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 *Lamna nasus* (Bonnaterre, 1788) in Appendix II in accordance with Article II 2(a) and (b).

Qualifying Criteria (Conf. 9.24 (Rev. CoP14)[1]

Annex 2a 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.

North and Southwest Atlantic and Mediterranean stocks of *Lamna nasus* qualify for listing under this criterion, because their marked decline in population size meets CITES' guidelines for the application of decline to commercially exploited aquatic species. Stocks of this low productivity shark (natural mortality 0.1–0.2) have experienced historical extent of declines to ~20% of baseline and rapid recent rates of decline.

Annex 2a B: It is known, or can be inferred or projected, that regulation of trade in the species 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.

Unsustainable target fisheries for *Lamna nasus* in parts of its range have been driven by international trade demand for its high value meat. Based on past fisheries' development and shifting of effort from the NE Atlantic to the NW 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.

Annex 2b 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.

Complex patterns of export, processing and re-export of meat make it difficult to readily distinguish products from different stocks, unless DNA analysis is used to confirm the origin of processed products. A split listing is therefore not recommended as it could facilitate IUU fishing for stocks listed in Appendix II and enable catches to be laundered as taken from non-listed stocks. Such an outcome would clearly be undesirable and has the potential to undermine the effectiveness of global conservation and management efforts (FAO 2007). Stocks that do not qualify under Annex 2a are therefore proposed for listing under Article II(b).

Annotation

The entry into effect of the inclusion of *Lamna nasus* in Appendix II of CITES will be delayed by 18 months to enable Parties to resolve related technical and administrative issues, such as the possible designation of an additional Management Authority and adoption of Customs codes.

[1] CITES Standing Committee 58 under point 43 [SC58 Sum. 7 (Rev. 1) (09/07/2009)] has asked Parties, as they prepared for the upcoming CoP15, to i. a. clearly define in their listing proposals how they interpreted and applied Resolution Conf. 9.24 (Rev. CoP14). This interpretation is outlined in Annex 4 to this proposal.

B. PROPONENT

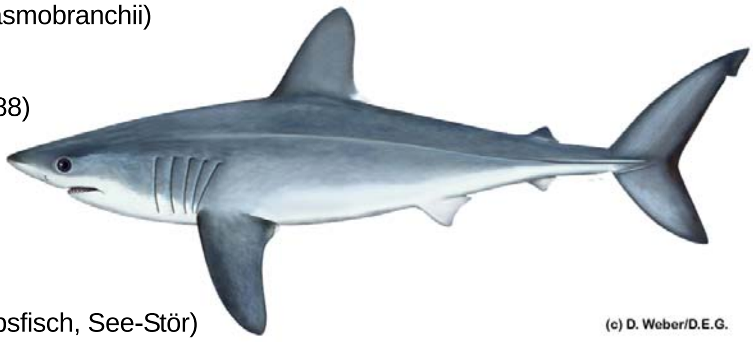
Sweden, on behalf of the European Community's Member States acting in the interest of the European Community[*]

C. SUPPORTING STATEMENT

1. Taxonomy

1.1 Class: Chondrichthyes (Subclass: Elasmobranchii)
1.2 Order: Lamniformes
1.3 Family: Lamnidae
1.4 Species: *Lamna nasus* (Bonnaterre, 1788)
1.5 Scientific synonyms: See Annex 2
1.6 Common names:

Figure 1. Porbeagle *Lamna nasus nasus*



English:	Porbeagle
Danish:	Sildehaj
Swedish:	Hábrand; sillhaj
German:	Heringshai (market name: Kalbsfisch, See-Stör)
Italian:	Talpa (market name: smeriglio)
Spanish:	Marrajo sardinero; cailón marrajo, moka, pinocho
French:	Requin-taupe commun (market name: veau de mer)
Japanese:	Mokazame

2. Overview

2.1 The large warm-blooded Porbeagle shark (*Lamna nasus*) occurs in temperate waters of the North Atlantic and Southern Oceans. It is highly vulnerable to over-exploitation in fisheries and very slow to recover from depletion. It is taken in target fisheries and is also an important retained and utilised component of the bycatch in pelagic longline fisheries. The meat and fins are of high quality and high value in international trade. Trade records are generally not species-specific; international trade levels, patterns and trends are largely unknown. DNA tests for parts and derivatives in trade are available.

2.2 Unsustainable North Atlantic target *L. nasus* fisheries are well documented. These have depleted stocks severely; landings fell from thousands of tonnes to a few hundred in less than 50 years. Joint assessments of North and South Atlantic stocks by ICCAT and ICES scientists (2009) have identified marked historical extents of decline to less than 30% of baseline, and marked recent rates of decline exceeding 50%. Where data are available for other Southern Hemisphere stocks, which are a high value target and bycatch of longline fisheries and biologically less resilient to fisheries, these also show declining trends.

2.3 Quota management based on stock assessment and scientific advice has been in place in the Canadian Exclusive Economic Zone (EEZ) since 2002, where the stock has now stabilised, in the US since 1999, in New Zealand since 2004, and in the EU since 2008. National management measures cannot control high seas catches, where unregulated and unreported fisheries jeopardize stock recovery. At the time of writing, Regional Fishery Organisations (RFOs) have not set catch limits for high seas stocks.

2.4 *Lamna nasus* meets the guidelines suggested by FAO for the listing of commercially exploited aquatic species. It falls into FAO's lowest productivity category of the most vulnerable species: those with an intrinsic rate of population increase of <0.14 and a generation time of >10 years (FAO 2001). Extent and rate of population declines, where known, exceed the qualifying levels for listing in Appendix II.

2.5 An Appendix II listing is proposed for *Lamna nasus* in accordance with Article II.2 (a) and (b) of the Convention and Res.Conf. 9.24 (Rev. CoP14). Atlantic stock assessments describe marked historic and recent declines. Exploitation of stocks in other oceans of the Southern Hemisphere is largely unmanaged and unlikely to be sustainable.

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[*] *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.*

2.6 An Appendix II listing for *Lamna nasus* will ensure that international trade be supplied by sustainably managed, accurately recorded fisheries that are not detrimental to the status of the wild populations that they exploit. This can be achieved if non-detriment findings require that an effective sustainable fisheries management programme be in place and implemented before export permits are issued, and by using other CITES measures for the regulation and monitoring of international trade. Trade controls will complement and reinforce traditional fisheries management measures, thus also contributing to implementation of the UN FAO IPOA–Sharks.

3. Species characteristics

3.1 Distribution

In the Southern Hemisphere, in a circumglobal band of ~30–60^{o}S; in the North Atlantic Ocean, between 30-70^{o}N (Compagno 2001, Figure 2). There are separate stocks in the Northeast and Northwest Atlantic, and in the Southeast and Southwest Atlantic. The latter two stocks extend into the Southwest Indian Ocean and Southeast Pacific, respectively. Annex 3 lists Range States and FAO Fisheries Areas (Figure 3).

3.2 Habitat

Epipelagic in boreal and temperate seas of 2–18°C, but preferring 5–10^{o}C in the Northwest Atlantic (Campana and Joyce 2004, Svetlov 1978), from the surface to depths of 200m, occasionally to 350–700m. Most commonly reported on continental shelves and slopes from close inshore (especially in summer), to far offshore (where they are often associated with submerged banks and reefs). They also occur in the high seas outside 200 mile EEZs (Campana and Gibson 2008), where they are less abundant. Stocks segregate (at least in some regions) by age, reproductive stage and sex and undertake seasonal migrations within their stock area. (Campana *et al*. 1999, 2001, Campana and Joyce 2004, Compagno 2001, Jensen *et al*. 2002.)

3.3 Biological characteristics

Lamna nasus is active, warm-blooded, relatively slow growing and late maturing, long-lived, and bears only small numbers of young. It falls into FAO's lowest productivity category of most vulnerable aquatic species. Life history characteristics vary between stocks and are summarised in Table 2. Northeast Atlantic sharks are slightly slower growing than the Northwestern stock. Both northern stocks are much larger, faster growing and have a shorter life span than the smaller, longer-lived (~65 years old) Southern Oceans Porbeagles, which are even more vulnerable to overfishing than are North Atlantic stocks.

3.4 Morphological characteristics

Heavy cylindrical body, conical head and crescent-shaped tail (Figure 1). First dorsal fin has a distinctive white patch on the lower trailing edge.

3.5 Role of the species in its ecosystem

An apex predator, feeding on fishes, squid and some small sharks, but not on marine mammals (Compagno 2001, Joyce *et al*. 2002). It has few predators other than humans, but Orcas and White Sharks may take it (Compagno 2001). DFO Canada (2006) could not demonstrate an ecosystem role at present low levels. Stevens *et al*. (2000) warn that the removal of top marine predators may have a disproportionate and counter-intuitive impact on fish population dynamics, including by causing decreases in some prey species.

4. Status and trends

4.1 Habitat trends

Critical habitats and threats to these habitats are largely unknown, although some North Atlantic mating grounds have been identified. High levels of ecosystem contaminants (PCBs, organo-chlorines and heavy metals) that bio-accumulate and are bio-magnified at high trophic levels are associated with infertility in sharks (Stevens *et al*. 2005), but their impacts on *L. nasus* is unknown. Effects of climatic changes on world ocean temperatures, pH and related biomass production could potentially impact populations.

4.2 Population size

Effective population size (as defined in Resolution Conf. 9.24 (Rev. CoP14) Annex 5), is best defined by the number of mature females in the population, particularly in heavily fished stocks dominated by immatures or males[2]. The only stock for which population size data are available is in the Northwest Atlantic. Recent stock assessments (DFO 2005a, Campana and Gibson 2008, ICCAT/ICES 2009, Figure 13) estimated the total population size for this stock as 188,000–195,000 sharks (22–27% of original numbers prior to the fishery starting; possibly 800,000 to 900,000 individuals) but only 9,000–13,000 female spawners (12–16% of their original abundance and 83–103% of abundance in 2001). Stock size elsewhere is unknown.

4.3 Population structure

Genetic studies identified two isolated populations, in the North Atlantic and the Southern oceans (Pade *et al*. 2006). Tagging studies in the Atlantic support two distinct Northwest and Northeast Atlantic stocks. Long distance movements occur within each stock, with fish tagged off the UK recaptured off Spain, Denmark and Norway, travelling up to 2,370km. Only one tagged shark crossed the Atlantic (Ireland to eastern Canada, 4,260km) (Campana *et al*. 1999, Kohler & Turner 2001, Kohler *et al*. 2002, Stevens 1976 & 1990). Porbeagles tagged in Canadian waters move onto the high seas for unknown periods of time (Campana and Gibson 2008). Stock boundaries in the Southern Hemisphere are unclear. The Southwest and Southeast Atlantic stocks appear to extend into the adjacent Pacific and Indian Oceans. The structure of exploited populations is highly unnatural, with very few large mature females present. This results in an extremely low reproductive capacity in heavily fished, depleted stocks (e.g. Campana *et al*. 2001).

4.4 Population trends

Stock assessments undertaken in 2009 and described below have provided important new information on declines in northern and southern hemisphere porbeagle stocks, not available in 2007. Original documents should be consulted to obtain information on assessment methodology.

Population trends, summarised in Table 1, are presented in the context of Annex 5 of Conf. 9.24 (Rev. CoP14) and FAO (2001). The estimated generation time for *L. nasus* is at least 18 years in the North Atlantic, and 26 years in the Southern Oceans (Table 2). The three-generation period against which recent declines should be assessed is 54 to 78 years, greater than the historic baseline for most stocks. Trends in mature females (effective population size [2]) must be considered where possible. Stock assessments usually show a correlation between declines in landings, declining catch per unit effort (CPUE), and reduced biomass. Where no stock assessments are available, CPUE, mean size and landings are used as possible metrics of population trends.

[2] It is noted that this aspect of the FAO guidance for evaluating commercially aquatic species for listing in CITES (FAO 2001) is highly relevant.

Table 1. Summary of population and catch trend data

Year	Location	Data used	Trend	Source
1936–2007	NE Atlantic	Norwegian fishery	>99 % decline from baseline	Norwegian and ICES data (Figure 7)
1973–2007	NE Atlantic	Norwegian fishery	96% decline	Norwegian and ICES data (Figure 7)
1954–2007	NE Atlantic	Danish fishery	99% decline from baseline	ICES data (Figure 8)
1973–2007	NE Atlantic	Danish fishery	90% decline	ICES data (Figure 8)
1973–2007	NE Atlantic	Faroese fishery	Decline & closure	ICES data (Figure 9)
1936–2007	NE Atlantic	All target catches	80% decline since post-WWII peak	Norwegian, French & ICES data
1926–2008	NE Atlantic	Stock assessment	94% decline in biomass, 93% in numbers from baseline	Surplus production age-structured model ICCAT/ICES 2009 (Figure 11)
1972–2008	NE Atlantic	Stock assessment	60% decline in biomass, 59% decline in numbers	Surplus production age-structured model ICCAT/ICES 2009 (Figure 11)
Various, 1800–2006	Mediterranean	Abundance & biomass of lamnids	>99% decline in tuna traps over 50–100 years	Ferretti *et al*. 2008
1963–1970	NW Atlantic	Norwegian & Faroese landings	~90% decline in catch and collapse of fishery	Landings data (Figure 12)
1961–2005	NW Atlantic	Stock assessment	73–78% decline from baseline biomass	Campana & Gibson 2008, ICCAT/ICES 2009
1961–2005	NW Atlantic	Stock assessment	84–88% decline in mature females	Campana & Gibson 2008, ICCAT/ICES 2009
1994–2003	North Atlantic	Catches	Decline, 1000 to near zero/year	Matsunaga and Nakano 2005
1993–2003	North Atlantic	CPUE	Decline with slope -0.6	Matsunaga and Nakano 2002
1961–2008	SW Atlantic	Stock assessment	82% decline in biomass (SSB)	ICCAT/ICES 2009 (Figure 19)
1982–2008	SW Atlantic	Stock assessment	60% decline in biomass (SSB)	ICCAT/ICES 2009 (Figure 19)
1992–2002	SW Pacific	Longline CPUE	>50–80% decline in 10 yrs	NZ Ministry of Fisheries 2008 (Figure 17)
1998–2005	SW Pacific	Weight landed	75% decline	NZ Ministry of Fisheries 2008 (Figure 16)
A 'marked historical extent of decline' is a percentage decline to 5%–30% of the baseline, depending upon the productivity of the species [30% for Porbeagle]. A 'marked recent rate of decline' is a percentage decline of 50% per cent or more within the last 10 years or three generations, whichever is the longer				

The IUCN Red List status assessment for Porbeagle is **Vulnerable** globally, **Critically Endangered** in the Northeast Atlantic and the Mediterranean (past, ongoing and estimated future reductions in population size exceeding 90%), **Endangered** in the Northwest Atlantic (estimated reductions exceeding 70% that have now ceased through management, and **Near Threatened** in the Southern Ocean (Stevens *et al.* 2005).

The North Atlantic is the major reported source of world catches, with detailed long-term fisheries trend data recorded. Landings here have exhibited marked declining trends over the past 60–70 years (see below) during a period of rising fishing effort and market demand for this valuable species and improved fisheries technology. Fewer Southern Ocean data are available, but these also show declines. FAO Porbeagle catch data (Figure 4) are generally lower than that from other sources (national landings, ICES data *etc*.). Under-reporting is widespread, 'grossly' so in the South Atlantic (ICES/ICCAT 2009). Landings from the NAFO Regulatory Area reported to NAFO "seldom resembled those reported to ICCAT... 2005–2006 catches by countries other than Canada are in doubt and probably under reported" (Campana and Gibson 2008).

Stock assessments available for the Atlantic (ICCAT/ICES 2009) illustrate the correlation between steep declines in landings and catch per unit effort (CPUE) and declining biomass. CPUE and landings are therefore used as indicators of population trends for this valuable commercial species in unmanaged fisheries elsewhere, while recognizing that other factors may also affect catchability.

4.4.1 North Atlantic and Mediterranean

Fisheries continue to target seriously depleted shelf stocks in the Northeast and Northwest Atlantic (see Table 1). High seas Tuna and Swordfish longline fisheries also exploit these stocks (as target or retained bycatch) in the NAFO and ICCAT regulatory areas, where shark catch is unregulated.

Northeast Atlantic

The Northeast Atlantic stock assessment estimated a decline from baseline of over 90%, to far below the maximum sustainable yield (MSY), at 6% of biomass and 7% of numbers (ICCAT/ICES 2009, Fig. 11).

Lamna nasus has been fished by many European countries, principally Denmark, France, Norway, Faroes and Spain (Figures 5–9). Norway's target *L. nasus* longline fishery began in the 1920s and first peaked at 3,884t in 1933. About 6,000t were landed in 1947, when the fishery reopened after the Second World War, followed by a decline to between 1,200–1,900t from 1953–1960. The collapse of this fishery led to the redirection of fishing effort by Norwegian, Faroese and Danish longline shark fishing vessels into the Northwest Atlantic (see below). Norwegian landings from the Northeast Atlantic subsequently decreased to a mean for the past decade of 20t (Figure 7). Average Danish landings (Figure 8) fell from over 1500t in the early 1950s to a mean of ~50t. (DFO 2001a, Gauld 1989, ICES and Norwegian data.)

Reported landings from the historically most important fisheries, around the UK and in the North Sea and adjacent inshore waters (ICES areas III & IV) have decreased to very low levels during the past 30–40 years. Catches from offshore ICES sub-regions west of Portugal (IX), west of the Bay of Biscay (VIII) and around the Azores (X) have increased since 1989 (Figure 6). This is attributed to a decline in heavily fished and depleted inshore populations and redirection of effort to previously lightly exploited offshore areas.

French longliners have targeted *L. nasus* since the 1970s in the Celtic Sea and Bay of Biscay. The fleet has declined from eleven vessels in 1994 to five in 2008. Mean CPUE fell from 1 to 0.73 kg per hook; from 3t/vessel in 1994, to less than 1t in 2005 (ICES WGEF 2008, Biseau 2006). Reported landings fell from over 1,092t in 1979 to 3–400t in the late 1990s to present. Spanish longliners took *L. nasus* opportunistically in the 1970s and since 1998, as bycatch from the longline swordfish fishery in the Mediterranean and Atlantic and from a target Blue Shark fishery that also catches Mako and Porbeagle (Biseau 2006, Bonfil 1994, Mejuto 1985, Mejuto and Garcés 1984, Lallemand-Lemoine 1991). ICCAT/ICES (2009) undertook the first assessment of this stock (Figures 10 and 11), concluding that biomass and numbers have declined 94% and 93%, respectively, from baseline, and by more than 50% from the level in 1972, to well below MSY.

Mediterranean Sea

Lamna nasus has virtually disappeared from Mediterranean records. Ferretti *et al*. (2008) reviewed historic data from fisher logbooks, reporting declines in tuna traps of >99.99% during a range of time series (135 to 56 years). FAO Fishstat (2009) records very small landings since the 1970s by Malta, in recent years also Spain. In the North Tyrrhenian and Ligurian Sea, Serena and Vacchi (1997) reported only 15 specimens of *L. nasus* during a few decades of observation. Soldo and Jardas (2002) reported only nine records in the Eastern Adriatic from the end of 19th century until 2000. Since then there have been only a few new records (A. Soldo unpublished data). Newborn and juvenile *L. nasus* have been reported in the Western Ligurian and central Adriatic Seas (Orsi Relini and Garibaldi 2002, Marconi and De Maddalena 2001). No *L. nasus* were caught during research into western Mediterranean swordfish longline fishery bycatch (De La Serna *et al*. 2002). Only 15 specimens were caught during research conducted in 1998–1999 on bycatch in large pelagic fisheries (mainly driftnets) in the southern Adriatic and Ionian Sea (Megalofonou *et al*. 2000).

Northwest Atlantic

Detailed stock assessments and recovery projections are available (DFO 2005; Gibson and Campana 2005; Campana and Gibson 2008; updated by ICCAT/ICES 2009). Spawning stock biomass (SSB) is currently estimated to be about 22–27% of its size in 1961. The estimated number of mature females in 2009 is in the range of 11,000 to 14,000 individuals, or 12% to 16% of its 1961 level (ICCAT/ICES 2009).

Targeted *Lamna nasus* fishing started in 1961, when the Norwegian and subsequently the Faeroese shark longline fleets moved from the depleted Northeast Atlantic to the coast of New England and Newfoundland. Catches increased rapidly from ~1,900t in 1961 to > 9,000t in 1964 (Figure 12). By 1965 many vessels had switched to other species or fishing grounds because of the population decline (DFO 2001a). The fishery collapsed after six years, landing less than 1,000t in 1970. It took 25 years for only very limited recovery to take place. Norwegian and Faroese fleets have been excluded from Canadian waters since 1993. Canadian and US authorities reported all landings after 1995.

Three offshore and several inshore Canadian vessels entered the targeted Northwest Atlantic fishery in the 1990s. Catches of 1,000–2,000 t/year reduced population levels to a new low in under ten years: the average size of sharks and catch rates were the smallest on record in 1999 and 2000, catch rates of mature sharks in 2000 were 10% of those in 1992, and biomass estimated as 11–17% of virgin biomass and fully recruited F as 0.26 (DFO 2001a). The annual catch quota was reduced for 2002–2007 to allow population growth (DFO 2001a, 2001b) and reduced again in 2006. Landings have since ranged from 139t to 229t. Total population numbers have remained relatively stable since 2002, although female spawners may have continued to decline slightly. ICCAT/ICES (2009) estimate that spawning stock biomass (SSB) is now about 95–103% of its size in 2001 and the number of mature females 83% to 103% of the 2001 value (Figure 13), or 12 - 16 % if baseline.

Stock assessments have determined that recovery is possible, but sensitive to human-induced mortality. The trajectory is extremely low (from decades to over 100 years). Human-induced mortality of ~2 to 4% of the vulnerable biomass of 4,500t to 4,800t (equivalent to catching 185–192t in 2005) should allow recovery to 20% of virgin biomass ($SSN_{20\%}$) in 10–30 years. Recovery to maximum sustainable yield (SSN_{msy}) would take much longer: between 2030 and 2060 with no human-induced mortality, or into the 22nd century (or later) with an incidental harm rate of 4%. At an incidental harm rate of 7% of the vulnerable biomass, corresponding to a catch of 315t, the population will not recover to SSN_{msy} (Figures 14 and 15). Campana and Gibson (2008) warned that a high seas fishery exploiting this stock jeopardizes Canada's fisheries management and recovery plan – the population would crash at these exploitation rates.

In addition to the Canadian quota of 185t, in 1999 a quota of 92t was set in the US EEZ, which is presumed to share the same stock. The TAC for all US fisheries was reduced to 11t, including a commercial quota of 1.7t, in 2008. Taiwanese, Korean and Japanese tuna longliners take a largely unknown bycatch of *L. nasus* on the high seas in the North Atlantic (ICES 2005). Most of the catch is reportedly discarded or landed at ports near the fishing grounds. Stocks and catches are "under investigation" (Fishery Agency of Japan 2004). Campana and Gibson (2008) note that the unreported Porbeagle bycatch observed on Japanese vessels could have amounted to ~200t in 2000 and 2001. Spanish catches are usually also unreported. These levels of combined Northwest Atlantic landings will prevent stock recovery.

4.4.2 Southern Hemisphere

Observer data from the Uruguayan tuna and swordfish fleet were used to assess the status of the Southwest Atlantic stock. The assessment identified an 82% decline in biomass (SSB) since 1961, and 60% since 1982, to well below maximum sustainable level (B_{MSY}) (Figure 19, ICCAT/ICES 2009), mirroring the decline in CPUE (Figure 18). This stock probably extends into the Southeast Pacific. Data were not available to support an assessment of the Southeast Atlantic/Southwest Indian Ocean stock.

Although Porbeagle landings from the Southern Hemisphere are only reported to FAO by New Zealand, NZ catch data for the Pacific southwest, primarily bycatch in tuna longlines, but also trawl and bottom longline catches, sometimes exceed FAO's total Southern Ocean catch records (FAO Fishstat 2008). New Zealand commercial catch, discard and processing records are illustrated in Figure 16. Volumes processed are sometimes higher than reported catches. Estimates of tuna longline bycatch are not available for all years and are imprecise because of low observer coverage. Approximately 60% of longline bycatch is alive when retrieved. Survival of unprocessed discarded sharks is unknown. About 80% of the bycatch is processed, 80% of this is finned, 20% processed for the meat and fins (MFSC 2008). There has been a 75% decline in the total weight of *L. nasus* reported since 1998–99, to a low of 55 t in 2005-06. This decline began during a period of rapidly increasing domestic fishing effort in the tuna longline fishery, and has accelerated since tuna longline effort dropped during the last two years. Unstandardised catch per unit effort recorded by observers from 1992-93 to 2004–05 varies considerably, but has been extremely low in recent years (Figure 17). This may not reflect stock abundance because of low observer coverage and other potential sources of variation (e.g., vessel, gear, location and season).

Japanese tuna longline vessels take an unknown quantity of bycatch of *L. nasus* in the Southern Bluefin Tuna fishing grounds. Standardised CPUE has varied from 1992 to 2002 but recent stock trends were deemed to be stable. Current stock levels are under investigation. Most of the catch is reportedly discarded or landed at ports near the fishing grounds (Fishery Agency of Japan 2004). Matsumoto (2005, cited in FAO 2007) reports a decline in annual landings to around 40% of original levels between 1997 and 2003, following an increase from very low levels during 1989–1995.

4.5 Geographic trends

This species now appears to be scarce, if not absent, in areas of the Mediterranean where it was formerly commonly reported (Ferretti *et al*. 2008, Stevens et al. 2006).

5. Threats

The principal threat to *L. nasus* worldwide is over-exploitation, in target and bycatch fisheries. FAO FishStat (2009) reports the highest Porbeagle catches in 2007 from France (356t), Spain (228t), Canada (94t) and New Zealand (52t), but ICCAT/ICES (2009) notes that reported landings "grossly underestimate actual landings".

Canadian catch data indicates that Porbeagle landings have been progressively decreasing, from a peak of 1400 t in 1995 to 92t in 2007, corresponding with decreasing TAC levels (Campana and Gibson 2008, Figure 20), but other fisheries are also declining, in the absence of management. Global reported Porbeagle landings from bycatch and directed fisheries have decreased from 2 700t in 1999 to 887t in 2007 (FAO Fishstat 2008), although these are under-reported. This species is particularly vulnerable to fisheries because these target adults and juveniles of all age classes (Ministry of Fisheries 2006, Francis *et al*. 2007). The life history characteristics of Southern Ocean Porbeagles make this population significantly more vulnerable to overfishing than the depleted North Atlantic populations.

5.1 Directed fisheries

Intensive directed fishing for the valuable meat of *L. nasus* was the major cause of 20th Century population declines. ICES (2005) noted: “The directed fishery for Porbeagle [in the Northeast Atlantic] stopped in the late 1970s due to very low catch rates. Sporadic small fisheries have occurred since that time. The high market value of this species means that a directed fishery would develop again if abundance increased.” Target fisheries for the meat of *L. nasus* still operate in Canada and France, and short term opportunistic target fisheries occur in other States as and when aggregations are located. **The ICCAT/ICES specialist meetings (2009) recommended that high seas fisheries should not target porbeagle.** *L. nasus* is also an important target game fish species for recreational fishing in Ireland and UK. The recreational fishery in Canada and the US is very small (FAO FIGIS undated, DFO 2001b).

5.2 Incidental fisheries

Lamna nasus is a valuable utilised ‘bycatch’ or secondary target of many fisheries, particularly longline pelagic fisheries for tuna and swordfish (Buencuerpo *et al*. 1998), but also gill nets, driftnets, trawls and handlines. Bycatch is often inadequately recorded in comparison with captures in target fisheries. The high value of Porbeagle meat means that the whole carcass is usually retained and utilised, unless the hold space of vessels targeting high seas tuna and billfish is limited, when the fins alone may be retained (e.g. New Zealand and far seas longline fisheries for Southern Bluefin Tuna, and other pelagic fishing fleets operating in the Southern Hemisphere,see Compagno 2001). ICES (2005) noted: “effort has increased in recent years in pelagic longline fisheries for Bluefin Tuna (Japan, Republic of Korea and Taiwan Province of China) in the North East Atlantic. These fisheries may take Porbeagle as a bycatch. This fishery is likely to be efficient at catching considerable quantities of this species.” This was confirmed by Campana and Gibson (2008). ICCAT/ICES (2009) warned that increased effort on the high seas could compromise stock recovery efforts.

Despite the large amount of fishing activity that must capture *L. nasus* in the Southern Hemisphere, only New Zealand reports landings to FAO (but total FAO landings data are sometimes lower than New Zealand’s published data). Important but largely unreported bycatch fisheries include demersal longlining and trawling for Patagonian Toothfish and Mackerel Icefish around Heard and Macdonald Islands and in the southern Indian Ocean (van Wijk and Williams 2003, Compagno 2001) and by the Argentinean fleet (Victoria Lichtstein, CITES Management Authority of Argentina, *in litt*. to TRAFFIC Europe, 27 October 2003); longline swordfish and tuna fisheries in international waters off the Atlantic coast of South America (Domingo 2000, Domingo *et al*. 2001, Hazin *et al*. 2008); the artisanal and industrial longline swordfish fishery within and outside the Chilean EEZ, between 26–36ºS (E. Acuña unpublished data; Acuña *et al*. 2002), and the Japanese tuna fishery in Australian waters, where Porbeagle was the second most abundant species after Blue Shark and comprised 5.5% of shark catches (Stevens and Wayte 2008). Overall catches of *Lamna nasus* by Argentina was 30,1 - 17,7 - 19,8 - 69,7 t between 2003 and 2006 (source: INIDEP 2009)

6. <u>Utilisation and trade</u>

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. Products include fresh, frozen and dried-salted meat for human consumption, oil and fishmeal for fertilizer, and fins for soup (Compagno 2001). The high commercial value of the species has been documented through market surveys (Fleming and Papageorgiou 1997, Rose 1996, unpublished TRAFFIC Europe 2003 market surveys). Findings indicate that the demand for fresh, frozen or processed *L. nasus* meat, as well as fins, is sufficiently high to justify the existence of an international market. Despite the high value of its meat, and unlike other high-priced fish such as Swordfish, Bluefin Tuna and Spiny Dogfish, trade in *L. nasus* is not documented at the species level. This makes it difficult to compare trade and landings data and assess the importance and scale of its utilisation worldwide. The species is also utilised for sports fishing in Ireland, US and UK (FAO FIGIS undated). Catches are either retained for meat and/or trophies, or tagged and released (DFO 2001). Low levels of *L. nasus* are also taken by game fishers off New Zealand South Island, but estimates of the recreational harvest is unavailable and probably negligible since *L. nasus* usually occur over the outer continental shelf or beyond (MFSC 2008).

6.1 National utilisation

L. nasus was one of the most valuable (by weight) marine species landed in Scotland in the 1980s (Gauld 1989). In 1997 and 1998 *L. nasus* meat was auctioned in southwest England at EUR 5–7/kg, about four times the wholesale price of Blue shark (EUR 1.5/kg) (Vas and Thorpe 1998). In Newlyn fishing harbour (South England), the retail price for fresh *L. nasus* shark loin was about EUR 25/kg (TRAFFIC Europe market survey, November 2003). In Germany it is offered as meat of *Kalbsfisch* or *See-Stör*. Porbeagle is considered to be of similar quality to swordfish meat and has been marketed as swordfish in Italy (Vannucinni 1999). In 2009, the retail price for fresh L. nasus shark loin was on average around EUR 16/kg (TRAFFIC market survey, 2009). Anecdotal reports from the German market suggest that availability has decreased significantly in recent years (R. Melisch, TRAFFIC,*in litt.* May 2006).

Porbeagle may also be utilised nationally in some range States for liver oil, cartilage and skin (Vannuccini 1999). Low-value parts of the carcass may be processed into fishmeal. There is limited utilisation of jaws and teeth as marine curios. No significant national use of *L. nasus* parts and derivatives has been reported, partly perhaps because records at species level are not readily available, and partly because quantities landed are now so small, particularly in comparison with other shark species.

6.2 Legal trade

There is a considerable market for these products within the European Union (EU), with EU Member States taking 60% of global reported Porbeagle catch in 2006 and 75% in 2007 (prior to establishment of a TAC), according to (seriously incomplete) data reported to FAO. International trade in *Lamna nasus* products is unregulated, and all is therefore legal. While there is very little recent information available, earlier studies reported that Canada exports *L. nasus* meat to the US and the EU, Japan exports to the EU, and EU Member States export *L. nasus* to the US, where it is mainly consumed in restaurants (Vannuccini 1999, S. Campana *in litt*. to IUCN Shark Specialist Group 2006). *L. nasus* is also imported by Japan (Sonu 1998). However, these commercial transactions could not be quantified nor their economic value estimated, because of the lack of any Customs code for *L. nasus* products in the Customs Harmonised System (HS). In most cases, it is grouped with other shark products under a general code, HS 0303 7500, which does not allow for estimation of trade at species level. In the Combined Nomenclature (CN) of the EU, codes such as 0302 65 90–Fresh or chilled shark (excl. dogfish of the species '*Squalus acanthias*' and '*Scyliorhinus* spp.), 0303 75 90–Frozen sharks (excl. dogfish) and 0304 20 69–Frozen fillets of sharks (excl. dogfish), cannot be used to estimate trade in *L. nasus* because they combine products of a variety of shark species and would therefore lead to incorrect conclusions. In Australia, data on exports of *L. nasus* to the US are grouped with Mako Sharks (Ian Cresswell, CITES Management Authority of Australia, *in litt*. to BMU, February 2004). Until targeted Customs control and monitoring systems or compulsory reporting mechanisms to FAO are established, data on international trade in *L. nasus* products will not be available. Currently, the scale and value of global consumption of the species cannot be assessed.

6.3 Parts and derivatives in trade

6.3.1 Meat: This is a very high value product, one of the most palatable and valuable of shark species, and is traded in fresh and frozen form (see sections 6.1 and 6.2).

6.3.2 Fins: Porbeagle appears in the list of preferred species for fins in Indonesia (along with Guitarfish, Tiger, Mako, Sawfish, Sandbar, Bull, Hammerhead, Blacktip, Thresher and Blue Shark, seeVannuccini 1999), but was reported to be relatively low value by McCoy and Ishihara (1999, quoting Fong and Anderson 1998). The large size of *L. nasus* fins nonetheless means that these are a relatively high value product. They have been identified in the fin trade in Hong Kong and are one of six species (including Makos, Blue, Dusky and Silky Sharks) frequently used in the global fin market (Shivji *et al*. 2002). New Zealand has established conversion factors for *L. nasus* for wet fin (45) and dried fin (108) (equivalent to a weight ratio of 2.2% and 0.9% respectively) in order to monitor quota and establish the size of former catches by scaling up reported landings (Ministry of Fisheries, 2005). The wet fin weight ratio from the Canadian fishery is 1.8–2.8% (S. Campana pers. comm., DFO).

6.3.3 Others: Porbeagle hides can be processed into leather, and liver oil extracted (Vannuccini 1999, Fischer *et al*. 1987), but trade records are not kept. Cartilage is probably also processed and traded. Other shark parts are used in the production of fishmeal, which is probably not a significant product from *L. nasus* fisheries because of the high value of the species' meat (Vannuccini 1999).

6.4 Illegal trade

No legislation has been adopted by range States or trading nations to regulate national or international trade in *Lamna nasus*; no trade transaction or transhipment is illegal.

6.5 Actual or potential trade impacts

The unsustainable *L. nasus* fisheries described above have been driven by the high value of the meat in national and international markets. Trade has therefore been the driving force behind the depletion of populations in the North Atlantic and may potentially also threaten Southern Hemisphere populations. Southern populations are of particular concern because they are intrinsically even more vulnerable to over-exploitation in fisheries than are the depleted northern stocks.

7. Legal instruments

7.1 National

Sweden legally protects Porbeagle. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated *L. nasus* as Endangered in 2004 (COSEWIC 2004). The Federal Government of Canada declined to list the species under Schedule 1 of Canada's Species at Risk Act (SARA) because recovery measures were already being implemented.

7.2 International

'Family Isurida' (now Lamnidae, including *L. nasus*) is listed in Annex 1 (Highly Migratory Species) of the UN Convention on the Law of the Sea (UNCLOS). The UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, in force since 2001, establishes rules and conservation measures for high seas fisheries resources. It directs States to pursue co-operation in relation to listed species through appropriate sub-regional fisheries management organisations or arrangements, but there has not yet been any progress with implementation of oceanic shark fisheries management.

Lamna nasus is listed in Annex III, 'Species whose exploitation is regulated' of the Barcelona Convention Protocol concerning specially protected areas and biological diversity in the Mediterranean. This population was also added in 1997 to Appendix III of the Bern Convention (the Convention on the Conservation of European Wildlife and Natural Habitats) as a species whose exploitation must be regulated in order to keep its population out of danger. No management action has yet followed these listings.

L. nasus is included in Appendix II of the Convention on the Conservation of Migratory Species (CMS). CMS is currently developing an instrument for the conservation of migratory sharks, which may in due course stimulate conservation actions for the species.

L. nasus is included in the OSPAR Convention for the Protection of the Marine Environment of the North-east Atlantic list of Threatened and/or Declining Species and Habitats. This list, developed under Annex V on the Protection and Conservation of the Ecosystems and Biological Diversity of the OSPAR Maritime Area, identifies species and habitats in need of protection or conservation. Proposals for actions, measures and monitoring that should be undertaken for this species will be considered in late 2009.

8. Species management

8.1 Management measures

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, but is voluntary and fewer than 20 States have produced Shark Assessment Reports or Shark Plans. Many RFMOs have adopted shark finning bans. Some RFOs have recently adopted shark resolutions to support improved recording or management of pelagic sharks taken as bycatch in the fisheries they manage, but no science-based catch limits. The management of southern porbeagle stocks will require close coordination between RFMOs for Atlantic, Pacific and Indian Ocean waters.

ICCAT requires Parties since 2007 to reduce the mortality of Porbeagle Sharks in directed Atlantic fisheries where a peer-reviewed stock assessment is not available. Also in 2007, the US proposed a prohibition on retention of Porbeagles through the Northwest Atlantic Fisheries Organisation (NAFO), which was withdrawn due to lack of support. In 2008 the NAFO Scientific Council was warned that overfishing in the high seas NAFO Regulatory Area was undermining Canada's management for Porbeagles and would lead to population crash (Campana and Gibson 2008). NAFO Parties at the 2008 annual meeting decided that pelagic shark management was the remit of the International Commission for the Conservation of Atlantic Tunas (ICCAT, the pelagic fishery management body), and urged ICCAT to take action for Porbeagles at their annual meeting. ICCAT's 2008 annual meeting did not set fishing limits on Porbeagles, but a policy meeting will consider management measures after the ICCAT/ICES stock assessment meeting in June 2009.

In the Northeast Atlantic, the conservation and management of sharks in EU waters falls under the European Common Fishery Policy (CFP), which manages fish stocks through a system of Total Allowable Catch (TAC or annual catch quotas) and reduction of fishing capacity. The EU *L. nasus* fishery entered TAC management in 2008. The initial restrictive quota was reduced by 25% in 2009 and a maximum landing size (210 cm fork length) introduced to protect large females. EC Regulation 1185/2003 prohibits the removal of shark fins and subsequent discarding of the body by EC vessels in all waters and non-EC vessels in Community waters. The European Community Action Plan for the Conservation and Management of Sharks (CPOA, EU COM(2009) 40 final), presented by the European Commission in 2009, sets out to rebuild depleted shark stocks fished by the Community fleet within and outside Community Waters, including through the establishment of catch limits for shark stocks in conformity with advice provided by ICES and relevant RFMOs, release of live unwanted bycatch, increased selectivity of fishing gear, establishment of bycatch reduction programmes for Critically Endangered and Endangered shark species, and international cooperation in CMS and CITES with a view to controlling shark fishing and trading. The CPOA's Shark Assessment Report pays particular attention to *Lamna nasus*. These measures will be implemented at Community and Member State level and the Community will seek their endorsement by all relevant RFMOs.

In the Northwest Atlantic, shark fisheries management is underway in Canadian and US waters. An annual quota of 92t was adopted in US waters in 1999, under the Highly Migratory Species Fisheries Management Plan. This was reduced in 2008 to a TAC of 11t for all US fisheries, including a commercial quota of 1.7t, leading to the closure of the fishery before the end of the year. Since 2008, US Atlantic sharks must be landed with their fins naturally attached. The 1995 Canadian fisheries management plan limits number of licenses, types of gear, fishing areas and seasons, prohibits finning, and restricts recreational fishing to catch-and-release only. Fisheries management plans for pelagic sharks in Atlantic Canada established non-restrictive catch guidelines of 1500t for *L. nasus* prior to 1997, followed by a provisional TAC of 1000t for the period 1997–1999, based largely on historic reported landings and the observation that recent catch rates had decreased (DFO 2001). Following analytical stock assessments (Campana *et al.* 1999, 2001), the Shark Management Plan for 2002–2007 reduced the TAC to 250t, followed by a further reduction to 185t (60t bycatch, 125t directed fishery) from 2006 (Figure 20). Population projections indicate that the population will eventually recover if harvest rates are kept under 4% (~185 mt, DFO 2005b), but unregulated and unreported catches on the high seas jeopardize recovery (Campana and Gibson 2008, Figures 14 and 15).

In 2006, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) adopted a moratorium on directed shark fishing until data become available to assess the impacts of fishing on sharks in the Antarctic region. The live release of sharks taken as bycatch is encouraged but not mandated (Conservation Measure 32-18; CCAMLR 2006). The Western and Central Pacific Fisheries Commission (WCPFC) will be responsible for pelagic shark management, but this is unlikely to be attempted during the early years of this Commission (Ministry of Fisheries 2006). Australia introduced legislation in 1991 preventing Japanese longliners fishing in the EEZ from landing shark fins unless accompanied by the carcass. They have not fished in the Australian EEZ since 1996. Finning is prohibited in domestic Australian tuna longliners. New Zealand has included *L. nasus* in its Quota Management System (QMS) since 2004 with an unrestrictive TAC set at 249t (Sullivan *et al*. 2005), permitting finning and discard of carcasses.

8.2 Population monitoring

Routine monitoring of catches, collection of reliable data on indicators of stock biomass and good knowledge of biology and ecology are required. Most States do not record shark catch, bycatch, effort and discard data at species level or undertake fishery-independent surveys, preventing stock assessments and population evaluation. High seas catches are particularly poorly monitored (e.g. Campana and Gibson 2008). Accurate trade data provide a means of confirming landings and an indication of compliance with catch levels, allow new catching and trading States to be identified, and provide information on trends in trade (Lack 2006). Trade data for Porbeagle are, however, unreported. In the absence of a CITES listing there is no reliable mechanism to track trends in catch and trade of this species.

8.3 Control measures

8.3.1 International

Other than sanitary regulations related to seafood products and measures that facilitate the collection of import duties, there are no controls or monitoring systems to regulate or assess the nature, level and characteristics of trade in *L. nasus*.

8.3.2 Domestic

The domestic fisheries management measures adopted by a few States described above cannot deliver sustainable harvest of *L. nasus* when stocks are exploited by several fleets. Even where catch quotas have been established, as in some North Atlantic countries, no trade measures prevent the sale or export of landings in excess of quotas. Otherwise, only the usual hygiene regulations apply to control of domestic trade and utilisation. STECF (2006) noted that although a CITES Appendix II listing alone would not be sufficient to regulate catching of Porbeagle, it could be considered an ancillary measure.

8.4 Captive breeding and artificial propagation

No specimens are known to be held in captivity.

8.5 Habitat conservation

Research in areas fished by the Canadian and French fleets has identified some important *L. nasus* habitats. Some habitat may be incidentally protected inside marine protected areas or static gear reserves.

9. Information on Similar Species

Lamna nasus is one of five species in the family Lamnidae, or mackerel sharks, which also includes the White Shark *Carcharodon carcharias* and two species of Mako, genus *Isurus*. Salmon Shark *Lamna ditropis* is restricted to the North Pacific. Mako *Isurus oxyrinchus* may be misidentified as *L. nasus* in Mediterranean fisheries, although the identification of whole sharks is straightforward using existing keys.

10. Consultations

All 51 range states of *Lamna nasus* have been addressed within the consultation process. Eight responses had been received by August 2009. FAO and RFMOs have also been contacted. Additional information and recommendations received during this process have been considered.

11. Additional remarks

11.1 CITES Provisions under Article IV, paragraphs 6 and 7: *Introduction from the sea*

It is unclear whether introduction from the sea will be a significant issue for this species. Most target fisheries, even on the shelf edge, are recorded inside EEZs. Pelagic Japanese, Korean and Taiwanese vessels, however, take Porbeagle bycatch on the high seas, estimates for Japan ranging from 15t to 280t annually during 2000–2002 (DFO 2005b). A CITES Appendix II listing would require introductions from the sea to be accompanied by a non-detriment finding. They would have to be taken from a sustainably exploited high seas fishery, requiring management action by the appropriate Regional Fisheries Management Organisation.

11.2 Implementation issues

11.2.1 Scientific Authority

It would be most appropriate for the Scientific Authority for this species to be advised by a fisheries expert.

11.2.2 Identification of products in trade

It will be important to develop species-specific commodity codes and identification guides for the meat and fins of this species. *L. nasus* meat, the product most commonly traded, is one of the highest priced shark meats in trade and often identified by name. The dorsal fin (with skin on) has a characteristic white rear free edge and a generic guide to the identification of shark fins is in preparation (Deynat in prep.). Several research groups have developed species-specific primers and highly efficient multiplex PCR (Polymerase Chain Reaction) screening assay for *L. nasus*, capable of distinguishing between Southern and Northern Hemisphere stocks (e.g. Shivji *et al*. 2002; Pade *et al*. 2006; Testerman *et al*. 2007). Cost per sample processed starts from US$20–60, depending upon condition of sample, less for large numbers. Turn-around time is in the region of 2–7 days from receipt of sample, depending upon urgency. These tests are available and may be used to confirm identification and product origin for enforcement purposes.

11.2.3 Non-detriment findings

CITES AC22 Doc. 17.2 provides first considerations on non-detriment findings for shark species. In 2008 further contributions have been made on practical tools for making NDFs. A document prepared by the Spanish Scientific Authority (García-Núñez 2008) reviews the management measures and fishing restrictions established by international organisations related to the conservation and sustainable use of sharks, offering some guidelines and a guide of useful resources. It also adapts to elasmobranch species the checklist prepared for making NDF by IUCN (Rosser & Haywood 2002). On a similar approach, the outcome of the Expert Workshop on Non-Detriment Findings (Anonymus 2008) points to the information considered essential for making NDF for sharks and other fish species, and also proposes logical steps to be taken when facing this task.

Management for *L. nasus* would ideally be based upon stock assessments and scientific advice to allow stock rebuilding (where necessary) and ensure sustainable fisheries (e.g. through quotas or technical measures, including closed areas, size limits and the release of live bycatch). This is standard fisheries management practice – albeit currently not widely applied for this species. Other States wishing to export *L. nasus* products would also need to develop and implement sustainable fisheries management plans if NDFs are to be declared, and would need to ensure that all States fishing the same stocks implement and enforce equally precautionary conservation and management measures.

12. References (see Annex 5)