in Resolution Conf. 9.24 (Rev. CoP14): "Where numerical guidelines are cited in this Annex, they are presented only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology." The definition of "decline" in Annex 5 is relevant to the determination of whether a species meets either criterion in Annex 2a of the resolution. Nonetheless, the United States believes that it is possible for a species to meet the criteria and qualify for listing in Appendix II even if it does not meet the specific parameters provided in the definition of "decline." Where quantitative data are available, they should be used to evaluate a species' status. However, where data on population abundance are not available but there are indications that over-exploitation is or may be occurring (i.e., "it is known, or can be inferred or projected") and the regulation of trade could benefit the conservation of the species, listing should be supported.

B. Proponent

Palau and the United States of America*

C. Supporting statement

1. Taxonomy



1.1 Class: Chondrichthyes

(Subclass: Elasmobranchii)

1.2 Order: Carcharhiniformes

1.3 Family: Sphyrnidae

1.4 Genus, species: *Sphyrna lewini* (Griffith and Smith, 1834)

1.5 Scientific synonyms: Cestracion leeuwenii (Day 1865), Zygaena erythraea (Klunzinger 1871), estracion oceanica (Garman 1913), Sphyrna diplana (Springer 1941).

1.6 Common names:

English: scalloped hammerhead, bronze hammerhead shark, hammerhead, hammerhead shark, kidney-headed shark, scalloped hammerhead shark, and southern hammerhead shark

French: requin marteau

Spanish: cachona, cornuda

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

Table 1. 'Look-alike' species for *S. lewini* fins

Family	Species	Scientific synonym	Common name	FAO Fishing areas	IUCN Red List
Sphyrnidae	*Sphyrna mokarran* (Rüppell 1837)	Sphyrna tudes Zygaena dissimilis Sphyrna ligo	Great hammerhead shark	21 27, 31, 34, 37,41,47, 51, 57, 71, 77, 81,87	Endangered
Sphyrnidae	*Sphyrna zygaena* (Linnaeus, 1758)	Zygaena malleus, Zygaena vulgaris, Zygaena subarcuata	Smooth hammerhead shark	21, 31, 27, 34, 37, 41, 47, 51, 57, 61, 71, 77, 81, 87.	Vulnerable
Carcharhinidae	*Carcharhinus obscurus (Lesueur, 1818)*	Geleolamna greyi, Carcharias macrurus Galeolamna eblis Carcharhinus iranza, Carcharhinus obscurella	Dusky shark	21,31, 34, 37,41,47, 71, 77, 81,87	Vulnerable
Carcharhinidae	*Carcharhinus plumbeus (Nardo, 1827)*	Eulamia milberti Carcharias ceruleus, Lamna caudata Squalus caecchia Carcharias japonicus Carcharias Carcharias stevensi Carcharias latistomus, Galeolamna dorsalis	Sandbar shark	21,31, 34, 37,41,47, 71, 77, 81,87	Vulnerable

1.7 Code numbers: Not applicable.

2. Overview

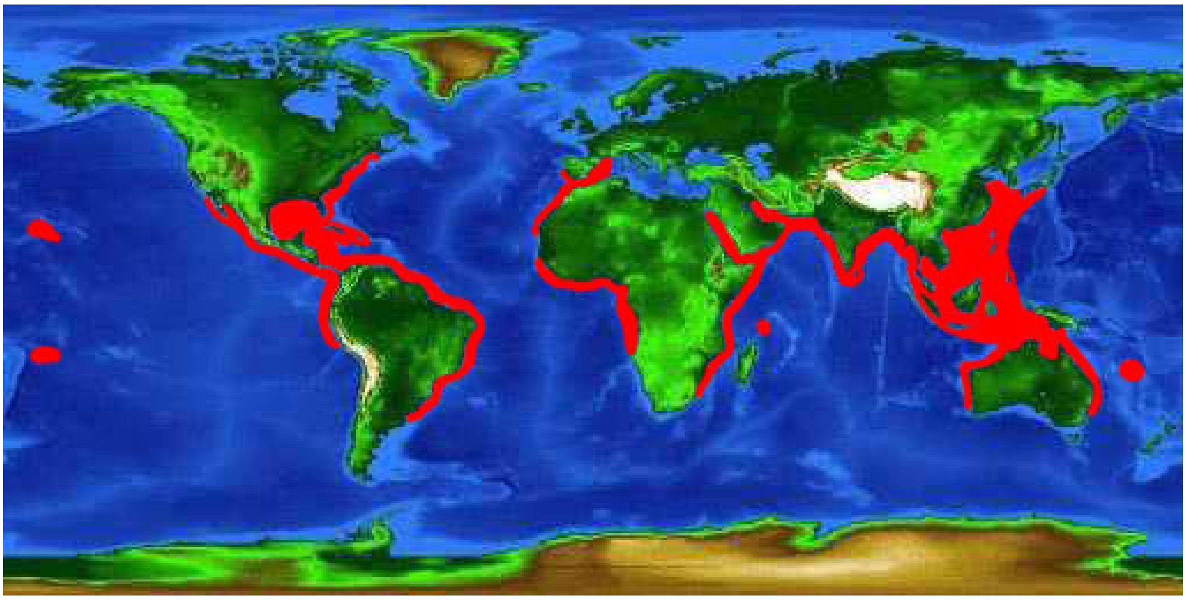
Sphyrna lewini is a circumglobal species residing in coastal warm temperate and tropical seas. *S. lewini* has among the lowest recovery potential when compared to other species of sharks. Population growth rates for populations in the Pacific and Atlantic Ocean are low (r=0.08-0.10 yr^{-1}) and fall under the low productivity category (r<0.14) as defined by the Food and Agriculture Organization of the United Nations (FAO) (Section 3.3). Abundance trend analyses of catch-rate data specific to *S. lewini* and to a hammerhead complex of *S. lewini* with *Sphyrna mokarran* and *Sphyrna zygaena* have reported large declines in abundance. Declines from the mid-1970s, 1980s, and early 1990s to recent years are 98%, 89% and 76%-89%, respectively in the northwest Atlantic Ocean. A stock assessment using information on catch, abundance trends and biology specific to *S. lewini* from the northwest Atlantic Ocean indicates a decline of 83% from 1981 to 2005. A meta-analysis of multiple time series from various gear types in the Mediterranean Sea suggested declines of a hammerhead shark complex that includes *S. lewini* of up to 99.9% since the early 19th century. An independent assessment of shark catch in the Australian-Queensland Shark Control Program found that catch rates of hammerheads have decreased by more than 85% over 44 years. Catch-rate information from shark nets deployed off the beaches of South Africa in the southwestern Indian Ocean from 1978 to 2003 indicated a decline of approximately 64% for *S. lewini.* Taken together, this relatively low-productivity species has declined to at least 15-20% of baseline for many populations. *S. lewini* is listed on the IUCN Red List of Threatened Species as Endangered globally (Section 4).

S. lewini is taken as directed catch and bycatch in domestic fisheries within Exclusive Economic Zones, as well as in multinational fisheries on the high seas. Catches of *S. lewini* are often amalgamated as *Sphyrna spp.* or reported specifically as *S. lewini* or as *S. zygaena*. The FAO database reports hammerheads in three categories: "hammerhead sharks;" "smooth hammerhead;" and "scalloped hammerhead." In 2007, these category landings were 3,645t, 319t and 202t, respectively. However, many catches go unreported, and analysis of fin-trade data indicates 49,000–90,000t of *S. lewini* and *S. zygaena* are harvested for the fin trade each year (Section 5). An Appendix-II listing would have beneficial effects upon the wild populations of these animals by helping regulate the international trade in fins (Section 6). Hammerheads are listed in

Annex I of the United Nations Convention on the Law of the Sea (UNCLOS) and therefore should be subject to its provisions concerning fisheries management in international waters. Like other sharks, however, no international catch limits have been adopted and few countries regulate hammerhead shark fishing. (Section 7). FAO and Regional Fisheries Management Organizations do not manage scalloped hammerhead shark fisheries or bycatch of this species (Section 8).

3. Species characteristics

3.1 Distribution



World distribution map for *S. lewini* (with permission from Florida Museum of Natural History, http://www.flmnh.ufl.edu/fish/Gallery/Descript/ScHammer/ScallopedHammerhead.html)

S. lewini is a circumglobal shark species residing in coastal warm temperate and tropical seas in the Atlantic, Pacific and Indian Oceans. Studies indicate high rates of adult site fidelity near seamounts and coastal areas as well as annual homing in nursery areas. Accordingly, distinct breeding populations within each ocean basin probably exist (see section 4.3). In the western Atlantic Ocean, this shark is found from New Jersey (United States) south to Brazil, including the Gulf of Mexico and Caribbean Sea; in the eastern Atlantic it is distributed from the Mediterranean Sea to Namibia. Distribution in the Indo-Pacific Ocean includes South Africa and the Red Sea, throughout the Indian Ocean, and from Japan to New Caledonia, Hawaii (United States), and Tahiti. *S. lewini* is found in the eastern Pacific Ocean from the coast of southern California (United States) to Ecuador and perhaps as far south as Peru. In Australia, this hammerhead may be found off the northwestern Australia coast. It is found in the following FAO Fishing Areas: 21, 31, 34, 41, 47, 51, 57, 61, 71, 77, 87.

3.2 Habitat

As a coastal pelagic semi-oceanic species, *S. lewini* occurs over continental and insular shelves and adjacent deeper water. It has been observed close inshore, and even entering estuarine habitats, as well as offshore to depths of 275m. Adult aggregations are common at seamounts, especially near the Galapagos, Malpelo, Cocos and Revillagigedo Islands and within the Gulf of California.

3.3 Biological characteristics

Various studies have examined life history parameters for *S.lewini* (see summary in Annex 1). *Sphyrna lewini* in the northwestern Atlantic Ocean appears to grow more slowly and have smaller asymptotic sizes compared to conspecifics in the eastern and western Pacific Ocean. Growth rates, expressed as the von Bertalanffy growth parameter (k), are 0.09-0.13 year^{-1} in the Atlantic Ocean (Piercy et al. 2007), 0.13-0.15 year^{-1} in the eastern Pacific Ocean (Tolentino and Mendoza 2001) and 0.22-0.24 year^{-1} in the western Pacific Ocean (Chen et al. 1990). While geographic differences likely occur among populations, the much higher growth rate found for the western Pacific Ocean may be due more to growth band interpretation (i.e. aging methodology) rather than true biological differences.

The oldest known animal among all populations was 30.5 years for both males and females in the northwest Atlantic Ocean.

Male and female *S. lewini* in the northwest Atlantic Ocean attain sizes at maturity (131 cm FL male and 180-200 cm FL female; A. Piercy, University of Florida, personal communication) similar to those reported in the Mexican Pacific (Tolentino and Mendoza 2001), northeastern Brazil (Hazin et al. 2001), and Indonesian waters (White et al. 2008). Off the coasts of Taiwan, *S. lewini* males mature at similar sizes as males in the northwest Atlantic (Chen et al. 1988). However, *S. lewini* females in Taiwanese waters attain maturity at apparently smaller sizes (152 cm FL) than females in the Northwest Atlantic (161 cm FL). In north Australian waters, *S. lewini* males and females mature at notably shorter lengths than what is reported for many other *S. lewini* populations (Stevens and Lyle 1989). This suggests that regionally specific factors may be partly responsible for some of the variability in size-at-maturity estimations for *S. lewini*. The average litter size of *S. lewini* in northwest Atlantic waters (23; A. Piercy, University of Florida, personal communication) is greater than the mean reported by Hazin et al. (2001) in northeast Brazilian waters (14) but slightly less than the average litter size found by Chen et al. (1988) and White et al. (2008) in Taiwanese and Indonesian waters (25-26; both studies). Reproductive cycle analysis from all studies indicates an 8-12 month gestation period followed by a year resting period.

Demographic analyses using a variety of techniques have found that *S. lewini* have low intrinsic rates of population growth and productivity when compared to other sharks. Using a demographic method that incorporates density dependence, Smith et al. (1998) determined *S. lewini* had among the lowest productivity when compared to 26 other species of sharks. Cortés (2002), using a density independent demographic approach, calculated population growth rates (λ) of 1.086 yr^{-1} (r=0.082 yr^{-1}) for the northwest Atlantic Ocean population and 1.60 yr^{-1} for the western Pacific population. Generation times (T) are 16.7 and 5.7 years for the Atlantic and Pacific Oceans, respectively. The much higher population growth rate found for the western Pacific population may be due more to the growth information used in the demographic model than because of real differences. Recent Ecological Risk Assessments using updated life history information from the northwest Atlantic Ocean found that the productivity of *S. lewini* was 1.11 yr^{-1} (λ) (Cortés et al. 2009).

Overall estimates of the intrinsic rate of increase for this species (r~0.08-0.105 yr^{-1}) indicate that populations are vulnerable to depletion and will be slow to recover from over-exploitation based on FAO's low productivity category (<0.14 yr^{-1}) (FAO 2001) and Musick et al. (2000).

3.4 Morphological characteristics

S. lewini is distinguished from other hammerheads by an indentation located centrally on the front margin of the broadly arched head (Castro 1983). The head is expanded laterally, resembling a hammer, hence the common name "hammerhead". Two more indentations flank the main central indentation, giving this hammerhead a "scalloped" appearance.

The mouth is broadly arched and the rear margin of the head is slightly swept backward. The body of this shark is fusiform and moderately slender with a large first dorsal fin and low second dorsal and pelvic fins. The first dorsal fin is mildly falcate with its origin over or slightly behind the insertion point of the pectoral fins, and the rear tip is in front of the origin of the pelvic fin. The pelvic fin has a straight posterior margin while the anal fin is deeply notched on the posterior margin. The second dorsal fin has a posterior margin that is approximately twice the height of the fin, with the free rear tip nearly reaching the origin of the upper caudal lobe.

Within the hammerhead family, several species are differentiated from each other by variations within the cephalophoil. The great hammerhead (*S. mokarran*) is distinguished by a T-shaped head that has an almost straight front edge as well as a notch in the center. The smooth hammerhead (*S. zygaena*) has a broad, flat, un-notched head. The bonnethead (*S. tiburo*) is much easier to identify, with a shovel-shaped head. Another distinguishing characteristic of *S. mokarran* is the curved rear margin of the pelvic fins, while *S. lewini* has straight posterior edges.

3.5 Role of the species in its ecosystem

S. lewini is a high trophic level predator in coastal and open ocean ecosystems. It has a diverse diet, feeding on crustaceans, teleosts, cephalopods and rays (Compagno 1984). Cortés (1999) determined the trophic level to be 4.1 (maximum=5.0) for *S. lewini* based on diet information.

4. Status and trends

4.1 Habitat trends

S. lewini utilises coastal bays and estuaries as potential nursery areas (Duncan et al. 2006a; McCandless et al. 2007). Habitat degradation and pollution affect coastal ecosystems that juvenile sharks occupy during early life stages. However, the effects of these changes and their ultimate impact on populations of *S. lewini* are currently unknown.

4.2 Population size

Few population assessments are available globally for *S. lewini*. In the northwest Atlantic Ocean, Hayes et al. (2009) conducted an assessment using two surplus production models. From this study, population size in 1981 was estimated to be between 142,000 and 169,000 sharks, but decreased to about 24,000 animals in 2005 (an 83-85% reduction).

4.3 Population structure

Sphyrna lewini has strong genetic traits that distinguish regional populations and mtDNA lineages that appear to have been isolated within ocean basins for hundreds of thousands of years (Duncan et al. 2006b). Recent studies indicate that the Northwest Atlantic, Caribbean Sea and Southwest Atlantic populations of this species are genetically distinct from each other, as are the Eastern Central Atlantic and Indo-Pacific populations (Chapman et al. 2009 in review). The boundaries between each population are not yet completely defined due to sampling constraints. However, the "Caribbean Sea" population includes Belize and Panama and the "U.S. Gulf Of Mexico" population covers Texas (United States) through southwestern Florida (United States), and the boundary or transition zone is considered to lie between Texas and Northern Belize (Chapman et al. 2009 in review). Adult site fidelity and annual homing to seamounts are known to occur in the Gulf of California (Klimley 1999). Duncan et al. (2006b) concluded that nursery populations of *S. lewini* linked by continuous coastline have high connectivity, but that oceanic dispersal by adult females is rare. Tagging data indicate that *S. lewini* uses offshore oceanic habitat, but does not regularly roam across large distances. The median distance between mark and recapture of adults along the eastern United States for a total of 3,278 tagged individuals ranging in age from 0 to 9.6 years (mean = 2.3 years) was less than 100 km (Kohler and Turner 2001). These sharks are most often encountered over continental or island shelves; it is unusual to capture a hammerhead in the open ocean. There is no information on the size class and sex distribution of *S. lewini* populations.

4.4 Population trends

Estimates of trends in abundance of *S. lewini* are available for this species (see summary in Annex 2). Given the difficulties in differentiating species such as *S. lewini, S. mokarran*, and *S. zygaena* and the amalgamation of catch records, estimates of trends in abundance are also available for hammerheads as a complex.

Atlantic Ocean

Multiple data sources from the Atlantic Ocean have demonstrated substantial declines in populations of *S. lewini*. A standardized catch-rate index of a hammerhead complex (i.e., *S. lewini, S. mokarran, and S. zygaena*) from commercial fishing logbook data in the U.S. pelagic longline fishery between 1986 and 2000 and from observer data between 1992-2005 estimated a decline of 89% (Baum et al. 2003), while pelagic longline observer data indicated that *Sphyrna spp.* declined by 76% between 1992 and 2005 (Camhi et al 2009). Standardized catch per unit effort (CPUE) from a shark–targeted, fishery-independent survey off North Carolina (United States) from 1972 to 2003 indicated a decline of *S. lewini* by 98% over this 32 year time period (Myers et al. 2007). Off South Carolina (United States), Ulrich (1996) reported a 66% decrease in population size between estimates for 1983-1984 and estimates for 1991-1995. However, recent time-series analysis conducted since 1995 suggest that the northwest Atlantic population may be stabilized but at a very low level (Carlson et al. 2005). Two stock assessments are available for hammerhead populations in the northwest Atlantic Ocean. An assessment for a hammerhead complex (i.e., *S. lewini, S. mokarran*, and *S. zygaena*) in the northwest Atlantic Ocean, utilising catch and population trend data from multiple studies, found a 72% decline in abundance from 1981 to 2005 (Jiao et al 2008). Similarly, an assessment specific to *S. lewini* utilising similar data sources reported an 83% decline since 1981 (Hayes et al. 2009).

A meta-analysis of multiple time series from various gear types in the Mediterranean Sea suggestsdeclines of the hammerhead shark complex of up to 99.9% in different time periods, in one case since the early 19th century (Ferretti et al. 2008). Elsewhere in the eastern Atlantic Ocean, data indicating trends in abundance are generally not available. However, Zeeberg et al. (2006) suggested that similar population trends for hammerheads (grouped) documented in the northwest Atlantic could be expected in the northeast and eastern central Atlantic. This is because longline fleets in these areas exert comparable fishing effort, and effort is seen to shift from western to eastern Atlantic waters (Buencuerpo et al*.* 1998; Zeeberg et al. 2006).

In the southwest Atlantic Ocean off Brazil, CPUE analyses of inshore fisheries indicate adult female *S. lewini* decreased between 60 and 90% from 1993 to 2001 (Vooren and Klippel, 2005). However, nominal CPUE from commercial fishing logbook data of a hammerhead shark complex caught by the Brazilian tuna longline fleet from 1978 to 2007 indicated a relatively stable trend (Felipe Carvalho, University of Florida, personal communication). This indicates that declines may be more severe in inshore areas where *S. lewini* are more common.

Pacific Ocean

Off Central America, large hammerheads were formerly abundant in coastal waters but were reported to be depleted in the 1970s (Cook 1990). A comparison of standardized catch rates of pelagic sharks (species-specific information was not available) in the Exclusive Economic Zone of Costa Rica from 1991 to 2000 showed a decrease of 60% in catch rates (Arauz et al. 2004). In 1991, sharks comprised 27% of the total catch in this area. In 2000, only 7.64% of the total catch was sharks, and in 2003 this decreased further to 4.9% of the total catch (Arauz et al. 2004). In 2001 and 2003, *S. lewini* only constituted 0.14% and 0.09% of the total catch by individuals, respectively. Myers et al. (2007) determined a 71% decline in *S. lewini* populations in the Cocos Island National Park (Costa Rica), despite this area being designated a “no take zone” from 1992 to 2004.

In Ecuador, catch records for combined *S. lewini*, *S. mokarran*, and *S. zygaena* indicated a peak in landings of approximately 1000t in 1996, followed by a decline through 2001 (Herrera et al. 2003). Landings of *S. lewini* caught by artisanal longline and drift-net fleets in the Port of Manta (which accounts for 80% of shark landings in Ecuador) were about 160t in 2004, 96t in 2005 and 82t in 2006. Artisanal fishery landings in the Port of Manta of *Sphyrna spp.* declined by 51% between 2004 and 2006 (Martínez-Ortíz et al. 2007).

An independent assessment of shark catch in the Queensland Shark Control Program (QSCP), which was designed to examine long-term trends (44-year dataset) in shark stocks, found that catch rates of hammerheads have decreased by more than 85% since the onset of the program. The preliminary results of this study suggest an overall long-term decline in hammerheads in the Cairns and Townsville regions, where the study was focused (de Jong and Simpfendorfer 2009).

Indian Ocean

Species-specific catch information is available for shark nets deployed off the beaches of Kwa-Zulu Natal, South Africa, in the southwestern Indian Ocean, from 1978 to 2003 (Dudley and Simpfendorfer 2006). CPUE of *S. lewini* declined significantly during this period from approximately 5.5 sharks/km net/year, to approximately 2 sharks/km net/year (Dudley and Simpfendorfer 2006). These trend data indicate a decline of approximately 64% over a 25-year period. Dudley and Simpfendorfer (2006) also reported large catches of newborn *S. lewini* by prawn trawlers on the Tudela Bank, South Africa, ranging from an estimated 3,288 sharks in 1989 to 1,742 sharks in 1992.

Although there have been few formal assessments of hammerhead populations in western Australia, a 50-75% decline in hammerhead CPUE was observed in the WA North Coast Shark Fishery for 2004 and 2005 compared to 1997 and 1998 (Heupel and McAuley 2007).

Global

Multiple studies over multiple areas indicate this relatively low-productivity species has declined to at least 15-20% of baseline for long-term abundance series. Based upon 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. *S. lewini* is listed on the IUCN Red List of Threatened Species as Endangered globally.

4.5 Geographic trends

None available.

5. Threats

S. lewini is taken as catch and bycatch in domestic fisheries within Exclusive Economic Zones, as well as in multinational fisheries on the high seas. This species is highly desired for the shark fin trade because of the fin size and high fin-ray count (i.e. ceratotrichia) (Rose 1996). Catches of S. lewini are often amalgamated into Sphyrna spp., with S. zygaena. Despite their distinctive head morphology, hammerheads are largely underreported; discrepancies are evident when compared to trade statistics. The FAO database reports hammerheads in three categories: "hammerhead sharks" "smooth hammerhead" and "scalloped hammerhead." In 2007, these category landings were 3,645t, 319t and 202t, respectively, with the large majority of them coming from the Atlantic Ocean (FAO 2009).

Atlantic Ocean

In the northwest Atlantic Ocean, *S. lewini* is caught as bycatch in bottom and pelagic longlines and coastal gillnet fisheries. *S. lewini* also made up a significant portion of recreational fishing landings in the 1980s following release of the movie "Jaws". U.S. catch reports on commercial and recreational landings data (including discards) peaked in 1982 at about 49,000 sharks. Currently landings are only about 2,500-6,000 animals, but this is largely due to increased regulation and reduction in quotas in U.S. shark fisheries (Hayes et al. 2009).

Off the Atlantic coast of Belize, hammerheads were fished heavily by longline in the 1980s and early 1990s (R.T. Graham personal communication to IUCN, 2006). Interviews with fishers indicated that the abundance and size of Sphyrnids have declined dramatically in the past 10 years as a result of over-exploitation, leading to a halt in the Belize-based shark fishery (R.T. Graham personal observation 2006). However, the pressure is still sustained by fishers entering Belizean waters from Guatemala (R.T. Graham, personal communication to IUCN, 2006). *S. lewini* is also taken in various fisheries along the Caribbean coast of South America and in artisanal gillnet fisheries targeting mackerel off Guyana, Trinidad and Tobago and in pelagic tuna fisheries of the eastern Caribbean Sea (Shing 1999).

S. lewini is threatened in Brazil by two main sources of fishing mortality: fishing of juveniles and neonates on the continental shelf by gillnets and trawl nets (Vooren and Lamónaca 2003, Kotas and Petrere 2002), and fishing of adults with gillnets (only in Brazil) and longlines on the continental shelf and oceanic waters (Kotas et al. 2000, Kotas and Petrere 2002, Kotas and Petrere 2003).

Combined annual landings of hammerhead sharks in the ports of Rio Grande and Itajaí (Brazil), increased rapidly from approximately 30t in 1992 to 700t in 1994, after which catches decreased, fluctuating between 100-300t from 1995 to 2002. The majority of this catch was taken by surface gillnet fisheries that targeted hammerhead sharks on the outer shelf and slope between 27° and 35°S (Vooren et al. 2005). There is also evidence to suggest that surface gillnet fisheries target adult *S. lewini* as they aggregate on the upper slope (Vooren et al. 2005). Neonates and small juveniles are caught in coastal waters by directed gillnet fishing and as bycatch in bottom trawls (Vooren et al. 2005). In inshore areas (depths down to 10m), neonates are fished intensively by coastal gillnets and are also caught as bycatch by shrimp trawl, pair trawl and intensive recreational fisheries. Their abundance in coastal waters has decreased markedly as a result (Haimovici and Mendonça 1996, Kotas et al. 1998, 2000, Kotas and Petrere 2002). Adults are also targeted by surface gillnet fisheries. Finning of hammerhead sharks, with discarding of the carcasses at sea, is often practiced (Kotas 2000, Vooren and Klippel 2005). Fisheries statistics only refer to the landed carcasses and therefore the true extent of catches is unknown. The Brazilian pelagic fishery based in Santos catches significant numbers of sharks, including *S. lewini* (Amorim et al. 1998). Until 1997, most of this shark catch was discarded, but greater demand for fins and flesh has resulted in a substantial increase in retention rates and targeting of sharks (Bonfil et al. 2005). Given the high level of largely unregulated fishing pressure on both juveniles and adults in this region, similar declines to those documented in the northwest and western central Atlantic are suspected here.

S. lewini is caught by both inshore artisanal fisheries and offshore European fisheries operating along the coast of western Africa. A study of bycatch rates in European industrial freeze trawlers targeting small pelagic fish off Mauritania from 2001 to 2005 showed that *Sphyrna* species combined represented 42% of total bycatch during this period (Zeeberg et al. 2006). The Subregional Workshop for Sustainable Management of Sharks and Rays in West Africa, 26-28 April 2000 in St. Louis, Senegal (Anon 2002) noted the high threat to sharks in the West African region and a noticeable decline in the CPUE of total sharks and rays. Walker et al. (2005) also noted that there was concern for *S. lewini* off Mauritania, with catches comprised exclusively of juveniles. Increased targeting of sharks began in the 1970s, when a Ghanaian fishing community settled in Gambia and established a commercial network throughout the region, encouraging local fishermen to target sharks for exportation to Ghana. By the 1980s, many fishermen were specialising in catching sharks, resulting in a decline in overall shark populations (Walker et al. 2005).

S. lewini is frequently caught along the western African coast and is heavily targeted by driftnets and fixed gillnets from Mauritania to Sierra Leone (M. Ducrocq personal communication to IUCN 2006). There is anecdotal evidence for some declines in catches off Senegal and Gambia (M. Ducrocq personal communication to IUCN, 2006). *S. lewini* were taken as bycatch in the milk shark fishery and in the Banc d'Aguin National Park, Mauritania, until the fishery was stopped in 2003, and they are still caught in large quantities in the Sciaenid fishery. A specialized artisanal fishery for carcharhinid and sphyrnid species was introduced in Sierra Leone in 1975, and since then fishing pressure has been continuous (M. Seisay personal observation to IUCN, 2006).

Pacific

Throughout the eastern Pacific Ocean, *S. lewini* juveniles are heavily exploited in directed fisheries, and are also taken as bycatch by shrimp trawlers and coastal fisheries targeting teleost fish. Fishing pressure directed at juveniles also appears to have increased in parts of the Gulf of California and off western Costa Rica. Increased fishing pressure from international longline fleets in the eastern central Pacific and southeast Pacific, driven by increasing demand for fins, is of concern. Furthermore, as traditional and coastal fisheries in Central America are depleted, domestic fleets have increased pressure at adult aggregating sites such as Cocos Island (Costa Rica) and the Galapagos Islands (Ecuador), or along the slopes of the continental shelf where high catch rates of juveniles can be obtained (Vargas and Arauz 2001).

In the Gulf of California, *S. lewini* is common in the directed artisanal elasmobranch fisheries of Sonora, Sinaloa, Baja California, and Baja California Sur, Mexico. Juveniles dominate the overall landings of this species; most are less than 100cm total length (Smith et al. 2009). Bottom set gillnets and longlines produce the majority of the catch. Adults are landed in artisanal pelagic longline and gillnet fisheries, but represented less than 20% of the total number of *S. lewini* observed in artisanal catches during 1998 and 1999 fisheries surveys (Smith et al. 2009). Landings data for 1996-1998 from the Gulf of Tehauntepec, Mexico, indicated that *S. lewini* was the second-most important shark caught in the artisanal shark fishery, representing 36% of the total catch from a sample of 8,659 individuals (Soriano et al. 2002). Off Pacific Guatemala, the importance of this species in the fishery landings appears to vary across areas, from 6% (n=339) to 74% (n=800) of the total catch from 1996-1999 (Ruiz and Ixquiac 2000). Data from El Salvador collected from July 1991 to June 1992, indicate that this species represented 11.9% of the landed catch in a sample of 412 specimens (Villatoro and Rivera 1994).

Gribble et al. (2004) determined that *S. lewini* constituted a large proportion (18%) of the Queensland East Coast (Australia) shark catch and had a high-risk sustainability due to a combination of low productivity and relatively high mortality. Harry et al. (2009) found that *S. mokarran* and *S. lewini*, which combined make up about 30% by weight of the total shark catch in the East Coast Inshore Finfish Fishery on the east coast of Queensland, can withstand a moderate amount of fishing pressure because the species are still quite common. The study also found that these species are extremely susceptible to all types of fishing, as all size classes may be caught in nets regardless of the mesh size.

Indian Ocean

Scalloped hammerhead sharks are often targeted by some semi-industrial, artisanal and recreational fisheries and are a bycatch in industrial fisheries (pelagic longline tuna and swordfish fisheries and purse-seine fisheries) in the Indian Ocean. There is little information on the fisheries prior to the early 1970s, and some countries continue not to collect shark data. Other countries collect data, but do not report it to the

Indian Ocean Tropical Tuna Commission. It appears that significant catches of sharks have gone unrecorded in several countries. Furthermore, many catch records probably under-represent the actual catches of sharks because they do not account for discards (i.e. do not record catches of sharks for which only the fins are kept or of sharks that are usually discarded because of their size or condition) or they reflect dressed weights instead of live weights.

S. lewini is captured in various fisheries throughout the western Indian Ocean. Countries with major fisheries for sharks include the Maldives, Kenya, Mauritius, Seychelles and United Republic of Tanzania (Young 2006). Sharks are considered fully- to over-exploited in these waters (Young 2006).

Landings data for Oman, beginning in 1985, are available from FAO. *S. lewini* is one of five dominant species in the catches of Oman. Since 1985, landings of sharks for Oman varied between 2,800– 8,300t, with peaks noted during 1986–1988 and 1995–1997. After 1997, landings continued to decline to under 4,000t in 2000 (FAO 2008). Oman has a long-established traditional shark fishery (Henderson et al. 2007). Henderson et al. (2007) surveyed landings sites in Oman between 2002 and 2003 and reported a notable decline in catches of *S. lewini* in 2003, although the trend varied between areas. Henderson et al. (2007) noted large pelagic sharks such as *S. lewini* were displaced during 2003 by smaller shark species. Although it is possible that this is due to sampling bias, informal interviews with fishermen revealed a general trend of declining shark catches over the last number of years, particularly large pelagic species (Henderson et al. 2007). Artisanal gillnet and longline fisheries also target sharks off Madagascar for their fins. A study of directed shark fisheries at two sites in southwest Madagascar during 2001-2002 showed that hammerhead sharks represented 29% of sharks caught and 24% of the total wet weight, but species-specific data are not available because fishers do not differentiate between *S. lewini* and *S. zygaena* (McVean et al. 2006).

Off Indonesia, *S. lewini* is a target and bycatch species of shark longline, tuna gillnet fisheries and trawls in several areas of this region (White et al. 2006, SEAFDEC 2006). White et al. (2008) noted that substantial catches of *S. lewini* were taken in gillnet and longline fisheries. Inshore fishing pressure is intense throughout Southeast Asia and juveniles and neonates are heavily exploited, with large numbers of immature sharks caught in other areas (SEAFDEC 2006). Foreign vessels are also reported to target sharks in eastern Indonesian waters (Clarke and Rose 2005). Given the marked declines in this species' abundance in areas for which data are available, there is reason to suspect that declines have also occurred in other areas of the Indian Ocean and Western Pacific, where fishing pressure is high.

6. Utilization and trade

6.1 National utilization

Hammerhead meat is often considered unpalatable because of high urea concentrations, but it is consumed domestically (Rose 1996). According to Vannuccini (1999), countries documented to consume hammerhead meat (usually salted or smoked) include Mexico, Mozambique, the Phillipines, Seychelles, Spain, Sri Lanka, China (Taiwan), Tanzania and Uruguay. *S. lewini* is a preferred species for production of leather and liver oil (Rose 1996). There is also utilisation of jaws and teeth as marine curios. There is also some catch by recreational fishing anglers in some coastal areas, particularly off the southeastern United States. In some countries, shark fins are retained for local consumption.

6.2 Legal trade

Foreign shark trade information is not documented to the species level for sharks in the Harmonized Tariff Schedule; therefore, specific information about overall quantities or value of imports or exports is not available. International trade in *S. lewini* products is unregulated. The problem of species-specific trade data is also hampered by the fact that most parties do not report catches to species level to FAO or Regional Fisheries Management Organizations. However, information on the trade of shark fins can be obtained by examination of the Hong Kong Fin Market, whose trade in fins represented 65-80% of the global market from 1980 to1990 (Clarke 2008) and 44-59% of the market from 1996 to 2000 (Fong and Anderson 2000; Clarke 2004). Prior to 1998, imports of fins to Hong Kong were reported as either dried or frozen ("salted") without distinguishing between processed and unprocessed fins. In order to avoid double counting fins returning to Hong Kong from processing in mainland China, only unprocessed dried and frozen fins were included in total imports to Hong Kong. Hong Kong shark-fin traders use 30–45 market categories for fins (Yeung et al. 2000), but the Chinese names of these categories do not correspond to the taxonomic names of shark species (Huang 1994). Instead, Chinese market categories for shark fins appear to be organized primarily by the quality of fin rays produced and secondarily by distinguishing features of dried fins. Using commercial data on traded weights and sizes of fins, the Chinese category for hammerhead shark, coupled with DNA and a Bayesian statistical model to account for missing records, Clarke et al. (2006a,b) estimated the percentage and volume of hammerhead sharks traded for fins, globally (see section 6.3.2).

6.3 Parts and derivatives in trade

Fins are the primary product from *S. lewini* in international trade (also see section 6.2). There is some international trade in meat. Other types of *S. lewini* products, including skin, liver oil, cartilage and teeth, are not traded in large quantities or are not separately recorded in trade statistics (Clarke 2004). Demand for these products appears to fluctuate over time with changes in fashion, medical knowledge and the availability of substitutes. There are numerous difficulties in using the existing trade databases to quantify trends in the shark trade by species. For example, none of the 14 commodity categories used by FAO for chondrichthyan fishes can be taxonomically segregated, with the exception of four categories for various forms of dogfish sharks (family Squalidae). Furthermore, because of non-specific reporting of both trade and capture production figures by many countries, sharks are commonly aggregated into generic fish categories. Therefore, at present, quantitative analysis of shark product trade based on FAO data can only be conducted for generic shark products. The use of commodity codes also varies considerably among countries, further complicating the traceability of products by species and provenience. Any information on trade in *S. lewini* products, other than fins, mostly is from observation of personnel in the field.

6.3.1 Meat

Shark flesh is used in some regions, most particularly in Europe, with northern Italy and France as the major consuming countries and Spain as the world's largest exporter of shark meat (Vannuccini 1999). While hammerhead sharks have the highest urea concentration, which gives the meat a particular smell and a somewhat bitter and acid taste, some reports indicate imports and exports of hammerhead meat. According to Lovatelli (1996), Kenyan dried and salted shark meat is sold in units of 16kg and by grades (1-6). Quality, as well as species, determines grades. Grade 1 is the highest quality and includes hammerhead shark which is preferred for exports inside Africa. Imports of hammerhead meat from the Seychelles to Germany were noted by Fleming and Papageogio (1996). Although trade information is not documented to species, Vannuccini (1999) indicated hammerhead shark meat was a favoured imported species for meat in countries like Spain and Japan. Uruguay indicated exports of hammerhead meat to Brazil, Spain, Germany, Netherlands and Israel (Vannuccini 1999).

6.3.2 Fins

Hammerhead shark fins are highly desired in international trade because of their size and high needle (ceratotrichia) count (Rose 1996). According to Japanese fin guides (Nakano 1999), *S. zygaena* fins, which are morphologically similar to *S. lewini*, are thin and falcate with the dorsal fin height longer than its base. 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. An assessment of the Hong Kong shark fin market has revealed that various Chinese market categories contain fins from hammerhead species: "Bai Chun" (*S. lewini*), "Gui Chun" (*S. zygaena*), "Gu Pian" (*S. mokarran*), and the general category "Chun Chi" containing both *S. lewini* and *S. zygaena* in an approximately 2:1 ratio, respectively. In addition, fins from *C. plumbeus* are identified as "Bai qing" and *C. obscurus* as "Hai hu" by Hong Kong fin traders. Abercrombie et al. (2005) reported that traders stated that hammerhead fins were one of the most valuable fin types in the market. Compilation of market prices from auction records (Clarke 2003) indicated an average, wholesale, unprocessed fin market value of US $135/kg for "Gu Pian", $103/kg for "Bai Chun" and $88/kg for "Gui Chun", indicating preferences for these species in trade. Together, *S. lewini* with *S. mokarran* and *S. zygaena* account for nearly 6% of the identified fins entering the Hong Kong shark fin market (Clarke et al. 2006b). *Sphyrna lewini* and *S. zygaena* account for 4.4% of the fin trade. Using commercial data on traded weights and sizes of fins, the Chinese category for hammerhead shark fins, coupled with DNA and Bayesian statistical analysis to account for missing records, Clarke et al. (2006a,b) estimated that 1.3 and 2.7 million sharks of these species, equivalent to a biomass of 49,000–90,000t, are harvested for the fin trade each year.

6.4 Illegal trade

There is little regulation of trade in these species, and the extent of illegal trade activities is unknown.

Hammerhead sharks have been documented in illegal, unreported, and unregulated (IUU) fishing activities. For example, about 120 longline vessels were reportedly operating illegally in coastal waters of the western Indian Ocean prior to 2005, and this number was expected to increase (IOTC 2005). These vessels were primarily targeting hammerhead sharks and giant guitarfish *Rhynchobatus djiddensis* for their fins (Dudley and Simpfendorfer 2006). Illegal fishing by industrial vessels and shark finning are also reported in other areas of the Indian Ocean (Young 2006).

Illegal fishing around the Galapagos is not only practiced by fishers from the Galapagos, but also by the industrial and artisanal fleet from continental Ecuador and international fleets (Coello 2005). These illegal fisheries target sharks for their fins. There are no species-specific data for these fisheries, but *S. lewini* is one of the most common species around the Galapagos (J. Martinez personal observation), and given the high value of fins of this species, it is very likely that it is targeted in illegal finning activities. In an effort to help stop illegal finning in the Galapagos, the Ecuadorian Government issued a decree in 2004 prohibiting fin export from Ecuador. Unfortunately, the Decree only resulted in establishing new illegal trade routes, with fins now exported mainly via Peru and Colombia. Interviews with fishers and traders in both Ecuador and Peru suggest that there are illegal trade routes for fins transported both from Ecuador and directly from Galapagos to Peru (Saenz 2005, WildAid 2005).

A recent assessment of IUU fishing for sharks was compiled from a review of the available literature by Lack and Sant (2008). The authors found hammerhead shark *Sphyrna spp.* and silky shark *Carcharhinus falciformis* to be the most frequently cited species taken in illegal fishing.

6.5 Actual or potential trade impacts

Though *S. lewini* is landed and sold in domestic markets and contributes to subsistence needs in some coastal communities, the predominant demand for this species is the international fin trade. Current landing levels may be unsustainable (see section 6.3).

7. Legal instruments

7.1 National

In the United States, *S. lewini* is included in the Large Coastal Shark complex management unit in the U.S. 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan (National Marine Fisheries Service 2008), which includes commercial shark quotas and recreational retention limits. In addition, all U.S. Atlantic sharks must be landed with their fins naturally attached to the shark carcass. There are, however, no management measures specific to this species. The Spanish Ministry of Environment and Rural and Marine Affairs will prohibit the capture of *S. lewini* by means of a Ministerial Order set to enter into force 1 January 2010. Spanish fishing ships will not be able to catch, transfer, land or commercialise these sharks in any of the fishing grounds they target. In an effort to help stop the illegal finning occurring in the Galapagos, the Ecuadorian Government issued a decree in 2004 prohibiting fin export from Ecuador. Unfortunately, the Decree resulted in establishing illegal trade routes, with fins now being exported mainly via Peru and Colombia where there is no finning ban in place.

7.2 International

Hammerheads are listed in Annex I of UNCLOS and therefore should be subject to its provisions concerning fisheries management in international waters. Like other sharks, however, no international catch limits have been adopted and few countries regulate hammerhead shark fishing. In 2008, the European Community proposed a prohibition on retention of all hammerhead species under ICCAT, but the measure met with opposition and was defeated. Most Regional Fisheries Management Organizations have implemented finning bans which, if effectively enforced, could reduce the number of hammerheads killed exclusively for their fins.

8. Species management

8.1 Management measures

No species-specific management exists.

8.2 Population monitoring

Population monitoring requires collection of catch data as initial input for stock assessment. Species-specific landings data are lacking; hammerhead catches are often amalgamated as *Sphyrna spp.*, and *S. zygaena* and *S. lewini* are often confused and misidentified. Maguire et al. (2006) reported that, of all hammerheads caught in world fisheries, only *S. lewini* and *S. zygaena* are reported as individual species in FAO statistics. However, landings have only been reported from the Atlantic and Pacific Ocean. In 2004, ICCAT (Rec. 04-10) required all members to annually report shark catches and effort data.

8.3 Control measures

8.3.1 International

n/a

8.3.2 Domestic

n/a

8.4 Captive breeding and artificial propagation

n/a

8.5 Habitat conservation

n/a

8.6 Safeguards

n/a

9. Information on similar species

Because of the difficulty in identification of these larger hammerhead species, catches of *S. lewini* are often amalgamated with *S. mokarran* and *S. zygaena*. As fins in trade, hammerhead fins, along with fins from *C. plumbeus* and *C. obscurus*, are morphologically similar to *S. lewini*. Fins from all these species are thin and falcate with the dorsal fin height longer than its base. 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. Further information relative to their biology and status can be found in Annex 3 and Annex 4.

10. Consultations

Country	Support Indicated (Yes/No/ Undecided/ No Objection)	Summary of Information Provided
Australia	Undecided	Species are not protected under Australian law; in development of a CITES Shark Species of Concern list earlier this year, Australia agreed with prioritization of hammerheads as a group, as well as sandbar, dusky, and oceanic whitetip sharks; dusky, sandbar, and oceanic whitetip are harvested commercially as target catch and bycatch in Australian waters; analysis of CPUE data for dusky

		sharks suggest that the breeding stock has been in decline, which has caused a reduction in recruitment; species-specific management regulations have been implemented to prohibit take of older dusky sharks; sandbar sharks have also been in decline; reductions in fishing mortality appear to have been partially achieved through new management measures; pelagic sharks are poorly recorded in catch statistics; all hammerhead sharks are found in Australian waters; there are no target fisheries for hammerheads in Australia, although they are taken as bycatch in small quantities and utilized for meat and fins; according to Australia, these species may meet the CITES criteria in the northwest Atlantic, but there are unlikely to be sufficient data to demonstrate this for other regions; identification of fins in international trade would be very difficult except for unprocessed dorsal fins of large great hammerheads.
Azerbaijan	No objection	These species are not found in the Caspian Sea; no scientific data are available on the status of these populations; no trade data are available.
Canada	Undecided	Sandbar, dusky, oceanic whitetip, and smooth hammerhead are extremely rare in Canadian waters; scalloped and great hammerhead are not found at all within Canadian waters; there are no directed harvests and bycatch is uncommon.
Cape Verde	Undecided	Does not have any information at this time; will provide information at a later date.
China (Hong Kong)	Undecided	Does not have fishery targeting sharks, but are caught as bycatch; no data are available; provides report on shark fisheries and trade in shark products in Hong Kong; raised concerns about practicality of implementation and enforcement of listing in CITES due to identification issues.
Colombia	Support	The inclusion of these species will generate an institutional arrangement of environmental and fisheries authorities to meet the challenge of regulating international trade in these species; Colombia calls attention to their experience in the management and administration of marine species under the CITES Convention, such as queen conch, one of the best-managed fisheries in the country.
Croatia	Undecided	Sandbar and smooth hammerhead are native to the Adriatic Sea and are protected by the Nature Protection Act.
Ecuador	Undecided	In Ecuador, directed fishing for sharks is illegal, and therefore, its inclusion in CITES Appendix II would be consistent with the spirit of protection of these species encouraged by national legislation; the Environmental and Fisheries Authorities recognize the need to establish regional management for the following species of sharks: i) *Sphyrna lewini*; ii) *Sphyrna zygaena*; iii) *Isurus oxyrinchus*, iv) *Carcharhinus falciformis*, v) *Alopias pelágicus* and vi) *Prionace glauca*.
Finland	Undecided	Species do not occur in their waters and no active fishing exists; some shark pieces are sold in Finland, but origin is unknown.
France	Undecided	Species are not harvested; some bycatch of scalloped hammerhead and sandbar shark may occur by tuna fisheries in tropical areas, but no data are available; species are neither imported nor exported.
Germany	Undecided	Only smooth hammerhead is recorded in their waters and is presumably rare; no data available.
Greenland	Undecided	Species do not occur in their waters; no data available.
Iceland	Undecided	None of these species has ever been recorded in Icelandic waters.
Indonesia	Undecided	No species-specific biological or trade data available; none of the species are protected; Indonesia is one of the world's top shark harvesters and exporters; Indonesia is formulating a National Plan of Action for sharks; raised concern about differentiating parts of listed species from non-listed species.

Italy	Undecided	Consultation with scientific experts has been initiated, but does not currently have information.
Kenya	Undecided	No data available; willing to conduct a landing site interview with fishermen to develop better understanding of shark fisheries.
Latvia	Undecided	No shark species in the wild; no national legislation for these species; species are not imported or exported.
Madagascar	Undecided	Dried shark fins of *Carcharhinus* spp. were exported to the European Union in the following quantities: 37892.40 kg (2007) and 37732.20 kg (2008); these are the only shark fins that are exported; there is no distinction made between species.
Malawi	Undecided	Is not a range state.
Mexico	Undecided	Species are captured and unloaded in Mexico and meat is sold on national markets for consumption; fins are sent to Asia; quantification of exports on fins and shark products at the species level is considered difficult; Mexico has fisheries management measures.
Monaco	Yes	Does not trade in species; will support due to interest in biodiversity conservation and since sharks reside in the same ecosystem as tuna.
Montenegro	Yes	Dusky shark, great hammerhead, and scalloped hammerhead are not present in the Adriatic Sea; sandbar shark and smooth hammerhead are rare in the Adriatic Sea.
Morocco	Undecided	Great hammerhead are found in Moroccan waters; this species is exploited seasonally by several fisheries (longliners, trawlers, and artisanal fisheries); present shark landings are ~3000 tons; landings are not separated by species; are initiating a program studying the biological status of these species and expressed willingness to cooperate with the U.S. on a program; shark measures include 5% maximum total harvest, logbook requirements, prohibition on manipulation of sharks on board, and prohibition on finning and oil extraction.
Namibia	Undecided	Species have not been observed in Namibian waters and no data are available; Namibia does not support the unilateral decision by parties to propose the listing of commercially important aquatic resources without the cooperation of FAO; therefore, they will not support a CITES listing for these species "if not done in cooperation with FAO."
Netherlands	Undecided	Species do not occur in North Sea; no data on catch or bycatch.
New Zealand	Undecided	Data are currently unavailable and will be provided in early September.
Peru	Undecided	Sandbar and dusky are not registered in Peru; among the hammerhead sharks in Peru, smooth hammerhead is caught as bycatch and is recorded throughout the coast as the most abundant and common species caught by the artisanal fishery (mostly with gillnet); there are no documented reports of fishing that impacts other hammerhead species; this species is marketed fresh and frozen for direct consumption; fins are collected and grouped with other fins and exported to Asia; fin export is not recorded by species; according to Peru, they do not have the necessary information to support a listing of Peruvian shark species in CITES.
Poland	Yes	No trade data available; suggestion made to elaborate identification guides to assist in the identification of fins and teeth.
Russia	Undecided	Species are not distributed in Russian waters and not harvested by Russian fishermen; no data are available.
Serbia	Yes	No data available.
Sweden	Undecided	Rarely found in Swedish waters; there are no exports from Sweden of these species, and little to no import of shark products to Sweden.
Thailand	Undecided	Caught as bycatch.

Turkey	No objection	Fishing for sandbar shark is prohibited year-round; shark species are not targeted in Turkey's fisheries but are caught as bycatch.
Ukraine	No objection	Species do not occur in Ukrainian waters; these species are not commercially caught by Ukrainian vessels; the following shark species were imported into the Ukraine in 2009 (8 months): *Squalus acanthias* (22 kg); *Scyliorhinus* spp. (172 kg); and other sharks unidentified (34,090 kg).
Vietnam	Undecided	No record of dusky shark or smooth hammerhead in Vietnam's waters; sandbar shark are mainly distributed in the open seas of central and southeast Vietnam; scalloped hammerhead and great hammerhead have only been recorded in the Gulf of Tonki (North Sea) and are incidentally found in fisheries in low ratios.

11. Additional remarks

The United States intends to submit an Information Document that will identify and propose solutions to potential implementation issues that need to be addressed during the 18-month delayed implementation period.

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Life history parameters for scalloped hammerhead shark

Growth rate (von Bertalanffy k)	0.13 yr^{-1} (M, NW Atlantic) 0.09 yr^{-1} (F, NW Atlantic) 0.13 yr^{-1} (M, eastern Pacific) 0.15 yr^{-1} (F, eastern Pacific) 0.22 yr^{-1} (M, western Pacific) 0.25 yr^{-1} (F, western Pacific)	Piercy et al. (2007) Tolentino and Mendoza (2001) Chen et al. (1990)
Size at Maturity	131 cm FL (M, NW Atlantic) 180-200 cm FL (F, NW Atlantic) 152 cm FL (M, western Pacific) 161 cm FL (F, western Pacific) 108-123 cm FL (M, northern Australia) 154 cm FL (F, northern Australia) 138-154 cm FL (M, SW Atlantic) 184 cm FL (F, SW Atlantic) 135 cm FL (M, Indo-Pacific) 175-179 cm FL (F, Indo-Pacific)	Piercy (personal communication) Tolentino and Mendoza (2001) Chen et al. (1988) Stevens and Lyle (1989) Hazin et al. (2001) White et al. (2008)
Age at Maturity	6 years (M, NW Atlantic) 15-17 years (F, NW Atlantic)	Piercy (personal communication)
Observed longevity	30.5 years (NW Atlantic) 12.5 years (eastern Pacific) 14 years (western Pacific)	Piercy et al. (2007) Tolentino and Mendoza (2001) Chen et al. (1990)
Gestation period	8-12 months (Global)	Piercy (personal communication) Chen et al. (1988) Hazin et al. (2001) White et al. (2008)
Reproductive Periodicity	2 years	Piercy (personal communication) Chen et al. (1988) Hazin et al. (2001) White et al. (2008)
Litter size (mean)	Global range=12-41 23 (NW Atlantic) 14 (SW Atlantic) 25-26 (Indo-Pacific)	Piercy (personal communication) Chen et al. (1988) Hazin et al. (2001) White et al. (2008)
Generation time (T)	20 years	Cortés et al. (2008)
Population growth rates (r)	0.09 $year^{-1}$	Cortés et al. (2009)

Summary of population and abundance trend data for scalloped hammerhead and *Sphyrna spp.* complex.

Year	Location	Data	Trend	Reference
1972-2003	NW Atlantic Ocean	Fishery independent survey (CPUE)	98% decline*	Myers et al. (2007)
1992-2003	NW Atlantic Ocean	Commercial pelagic fishery logbook (CPUE)	89% decline*	Baum et al. (2003)
1992-2005	NW Atlantic Ocean	Commercial pelagic longline observer program (CPUE)	76% decline*	Baum et al. (2003)
1983-1984 and 1991-1995	NW Atlantic Ocean	Fishery independent survey (CPUE)	66% decline	Ulrich (1996)
1994-2005	NW Atlantic Ocean	Commercial gillnet observer program (CPUE)	25% decline*	Carlson et al. (2005)
1994-2005	NW Atlantic Ocean	Commercial shark longline observer program (CPUE)	56% increase*	Hayes et al. (2009)
1995-2005	NW Atlantic Ocean	Fishery independent survey (CPUE)	44% decline*	Ingram et al. (2005)
1981-2005	NW Atlantic Ocean	Stock assessment (catch, life history, CPUE)	72% decline*	Jiao et al. (2008)
1981-2005	NW Atlantic Ocean	Stock assessment (catch, life history, CPUE)	83% decline*	Hayes et al. (2009)
1898-1922 1950-2006 1978-1999 1827-2000	Mediterranean Sea	Sightings, trap, longline (CPUE)	99% decline*	Ferretti et al. (2008)
1993-2001	SW Atlantic Ocean	Landings	60-90% decline	Vooren et al. (2005)
1978-2007	SW Atlantic Ocean	Commercial pelagic longline observer program (CPUE)	None	Carvalho (personal communication)
1992-2004	Eastern Pacific Ocean	Sightings	71% decline*	Myers et al. (2007)
2004-2006	Eastern Pacific Ocean	Landings	51% decline	Martinez-Ortiz et al. (2007)
1963-2007	Western Pacific Ocean	Beach mesh (CPUE)	85% decline	de Jong and Simpfendorfer (2009)
1978-2003	Western Indian Ocean	Beach mesh (CPUE)	64% decline*	Dudley and Simpfendorfer (2006)
1997-1998 and 2004-2005	Eastern Indian Ocean	Catch (CPUE)	50-75% decline	Heupel and McAuley (2007)

*Indicates the data has undergone a statistical standardization to correct for factors unrelated to abundance

Supplemental information concerning species proposed for listing under Conf. 9.24 (Rev. CoP13) Annex 2b. Information was summarized from AC24 Doc. 14.1 (Conservation and management of sharks and stingrays- Activities Concerning Shark Species of Concern (DECISION 14.107))

1. Hammerheads, *Sphyrna* sp.

Hammerhead sharks, primarily great, *Sphyrna mokarran*, scalloped, *S. lewini*, and smooth, *Sphyrna zygaena*, are caught in a variety of fisheries including artisanal and small-scale commercial fisheries, bottom longlines as well as offshore pelagic longlines. Hammerheads are generally not a target species but suffer high bycatch mortality. Catches of Sphyrnidae have been reported in the FAO statistics but only the scalloped hammerhead and the smooth hammerhead are reported as individual species (Maguire et al 2006). Hammerheads are highly valued among Hong Kong fin traders and are one of the most valuable fin types in the market (Abercrombie et al. 2005). According to Clarke et al. (2004, 2006a, 2006b), hammerheads are the second-most abundant species in the international fin trade.

Hammerheads have relatively moderate productivity depending on the species (Cortés 2002). Species-specific stock assessments for hammerheads are generally lacking but some studies have reported large declines in relative abundance. A recent assessment for a hammerhead complex (i.e., *S. lewini*, *S. mokarran*, and *S. zygaena*) in the northwest Atlantic Ocean found about a 70% decline in abundance from 1981 (Jiao et al 2008). According to Maguire et al. (2006), the state of exploitation for species is unknown except scalloped hammerheads, which are reported as fully- to over-exploited. The most recent IUCN red list assessments list the Sphyrnidae as Endangered globally (IUCN 2008).

There are no known species-specific conservation or management measures in place for the Sphyrnidae. They are listed on Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea, and some shark finning bans by fishing states, the European Union (EU), as well as by nine RFMOs, including the tuna commissions in the Atlantic (International Committee for the Conservation of Atlantic Tunas, ICCAT), Eastern Pacific (Inter-American Tropical Tuna Commission, IATTC), and Indian (Indian Ocean Tuna Commission, IOTC) Ocean (Camhi et al. 2009) may help reduce the harvesting of hammerhead sharks for their fins alone. In the United States, this species is managed as a Large Coastal Shark on the U.S. Highly Migratory Species Fishery Management Plan (National Marine Fisheries Service: Federal Fisheries Management Plan for Atlantic Tuna, Swordfish and Sharks).

2. Dusky shark, *Carcharhinus obscurus*

The dusky shark is harvested in coastal shark fisheries in several parts of the world but is also caught as bycatch in pelagic swordfish and tuna fisheries. Catches of dusky shark have been reported to FAO by the United States from the Northwest Atlantic Ocean and by South Africa, with South Africa reporting the highest catches. Juvenile dusky shark have been the primary target of a demersal gillnet fishery in southwestern Australian waters since at least the 1970s (Simpfendorfer 1999). Catches by that fishery escalated rapidly from under 100 tonnes (t) year^{-1} in the late 1970s to a peak of just under 600 t in 1988-1989 before management restrictions reduced and stabilized catches at approximately 300 t year^{-1} (McAuley et al. 2007). Fins are highly valued among Hong Kong fin traders and are still documented in international trade (Clarke et al. 2006a, 2006b).

Dusky sharks have one of the lowest intrinsic rebound potentials (Smith et al. 1998) and very low productivity when compared to other sharks (Cortés 2002). In the northwest Atlantic Ocean, Cortés et al. (2006) using multiple stock assessment models found dusky sharks have declined by at least 80% with respect to virgin population levels. However, off the southwestern Indian Ocean coast of South Africa, Dudley and Simpfendorfer (2006) found no significant declines in catch rates or mean lengths from 1978-2003 based on catches from shark nets deployed off the beaches of KwaZulu-Natal. Simpfendorfer (1999) performed an assessment of the dusky shark in the southwestern Australia gillnet fishery and found that it is possible to exploit dusky shark by targeting the youngest age-classes. However, concern now exists owing to declining neonate recruitment and unquantified catch of older sharks in non-target fisheries (McAuley et al. 2007). The most recent IUCN redlist assessment lists dusky shark as Vulnerable globally.

In the U. S. EEZ of the Atlantic Ocean, Gulf of Mexico and Caribbean Sea, the dusky shark has been a prohibited species (no commercial or recreational harvest) since 2000. Management measures also exist in western Australia and in South Africa (e.g. recreational bag limit).

8. Sandbar shark, *Carcharhinus plumbeus*

Sandbar sharks are commonly targeted in directed coastal gillnet and longline fisheries and occasionally caught as bycatch by pelagic longlines. Important sandbar fisheries are found in the western North Atlantic, eastern North Atlantic, and South China Sea. FAO catch statistics have been reported for this species, primarily from the United States with landings peaking at 89 t in 1990 and steadily declining since then due to management restrictions. Sandbar sharks are also targeted catches of the southwestern Australia gillnet fishery and demersal longline shark fishery off the northwest coast of Australia. Sandbar catches for these fisheries more than doubled between 1994-1995 and 2003-2004 to over 400 t $year^{-1}$ (McAuley 2006). Sandbar shark fins are highly valued among Hong Kong traders and are one of the more common species identified within the international shark fin trade (Clarke et al. 2004, 2006a, 2006b).

Sandbar sharks have low intrinsic rebound potentials (Smith et al. 1998) and low productivity when compared to other sharks (Cortés 2002). In the northwest Atlantic Ocean, stock assessments have found sandbar sharks have been depleted 64-71% from unexploited population levels (NMFS 2006). Dudley and Simpfendorfer (2006) found significant declines of sandbar shark in catches from shark nets deployed off the beaches of KwaZulu-Natal, South Africa. McAuley (2006) determined the current levels of exploitation on sandbar shark by target fisheries in western Australia are unsustainable. The most recent IUCN redlist assessment lists sandbar shark as Vulnerable globally.

In the U. S. EEZ of the Atlantic Ocean, Gulf of Mexico and Caribbean Sea, harvest of sandbar sharks is limited to a small shark research fishery, and is otherwise prohibited. Species-specific management plans are also found in Australia. Where species management action is lacking, finning bans implemented by States and RFMOs may help further reduce mortality.

Table 1: Shark species of concern listed in CoP 14 Doc 59.1 Annex 3.

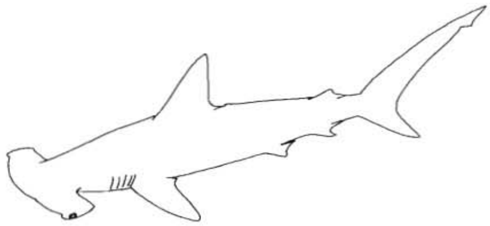
Species listed in CoP14 59.1 and/or AC24 Doc.14.1.	**FAO's list of primary species for monitoring of fisheries and trade**[1]	**Action taken under CITES**
Spiny dogfish shark *Squalus acanthias*	Nominated by Spain, Argentina, Japan	Considered and rejected for listing in Appendix II at CoP14; have entered range State consultation prior to consideration at CoP15
Porbeagle shark *Lamna nasus*	Nominated by Spain	
Freshwater stingrays Family Potamotrygonidae	-	Decision 14.109. New AC recommendations proposed.
Sawfishes Family Pristidae	Nominated by the United States of America	Listed in the CITES Appendices
Gulper sharks genus *Centrophorus*	Nominated by Sri Lanka	
School, tope, or soupfin shark *Galeorhinus galeus*	Nominated by Argentina	Decision 14.114 not yet implemented.
Guitarfishes, shovelnose rays Order Rhinobatiformes	Four species nominated by West African CSRP (*Commission sous-régionale des pêches*) (7 States)	
Requiem and pelagic sharks	Many species nominated	Some reviewed in AC24 Doc. 14.1
Devil rays Family Mobulidae	-	
Leopard sharks *Triakis semifasciata*	-	
Species reviewed in AC24 Doc 14.1		
Hammerhead sharks *Sphyrna* spp	Nominated by eight States & West African CSRP (7 States), China (Hong Kong SAR)	
Dusky shark *Carcharhinus obscurus*	Nominated by the United States of America	
Thresher sharks *Alopias* spp	Nominated by Panama, Sri Lanka, Indonesia	
Shortfin mako *Isurus oxyrinchus*	Nominated by Hong Kong, Spain, the United States of America, Japan	
Silky shark *Carcharhinus falciformis*	Nominated by China (Hong Kong SAR), Sri Lanka, Indonesia	
Oceanic whitetip shark *Carcharhinus longimanus*	Nominated by Panama	
Blue shark *Prionace glauca*	Nominated by China (Hong Kong SAR), Spain, Panama, Ghana, the United States of America, Japan	
Sandbar shark *Carcharhinus plumbeus*	Nominated by China (Hong Kong SAR), the United States of America	
Bull shark *Carcharhinus leucas*	-	
Tiger shark *Galeocerdo cuvier*	Nominated by Ghana	

[1] AC24 Inf. 6. Report of the FAO Technical Workshop on Status, Limitations and Opportunities for Improving the Monitoring of Shark Fisheries and Trade (Advance copy). *FAO Fisheries and Aquaculture Report* No. 897. Appendix IV: Provisional list of primary species of elasmobranchs for the monitoring of fisheries and trade.

Guide to identification of smooth hammerhead shark fins (with permission from Dr. Hideki Nakano, Characterization of Shark Fin Products, A Guide of Shark fin caught by Tuna Longline Fishery, Fisheries Agency of Japan).

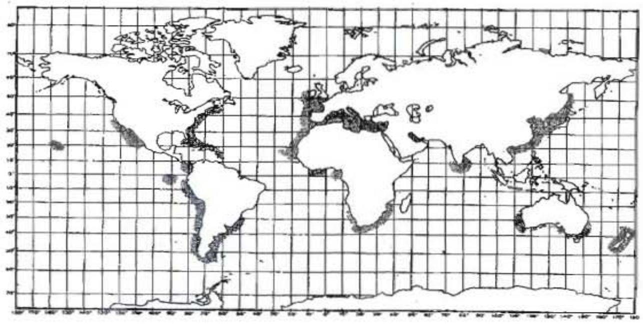
Smooth hammerhead

(*Sphyrna zygaena*)



§ Distribution §

Widespread in temperate seas in both hemispheres (also in tropical seas in some regions).



From Compagno, 1984

§ Fin Characteristics §

First Dorsal Fin

Shape: · Thin, relatively falcate.
· Fin height longer than its base length.
· Slightly concave on posterior margin.
· Length of free rear tip more than one-third of the fin base length.

Color: · Grayish brown.

Others: · Posterior margin without denticulation.

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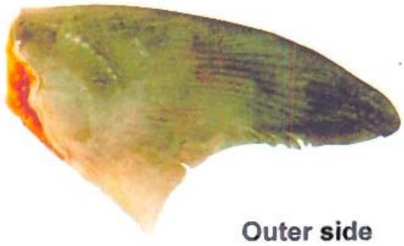
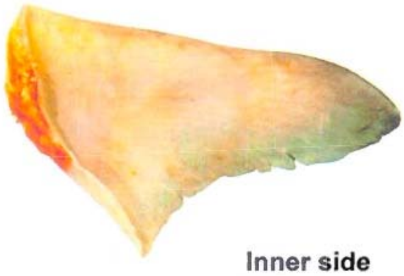


Outer side



Inner side

Pectoral Fin

Shape: ·Broad, relatively falcate.
·Length of anterior margin less than three times of the fin base length.
Color: ·Grayish brown with grayish tip on outer side.
·White with black tip on inner side.
Others:

Caudal Fin

Shape: ·Upper lobe much longer than lower one.
·Length of terminal lobe nearly equal to the length of posterior margin of lower lobe.
Color: ·Grayish brown.
Others: ·Caudal keel absent.