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

Sixteenth meeting of the Conference of the Parties
Bangkok (Thailand), 3-14 March 2013

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).

Qualifying Criteria (Conf. 9.24 (Rev. CoP15))[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. The largest global stocks of this low productivity shark have experienced historical declines to significantly less than 30% of the baseline – the Appendix II trigger – as a result of unsustainable target and bycatch fisheries driven largely or partly by international trade demand for its high value meat. These stocks are now under management in some EEZs, but the greatest continuing threat to the species is unsustainable harvesting elsewhere to supply international trade in meat and fins.

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.*

Based on past fisheries' development to meet international trade demand, including shifting of effort from Northeast to Northwest Atlantic stocks, and a rapid recent rate of decline in catch per unit effort data for some southern stocks, it can be projected that southern hemisphere populations have experienced or are likely to undergo similar declines, triggering consideration for Appendix 1, unless international trade regulation provides the incentive to introduce sustainable management and/or improve existing management and monitoring regimes to provide a basis for non-detriment and legal acquisition findings.

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[2].

B. Proponent

Denmark on behalf of the European Union Member States acting in the interest of the European Union.

C. Supporting statement

1. Taxonomy

   1.1 Class: Chondrichthyes (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: English: Porbeagle, mackerel shark
   French: Requin-taupe commun, loutre de mer, (market name: veau de mer)

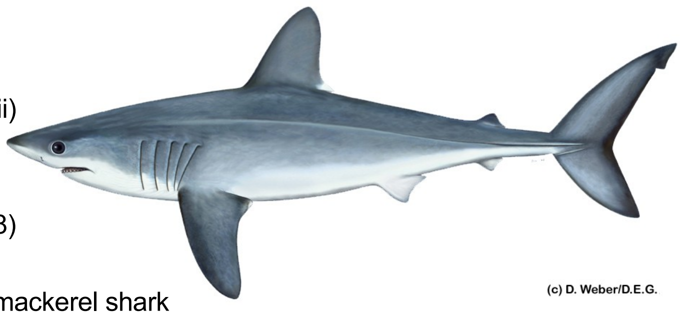

Figure 1. Porbeagle *Lamna nasus*

[1] Interpretation & application of Res. Conf. 9.24 (Rev. CoP14) applied here is described in more detail in Annex 5.

[2] E.g. the designation of an additional Management Authority and adoption of Customs codes.

[*] *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.*

Spanish:	Marrajo sardinero; cailón marrajo, moka, pinocho
Danish:	Sillhaj, sildehaj
German:	Heringshai (market names: kalbsfisch, see-stör)
Italian:	Talpa (market names: vitello di mare, smeriglio)
Japanese:	Mokazame
Portuguese:	Tubarão-sardo, tubarão golfinho, cavalha
South Africa:	Haringhaai
Swedish:	Hábrand, haamar, sillhaj

1.7 Code numbers: n/a

2. Overview

2.1 This proposal is significantly updated since CoP15: EU trade data are added, following the introduction of species-specific codes in 2010. New data added from the FAO Expert Panel report (2010a) (which concluded that available evidence supports the proposal to include *Lamna nasus* in CITES Appendix II). Declines in Southern stocks mean that the look-alike criterion (Annex 2bA) is not used. A fin identification guide is provided (Annex 8).

2.2 An Appendix II listing is proposed for porbeagle shark (*Lamna nasus*) in accordance with Article II.2 (a) of the Convention and Res.Conf. 9.24 (Rev. CoP15). Stock assessments describe marked historic and recent declines to significantly less than 30% of baseline for the largest Atlantic populations. Exploitation of smaller stocks in Southern Hemisphere oceans is largely unmanaged and unlikely to be sustainable. The latest review of trend data for the porbeagle (section 4.4) indicates that populations formerly proposed for listing under the criterion of Annex 2b A (“look-alike”) qualify for listing under Annex 2a B (FAO 2011).

2.3 *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, section 3.3). It is highly vulnerable to over-exploitation in fisheries and very slow to recover from depletion. It is taken in target fisheries and is an economically-important retained and utilised catch of some pelagic longline fisheries (section 5). 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 (section 6). DNA tests for parts and derivatives in trade are available (section 11.2.2).

2.4 Extent and rate of decline of the majority of the global population significantly exceed the qualifying levels for listing in Appendix II. Some stocks already qualify for consideration for Appendix I (section 4.4). 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 Southwest Atlantic stocks by ICCAT SCRS and ICES[3] (2009) have identified marked declines to significantly less than 30% of historic baseline. Mediterranean catch per unit effort (CPUE) has declined to less than 5% of baseline. More limited data from other Southern Hemisphere stocks, which are also a high value target and secondary catch of longline fisheries and are biologically less resilient to fisheries than North Atlantic stocks, also suggest declining trends (section 4.4).

2.5 Quota management based on stock assessment and scientific advice commenced in Canada’s Exclusive Economic Zone (EEZ) in 2002 (the stock has now stabilised under a rebuilding plan), and in the EU since 2008 (with a zero quota since 2010). Unrestrictive quota management began in the US in 1999 (but the quota was greatly reduced in 2008, and has led to fishery closure in recent years) and in New Zealand in 2004. Argentina requires live bycatch of large sharks to be released alive. Unregulated and unreported high seas catches jeopardize national management and stock recovery plans. At the time of writing, Regional Fishery Management Organisations (RFMOs) had not yet set high seas catch limits (NEAFC fisheries do not target porbeagle and release bycatch alive) (section 8).

2.6 An Appendix II listing for *Lamna nasus* will ensure that international trade is 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, particularly controls upon Introductions from the Sea. 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] The Standing Committee on Research and Statistics (SCRS) of the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the International Council for the Exploration of the Seas (ICES).

3.1 Distribution

Lamna nasus is found in a circumglobal band of ~30–60ºS in the Southern Hemisphere and mostly between 30–70ºN in the North Atlantic Ocean and Mediterranean (Figure 3). Annex 3 lists Range States and FAO Fishing Areas (Figure 4).

3.2 Habitat

L. nasus is epipelagic in boreal and temperate seas of 2–22°C, but prefers 5–10ºC in the Northwest Atlantic (Campana and Joyce 2004, Forselledo 2012, Svetlov 1978), from the surface to 200m deep, occasionally to 350–700m. Most commonly reported on continental shelves and slopes from close inshore (especially in summer), to far offshore (where often associated with submerged banks and reefs). They are apparently less abundant in the high seas outside 200 mile EEZs (Campana and Gibson 2008). 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.) Mature females tagged off the Canadian coast appear to migrate 2000km south to give birth in deep water in the Sargasso Sea, Central North Atlantic; pups presumably follow the Gulf Stream to return north (Campana *et al*. 2010a).

3.3 Biological characteristics

L. 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 and is the most vulnerable Northern European pelagic shark (Anon. 2012). Life history characteristics vary between stocks (see 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 porbeagles, which are therefore of even lower productivity and more vulnerable to overfishing than are North Atlantic stocks (Francis *et al*. 2008, 2009; Forselledo 2012).

3.4 Morphological characteristics

Heavy cylindrical body, conical head and crescent-shaped tail (Figure 1). The distinctive white patch on the lower trailing edge of the first dorsal fin is used to identify fins in trade (Pew Environment Group 2012).

3.5 Role of the species in its ecosystem

L. nasus is an apex predator, feeding on fishes, squid and small sharks (Compagno 2001, Joyce *et al*. 2002). It has few predators other than humans, but may be eaten by orcas and white sharks (Compagno 2001). 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. DFO Canada (2006) could not demonstrate an ecosystem role at present low stock levels.

4. <u>Status and trends</u>

4.1 Habitat trends

Critical *L. nasus* 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 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. CoP15) Annex 5), is best defined by the number of mature females in the population, particularly in heavily fished stocks dominated by immatures or males[4]. The only stock for which population size data are available is in the Northwest Atlantic. Recent stock assessments (DFO 2005a, Campana and Gibson 2008, Campana *et al*. 2010b, ICCAT/ICES 2009, Figure 16) 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 (Shivji 2010, Pade *et al*. 2006). There are possibly separate stocks in the Northeast and Northwest Atlantic (these were

[4] The FAO guidance for evaluating commercially aquatic species for listing in CITES (FAO 2001) stresses the importance of this consideration.

historically the largest global stocks), likely also in the Mediterranean, and in the Southeast and Southwest Atlantic. The latter extend into the Southwest Indian Ocean and Southeast Pacific, respectively, but Southern Hemisphere stock boundaries are unclear and other Indo-Pacific stocks have not been identified. Tagging studies show long distance movements occur within each stock. *L. nasus* tagged off the UK have been recaptured off Spain, Denmark and Norway, and sharks tagged off Ireland have travelled to the mid-Atlantic Ridge and near Madeira (Northwest Africa) (Saunders *et al*. 2011). Only one tagged shark has been recovered after crossing the Atlantic (Campana *et al*. 1999, Kohler *et al*. 2002, Stevens 1990), but new telemetry studies may demonstrate greater connectivity between the Northwest and Northeast Atlantic stocks (R Saunders pers. comm. 2012) . *L. nasus* tagged in Canadian waters move onto the high seas for unknown periods of time (Campana and Gibson 2008), including to pupping grounds in the Sargasso Sea (Campana *et al*. 2010a). The structure of exploited populations is highly unnatural, with very few large mature females present (3–5% of the Uruguayan catch (Forselledo 2012). This results in an extremely low reproductive capacity in heavily fished, depleted stocks (e.g. Campana *et al*. 2001).

4.4 Population trends

Almost all population trend indices (percentage declines from baseline, or recent declines) are clearly within the threshold for at least an Appendix II listing, if not Appendix I. These trends are summarized in Figure 2 and Tables 1 and 3, presented in the context of Annex 5 of Conf. 9.24 (Rev. CoP15) 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 to assess recent declines is therefore 54 to 78 years, greater than the historic baseline for most stocks. Trends in mature females (the effective population sizeFehler: Referenz nicht gefunden) must be considered where possible. Stock assessments for *L. nasus* (ICCAT SCRS/ICES 2009) usually show a correlation between declining landings, declining catch per unit effort (CPUE), and reduced biomass, because market demand and prices have always been high and there has, until recently, been little or no restrictive management. Where no stock assessments are available, CPUE, mean size and landings are therefore used as metrics of population trends for this valuable commercial species in unmanaged fisheries elsewhere, while recognizing that other factors may also affect catchability.

The IUCN Red List status assessment for *L. nasus* 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).

Historic fisheries are summarised in Annex 4. The North Atlantic has historically been the major reported source of world catches, with detailed long-term fisheries trend data available. 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. Reported North Atlantic catches (FAO-FIGIS FISHSTAT) during the past decade were less than 10% of those during the past 50 years (only partly due to the recent introduction of restrictive catch quotas). Fewer southern hemisphere catch data are available (reporting to FAO commenced in the 1990s), but some of these also show declining trends. FAO *L. nasus* catch data (Figure 5) are generally lower than that from other sources (national landings, ICES data *etc*.). Under-reporting is widespread, ‘grossly’ so in the South Atlantic (ICCAT SCRS/ICES 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). Clarke and Harley (2010) refer to the non-reporting of catches to the Western Central Pacific Fisheries Commission (WCPFC), including by some of the largest shark catching nations.

4.4.1 North Atlantic and Mediterranean

Annex 4 describes historic fisheries. The fisheries targeting seriously depleted shelf stocks in Northeast and Northwest Atlantic EEZs are now under stringent management. High seas tuna and swordfish longline fisheries also exploit these stocks (as a target or valuable secondary catch) in the NAFO, ICCAT and GFCM regulatory areas, where *L. nasus* catches remain largely unregulated, except for shark finning bans.

Northeast Atlantic: The Northeast Atlantic age structured production model stock assessment estimated a decline from baseline of over 90%, to 6% of biomass and 7% of numbers (far below the maximum sustainable yield (MSY)). An alternative surplus production model estimated that biomass had declined to between 15% and 39% of baseline, and by more than 50% from the level in 1972, to well below MSY (ICCAT SCRS/ICES 2009; Figures 13 and 14.) During this period, total Northeast Atlantic landings declined to 13% of their 1930s levels (Figure 7), tracking the decline in stock biomass. ICES 2012 does not update this assessment.

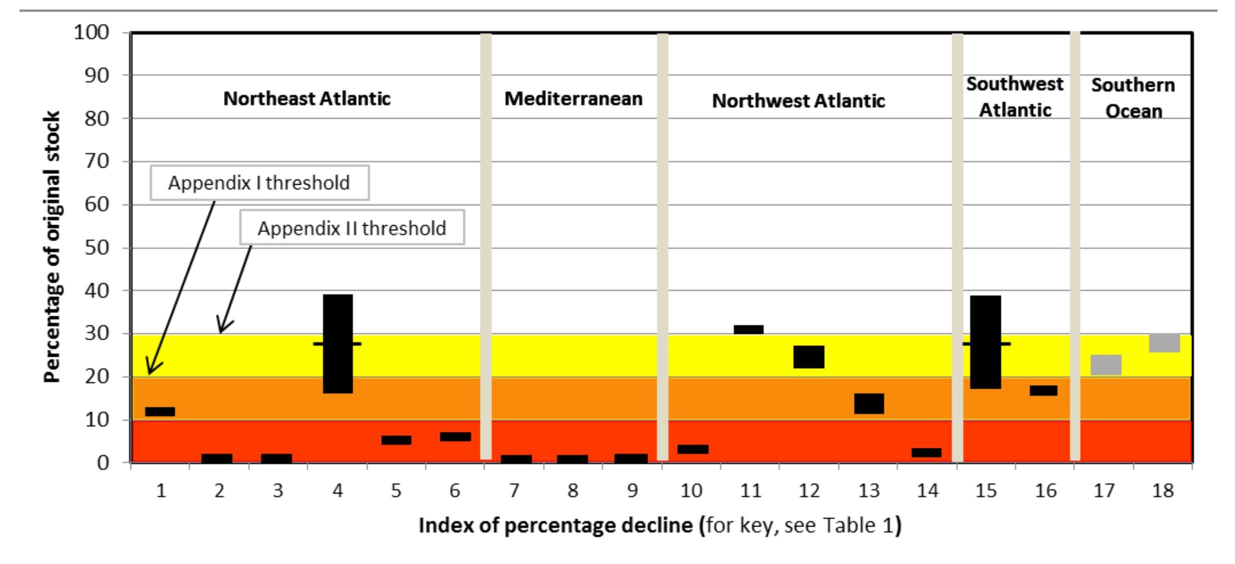

Figure 2. Decline trends for porbeagle *Lamna nasus* stocks (from FAO 2010a & sources cited in Section 4). Stock declines from historic baseline are indicated in black, recent declines (≤3 generations, or 50 years) in grey. Median and range are indicated where appropriate for stock assessments. A low productivity species that has declined to 15–20% of baseline (orange) can be considered for listing in Appendix I, or if within 20-30% of baseline (yellow), for listing in Appendix II (see footnote to Annex 5 of Res. Conf. 9.24 (Rev. CoP15)).

Table 1. Indices of percentage decline (trends recorded as % of baseline) illustrated in Figure 2.

	Index	Trend
Northeast Atlantic		
1	All landings	13%
2	Norwegian landings	1%
3	Danish landings	1%
4	Biomass (surplus production model)	15-39%
5	Biomass (age structured production model)	6%
6	Stock abundance (age structured production model)	7%
Mediterranean		
7	All observations	1%
8	Ligurian Sea catches	1%
9	Ionian Sea CPUE	2%

See Table 3 (Annex) for Table 1 data sources.

	Index	Trend
Northwest Atlantic		
10	All landings	4%
11	Stock biomass (surplus production model)	32%
12	Stock abundance (age structured production model)	22-27%
13	Mature female abundance (age structured production model)	12-16%
14	Stock biomass (Bayesian surplus production model)	3%
Southwest Atlantic		
15	Stock biomass (surplus production model)	18-39%
16	Spawning Stock Biomass (age structured production model)	18%
Southern Oceans		
17	Recent NZ landings (see comments in 4.2.2)	25%
18	Recent NZ longline CPUE (see comments in 4.2.2)	30%
19	Recent Japanese bluefin tuna bycatch CPUE	no trend

Mediterranean Sea: L. nasus has virtually disappeared from Mediterranean records. Ferretti *et al*. (2008) reviewed historic logbook data, reporting declines in tuna traps of >99.99% during a range of time series (135 to 56 years). FAO-FIGIS Fishstat (2012) only records very small landings. In the North Tyrrhenian and Ligurian Sea, Serena and Vacchi (1997) reported just 15 specimens of *L. nasus* during a few decades of observation. Soldo and Jardas (2002) report nine records in the Eastern Adriatic in the 20th century, with few records since (A. Soldo unpublished data). A few newborn and juvenile *L. nasus* were reported in the Ligurian and Adriatic Seas (Orsi Relini & Garibaldi 2002, Marconi & De Maddalena 2001). No *L. nasus* were caught during research into a western Mediterranean swordfish longline fishery (de la Serna *et al*. 2002). Only 15 specimens were caught during research conducted in 1998–1999 on large pelagic fisheries (mainly driftnets) in the southern

Adriatic and Ionian Sea (Megalofonou *et al*. 2000). Single male sharks were reported in the Adriatic in 2010 and in 2011 (Scacco *et al*. 2012).

Northwest Atlantic: Detailed stock assessments and recovery projections are available (DFO 2005a & b; Gibson & Campana 2005; Campana & Gibson 2008; ICCAT SCRS/ICES 2009; Campana *et al*. 2010b). Spawning stock biomass (SSB) is currently estimated to be about 22–27% of the historic baseline in 1961, when fishing commenced (see Annex 4). 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, biomass was estimated as 11–17% of virgin biomass, and fully recruited F as 0.26 (DFO 2001a). Total population numbers have remained relatively stable since quotas were reduced in 2002 (see Section 8), although female spawners may have continued to decline slightly. ICCAT SCRS/ICES (2009) estimated that spawning stock biomass (SSB) is now about 95–103% of its size in 2001 and the number of mature females is 83% to 103% of the 2001 value (Figure 16), or 12–16% of baseline. 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 and just 6% of the total population (ICCAT SCRS/ICES 2009; Campana *et al*. 2010b). A Bayesian Surplus Production (BSP) model is more pessimistic, estimating the 2004 population to be just 3% of the 1961 biomass (Babcock & Cortes 2010).

Stock assessment models have determined that recovery is possible, but Campana *et al*. (2010b) warn that the trajectory is extremely low and sensitive to human-induced mortality. Human-induced mortality of ~2 to 4% of the vulnerable biomass of 4,500t to 4,800t (equivalent to catching the 2005 quota of 185–192t) should allow recovery to 20% of virgin biomass ($SSN_{20\%}$) in 10–30 years. Recovery to maximum sustainable yield (SSN_{msy}) will 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 only 315t, the population will not recover to SSN_{msy} (Figure 17), but Campana & Gibson (2008) warned that the high seas fisheries (see below) exploiting this stock jeopardize Canada's fisheries management and recovery plan – the population would crash at these exploitation rates.

Taiwanese, Korean and Japanese tuna longliners take a largely unknown catch 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). Estimates for Japan's mostly unreported high seas North Atlantic catch ranged from 15t to 280t annually during 2000–2002 (DFO 2005b), or ~200t in 2000 and 2001 (Campana & Gibson 2008). Furthermore, Campana *et al*. (2011) estimate that about 30t/yr of *L. nasus* die following discard from commercial Canadian fisheries alone. Stock assessments indicate that these levels of combined North Atlantic landings will prevent stock recovery.

4.4.2 Southern Hemisphere

The latest review of *L. nasus* trend data indicates that Southern Hemisphere populations formerly proposed for listing under the criterion of Annex 2b A ("look-alike") actually qualify for listing under Annex 2a B. FAO-FIGIS FISHSTAT data have improved in recent years; southern hemisphere catch data are available for several countries since the mid-1990s (Figure 21), but some of the largest shark fishing nations are still not reporting catches (Clarke & Harley 2010). Available data show a declining trend, with New Zealand catches dominating, followed by Spain (prior to the adoption of the EU zero quota for *L. nasus*) and Uruguay (FAO-FIGIS FISHSTAT). Catch data reported to ICCAT (e.g. Figure 12) illustrate the difficulty in interpreting such data when fisheries move between different fishing areas.

Observer data and logs from the Uruguayan tuna and swordfish long-line fleet showed a decline in *L. nasus* CPUE from 1982 to 2008 (Pons and Domingo 2010). These and other data 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 20, ICCAT SCRS/ICES 2009), mirroring the decline in CPUE. This stock probably extends into the Southeast Pacific. Data were not available to support an assessment of the Southeast Atlantic/Southwest Indian Ocean stock. The WCPFC and other Indo-Pacific RFMOs have not yet investigated *L. nasus* stock status (Clarke and Harley 2010).

New Zealand commercial catch and effort records are illustrated in Figure 18. Estimates of tuna longline bycatch of *L. nasus* are not available for all years and are imprecise because of low observer coverage. There has been an 86% decline in the total weight of *L. nasus* reported by New Zealand since 1998–99, to a low of 41 t in 2007-08. This decline was steepest during a four year period of rapidly increasing domestic fishing effort in the tuna longline fishery, but has stabilised since tuna longline effort dropped during the last four years. Unstandardised catch per unit effort recorded by observers from 1992–93 to 2005–06 (Figure 19) varies considerably, but has been extremely low in recent years. This trend may not reflect stock abundance because of low observer coverage and other potential sources of variation (e.g., vessel, gear, location and season), but these data were used to assess the stock as unlikely (<40%) to be at or above MSY (MFSC 2011). Australian and New Zealand shark research and management organisations are compiling data on the status and catch of porbeagle in Australasian waters and in due course may collaborate with the Secretariat of the Pacific Community to develop a stock assessment for porbeagle (Clarke & Harley 2010, Barry Bruce pers. comm.).

After blue sharks, porbeagle is one of the sharks commonly caught by Japanese Southern bluefin tuna longline vessels (Matsunaga 2009). Most of the catch is reportedly discarded or landed at ports near the fishing grounds (Fishery Agency of Japan 2004), but do not appear in FAO or most RFMO databases. Matsumoto (2005) reports an increase in catch from very low levels during 1989–1995 followed by a decline in annual landings to around 40% of original levels between 1997 and 2003. Standardised reported CPUE has varied from 1992 to 2002, but recent stock trends were deemed to be stable (Matsunaga and Nakano 2002). Matsunaga (2009) reported no *L. nasus* catch trend in the same fishery from 1992 to 2007, but these data are difficult to interpret. Different catches for 'all sharks' were reported to the CITES AC and to FAO in 2011 and 2012[5] and the reliability of Japanese catch data has been questioned by the CCSBT[6].

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 – see section 4.4.1).

5. Threats

The principal threat to *L. nasus* worldwide is over-exploitation in target fisheries, which depleted the world's largest North Atlantic stocks over 50 years ago (Figure 5, Annex 4), and as a secondary long-line catch or bycatch. Recent global reported *L. nasus* landings have decreased from 1 719t in 1999 to 746t in 2009 and 252t in 2010. The highest catches in 2009 and 2010 were from France (305t, 9t), Spain (239t, 70t), Canada (63t, 83t) and New Zealand (63t, 56t) (FAO FISHSTAT 2012), although ICCAT/ICES (2009) notes that reported landings "*grossly underestimate actual landings*" and FISHSTAT has no *L. nasus* data from Japan, Taiwan or Korea. A zero quota has since been set for EU waters, all EU fleets, and the NEAFC area. USA and Canadian fisheries are under strict quota management. However, other fisheries are also declining, even in the absence of restrictive management (e.g., in the southern hemisphere (Figure 21)). This species is particularly vulnerable to fisheries because, in the absence of management, adults and juveniles of all age classes are targeted (MFSC 2011, Francis *et al*. 2007). Furthermore, the life history characteristics of Southern Ocean porbeagles make them significantly more vulnerable to overfishing than the depleted North Atlantic stocks.

5.1 Directed fisheries

Intensive directed fishing for valuable *L. nasus* meat was the major cause of 20th Century population declines (see Annex 4). ICES (2005) noted: "*The directed [Northeast Atlantic] fishery for porbeagle 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*." A target fishery for the meat of *L. nasus* still operates in Canada. The 2009 ICCAT SCRS/ICES stock assessment meeting recommended that high seas fisheries should not target porbeagle, but there is no quota management for high seas catches, except where these are covered by fleet regulations (e.g. NEAFC Parties, EU and Canadian quotas). *L. nasus* used to be an important target game fish species for recreational fishing in Ireland and UK. The recreational fisheries in Canada, the US and New Zealand are very small.

5.2 Incidental fisheries

L. nasus is a valuable 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. This catch is often inadequately recorded or un-reported. The high value of *L. nasus* 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 in the absence of a finning ban. Approximately 60% of New Zealand longline bycatch is alive when retrieved, and about 80% of the catch is processed. Survival of unprocessed discarded sharks is estimated at 50% (Campana *et al*. 2011). 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.

While there is a large amount of oceanic fishing effort in the Southern Oceans, and several fleets catch *L. nasus* as part of their fishing activity, FAO records of capture production only commence in 1994 and are relatively low, with the exception of New Zealand, Spain and Uruguay. Japan's *L. nasus* catch in southern ocean fisheries is largely unreported, but must be significant: porbeagle was the second most abundant shark species after blue shark and comprised 5.5% of observer records of shark catches in the Japanese tuna fishery operating under an access agreement in Australian waters (Stevens and Wayte 2008).

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[5] Total shark catches reported to FAO show a decreasing trend from 2003 to 2008, with a catch in 2008 of ~18,000t, while data provided to CITES AC shows an increasing trend over the same period, with a catch in 2008 of 37,400t.

[6] The Commission for the Conservation of Southern Bluefin Tuna, a Regional Fisheries Management Organisation.

Spanish vessels used to retain the *L. nasus* catch from their longline swordfish fisheries, prior to the establishment of the zero EU quota, and Uruguay and other countries (some of which do not report to FAO) have a significant catch in 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, Forselledo 2012).

Important but largely unreported secondary 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 & Williams 2003, Compagno 2001), and the Chilean artisanal and industrial longline swordfish fishery, between 26–36ºS, which records *L. nasus* (E. Acuña unpublished data; Acuña *et al*. 2002). Hernandez *et al.* (2008) found that *L. nasus* made up 1.7% of all fins tested in the north-central Chilean shark fin trade, and that 98% of fins labelled 'Tintorera' (50 specimens) were *L. nasus* (i.e. were correctly identified by the traders). Overall catches of *L. nasus* by Argentina were 30.1t, 17.7t, 19.8t and 69.7 t between 2003 and 2006 (INIDEP 2009) (these data did not appear in FAO FISHSTAT), but *L. nasus* captures by the Argentinean fleet are probably now limited to incidental captures by three Patagonian toothfish fishing vessels, and with strict measures in force to protect sharks in Argentinian waters (live sharks greater than 1.5 m must be released if caught), catches are likely to be minimal. There are observers on all Argentinean fleets, and an observer report for sharks (including *L. nasus)* is due to be released in 2012 (Ramiro Sanchez, pers. comm.).

6. Utilization and trade

Until recently, a lack of species-specific landings and trade data made it impossible to assess the proportions of global catches that supply national demand and enter international trade, although the high commercial value of the species has been documented through market surveys (Fleming & Papageorgiou 1997, Rose 1996, TRAFFIC unpublished). Survey findings indicated that the demand for fresh, frozen or processed *L. nasus* meat and fins was sufficiently high to justify the existence of an international market, while other products include dried-salted meat for human consumption, oil, and fishmeal (Compagno 2001). The extent of national consumption *versus* export by range States can vary considerably, depending upon local demand. For example, the EU market for porbeagle products is well documented, whereas other States with lower domestic seafood consumption, such as Uruguay, are likely to export its landings of porbeagle, mixed with mako, another high value shark meat (Andres Domingo pers. comm.). Following the introduction by the EU of new species-specific codes in 2010, some international trade data for this species is now becoming available (albeit only for trade involving the EU).

6.1 National utilization

L. nasus has long been one of the most valuable (by weight) of marine fish species landed in Europe, similar in value to and sometimes marketed as swordfish (Gauld 1989; Vas and Thorpe 1998; TRAFFIC unpublished; Vannucinni 1999). Porbeagle may also be utilised nationally in some range States for liver oil, cartilage and skin (Vannuccini 1999), however 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.

Sports fishers catch porbeagle in the USA, New Zealand and in some EU Member States. Catches may be retained for meat and/or trophies, or tagged and released (e.g. in EU). New Zealand's recreational catch is probably negligible, since *L. nasus* usually occur over the outer continental shelf or beyond (MFSC 2011).

6.2 Legal trade

All international trade in *L. nasus* products is unregulated and legal, unless involving those States that have prohibited the possession of and/or trade in shark products. There are no quantitative historic trade data because, prior to 2010, all global trade in *L. nasus* products was reported under general Customs commodity codes for shark species and could therefore not be differentiated from other species. In 2010, the EU introduced new species-specific Customs codes for fresh and frozen *L. nasus* products (excluding shark fins) and amended previous codes covering most shark species accordingly (Table 4). Other countries/territories still do not have species-specific codes in place for trade in this species, and continue to report its trade under general shark commodity codes, preventing analysis.

There is a considerable market for *L. nasus* products within the European Union (EU). EU Member States were responsible for 60–75% of FAO's global records of *L. nasus* catch in 2006 and 2007, prior to establishment of a TAC (which was reduced to zero for EU waters and EU fleets in 2010). EU market demand must now therefore be met by imports. EU imports and exports of *L. nasus* in 2010 and 2011, reported in EUROSTAT, are summarized in Tables 5 and 6 (excluding internal EU trade). The following range States (excluding other EU countries) were the principal suppliers of fresh and frozen *L. nasus* meat to the EU in 2010 and 2011 (the EU importer is shown in brackets): South Africa (Italy), Japan (Spain), Morocco (Spain), Norway (Germany and Denmark), the Faroe Islands (Denmark) and New Zealand (Bulgaria). A total of 50,500kg of *L. nasus* meat, worth EUR 128,425, was imported during this two year period.

South Africa does not have any directed fisheries for *L. nasus*, which is only occasionally caught in the South African pelagic long-line fishery. Therefore, the high quantities imported from South Africa into the EU are likely to be derived from foreign flagged vessels fishing outside South Africa's EEZ and landing in South African ports, including Japanese, Korean and Taiwanese vessels targeting tuna and tuna-like species (Source: TRAFFIC East and Southern Africa, 2011). At the time of writing, none of these fishing entities were regularly reporting *L. nasus* catches to FAO or RFMOs. Two non-range States (previously unknown players in the market for this species) also reported exports to the EU in 2010 and 2011: Senegal and Suriname. However, determining the origin of the meat in trade is fraught with difficulties (as noted for South Africa).

Average prices of imports ranged from only 1.26 EUR/kg for meat imported from Japan to 3.64 EUR/kg for meat imported from the Faroe Islands. This is significantly lower than prices reported in earlier years for *L. nasus* landed into European ports and of meat (vitello di mare) seen for sale at 12.80 EUR/kg in Venice Fish Market, Italy, in November 2010 (pers. comm. Mats Forslund, WWF-SE).

The EU also reported significant exports of *L. nasus*, totalling 141,300kg in 2010 and 2011. These may have been exports of catches landed and frozen in 2009, before the zero quota, or re-exports. Morocco was by far the largest destination of *L. nasus* exported from the EU, followed by Afghanistan. However, the price of *L. nasus* exported to Morocco was very low (average 0.70 EUR/kg) compared to 17.81 EUR/kg for *L. nasus* exported to China and 2-4 EUR/kg for *L. nasus* exported to Ceuta (Spanish territory in North Africa), Andorra, Afghanistan, Switzerland and Turkey. All exports from the EU were from Spain, except those to Switzerland which came from Denmark. Earlier studies had reported that Canada exports *L. nasus* meat to the US and the EU, Japan exports to the EU, 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) and that it is also imported by Japan (Sonu 1998). The new EU trade data confirm exports from Japan to the EU, but there were no records of the EU importing *L. nasus* from Canada, or of the EU exporting (or re-exporting) it to the US, as reported in earlier studies.

EUROSTAT also records intra-EU trade – dispatches (equivalent to exports within the EU) and arrivals (equivalent to imports). Although total amounts of specific commodities in trade are difficult to estimate, due to the movement of commodities between EU Member States and different sources/methods used to report this trade, intra-EU trade data can provide an indication of the most important Member States involved in the trade. In 2010 and 2011 Spain (~58%) and Italy (~32%) were the principal destinations for trade of *L. nasus* commodities (fresh and frozen) within the EU, and Spain (~80%) and Portugal (~15%) were the principal suppliers of products traded within the EU.

6.3 Parts and derivatives in trade

Meat: This can be 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).

Fins: Porbeagle appears in the list of preferred species for fins in Indonesia (Vannuccini 1999), but was reported to be relatively low value by McCoy & Ishihara (1999, quoting Fong & 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 frequently used in the global fin market (Shivji *et al*. 2002). The raw fins are also readily recognised to species level by fin traders in Chile (Hernandez *et al.* 2008). 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).

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 its meat (Vannuccini 1999). There is limited use of jaws and teeth as marine curios.

6.4 Illegal trade

No species-specific legislation has been adopted by range States or trading nations to regulate national or international trade in *L. nasus*. The important national fisheries management measures adopted to allow populations to recover are vulnerable to violation/infringement in the absence of species-specific trade monitoring and regulation. An increasing number of States are prohibiting all trade in shark products or just trade in shark fins – none are *L. nasus* range States (Anon. 2012).

6.5 Actual or potential trade impacts

The unsustainable *L. nasus* fisheries described have been driven by the high value of the meat in national and international markets. Trade has therefore been the driving force behind the serial depletion of populations in the North Atlantic (see Annex 4) and, with the closure of the major northern fisheries, now threatens formerly lightly fished 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

It has been forbidden to catch and land *L. nasus* in Sweden since 2004. In 2007 Norway adopted ICES advice and banned all direct fisheries for *L. nasus*. From 2007–2011 specimens taken as bycatch had to be landed and sold. From 2011, live specimens must be released, whereas dead specimens can (not must) be landed and sold. Reporting was extended to include the number of specimens landed in addition to weight. From 2011, the regulations also include recreational fishing. Argentina requires live bycatch of large sharks to be released alive. 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 it under Schedule 1 of Canada's Species at Risk Act because recovery measures were being implemented.

Many range States have finning bans, or have prohibited all shark fishing in their waters. A few range States have legally binding fisheries regulations for *L. nasus.* For example, EC Regulations have prohibited fishing for *L. nasus* in EU waters since 2010, and EU vessels may not fish for, retain on board, tranship or land *L. nasus* from international waters (EU Regulation 43/2012 and Council Regulation 44/2012). Fisheries management measures are described under 8.1.

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), but no listed oceanic shark species is managed under the UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks (in force since 2001).

L. nasus is included in Appendix II of the Convention on the Conservation of Migratory Species (CMS) and the Annex to the Migratory Sharks Memorandum of Understanding (signatories will meet in September 2012). *L. nasus* has been uplisted to Annex II (Endangered or Threatened Species) of the Barcelona Convention Protocol concerning specially protected areas and biological diversity (SPA/BD) in the Mediterranean. Parties are required to protect and aid the recovery of these species. In May 2012, GFCM prohibited the retention on board, transhipment, landing, transfer, storage, sale, or display for sale of all shark species listed in Annex II of this Protocol. The Mediterranean population is also in Appendix III of the Bern Convention on the Conservation of European Wildlife and Habitats, as a species whose exploitation must be regulated to keep its population out of danger. *L. nasus* is included in the Annex V list of Threatened and/or Declining Species and Habitats of the OSPAR Convention for the Protection of the Marine Environment of the North-east Atlantic.

8. Species management

8.1 Management measures (fisheries management)

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. In 2012, only 47 countries (33% of the 143 countries reporting catches to FAO) had adopted an NPOA. Thirty of these have each reported less 1% of the world's shark catches to FAO since 2000. Twenty-six shark fishing states and entities are responsible for at least 1% of global shark catches reported to FAO, totalling 84% of catches in aggregate. Nine of the 26 (35%) have not yet adopted their NPOA. Four of the world's major shark fishing nations have not yet addressed implementation of the IPOA–Sharks (Fischer *et al*. 2012). *L. nasus* range and/or fishing States with Shark Plans include Argentina, Australia, Canada, the EU, Japan, New Zealand, Spain, Taiwan, Uruguay and USA. *L. nasus* is listed as a "High Priority" species in Uruguay's Shark Action Plan.

Many RFMOs have banned shark finning. Some have adopted resolutions to support improved recording or management of pelagic sharks taken as bycatch in the fisheries they manage, and/or have prohibited the retention of threatened species, but none have yet adopted science-based catch limits. ICCAT has required Parties since 2007 to reduce the mortality of *L. nasus* in directed Atlantic fisheries where a peer-reviewed stock assessment is not available, but compliance is not monitored. In 2008, the NAFO Scientific Council was warned that overfishing in the high seas NAFO Regulatory Area was undermining Canada's management for *L. nasus* and would lead to population crash (Campana & Gibson 2008), but Parties decided that shark management was ICCAT's remit. Although a stock assessment was prepared in 2009, neither ICCAT nor NAFO have adopted proposals to introduce catch limits or to prohibit the retention of *L. nasus* caught on the high seas. An ICCAT Ecological Risk Assessment (ICES SCRS/2012/079) found *L. nasus* to be the most vulnerable pelagic species (followed by shortfin mako, thresher, blue shark, and swordfish). Parties to the North-east Atlantic Fisheries Commission (NEAFC), which covers fisheries not under ICCAT's remit, have agreed since 2010 not to target *L. nasus* and to release incidental catches alive.

The management of southern *L. nasus* stocks will require close coordination between several RFMOs in the Atlantic, Pacific and Indian Ocean and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). CCAMLR (2006) adopted a moratorium on directed shark fishing until data become available to assess the impacts of fishing on sharks in the Antarctic region. Live release of sharks taken as bycatch is encouraged (not mandated). The Western and Central Pacific Fisheries Commission (WCPFC), established in 2004, is responsible for pelagic shark management. It has not yet addressed *L. nasus*, which is identified as a key species by the Scientific Committee. Commission Members, Cooperating non-Members, and participating Territories are required to report catch, effort and discard data (WCPFC 2010).

The conservation and management of sharks in EU waters falls under the European Common Fishery Policy, which manages fish stocks through a system of Total Allowable Catch (TAC or annual catch quotas) and reduction of fishing capacity. The Community Action Plan for the Conservation and Management of Sharks (CPOA, EU COM(2009) 40 final) sets out to rebuild depleted shark stocks fished by the EC fleet within and outside EC Waters. The CPOA's Shark Assessment Report pays particular attention to *L. nasus*, which has been under legally-binding EU management in EC and international waters since 2008 (see Section 7.1).

Information on national management measures and legislation (including in Australia, Canada, EU member States, New Zealand, Norway and the USA) is summarised in Annex 6.

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 to support sustainable fisheries management. 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, Clarke and Harley 2010). FAO and RFMO data are incomplete. 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 *L. nasus* are, however, unreported except in the EU. FAO (2010a) noted that a CITES listing is expected to result in better monitoring of catches entering international trade from all stocks and could therefore have a beneficial effect on the management of the species in all parts of its range. In the absence of a CITES listing there is no reliable mechanism to track trends in catch and trade of *L. nasus*.

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

Domestic fisheries management measures described above and listed in Annex 6, cannot deliver sustainable harvest of *L. nasus* when stocks are exploited by several fleets, particularly in unregulated and unreported high seas fisheries. Even where catch quotas have been established, no trade measures prevent the sale or export of landings in excess of quotas. STECF (2006) noted that although a CITES Appendix II listing alone would not be sufficient to regulate catching of *L. nasus*, it could be considered an ancillary measure. FAO (2010a) considered that regulation of international trade through listing in CITES Appendix II could strengthen national efforts to keep harvesting for trade commensurate with stock rebuilding plans. The usual hygiene regulations apply to control of domestic trade and utilisation.

8.4 Captive breeding and artificial propagation

No specimens are known to be bred in captivity.

8.5 Habitat conservation

Research in areas fished by Canadian and French fleets and telemetry studies have identified some important *L. nasus* habitat, within EEZs and on the high seas. Some habitat may be incidentally protected inside marine protected areas or static gear reserves, but there is no protection for critical high seas habitat.

9. Information on similar species

L. nasus is one of five species in family Lamnidae (mackerel sharks), including white shark *Carcharodon carcharias* and two species of mako, genus *Isurus*. Salmon shark *Lamna ditropis* occurs in the North Pacific. Porbeagle and Mako *Isurus oxyrinchus* may be confused in some fisheries, despite good keys being available (e.g. Fernández-Costa & Mejuto 2009).

10. Consultations

Ten range states responded, several of them providing additional information that has been incorporated into the proposal where space permitted. See Annex 9 for more information.

11. Additional remarks

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

Most target fisheries take place inside EEZs. There is a significant catch of *L. nasus* in some largely unrecorded and unmanaged pelagic high seas fisheries. A CITES Appendix II listing would require introductions from the sea to be accompanied by a non-detriment finding (NDF). They would have to be taken from a sustainably exploited high seas fishery, requiring management action by the appropriate RFMO. FAO (2010a) considered that regulation of international trade through listing in Appendix II could improve the control of high seas catches through the use of certificates of introduction from the sea accompanied by NDF.

11.2 Implementation issues

Lamna nasus was included in CITES Appendix III with effect from 25 September 2012. This listing will enable Parties to become familiar with trade patterns for *L. nasus* products and the issuance of CITES documentation in relation to such trade, before full implementation of this proposed Appendix II listing would come into effect 18 months after the adoption of the proposal, in September 2014.

11.2.1. Scientific Authority: It would be appropriate for a fisheries expert to advise the Scientific Authority.

11.2.2. Identification of products in trade: It will be important to develop and adopt 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. There is a photographic guide to dried L. nasus pectoral and dorsal fins (Pew Environment Group 2012, Annex 8), and a dichotomous guide to the identification of the fins of 48 shark species (Deynat 2010). Several research groups have developed species-specific primers and highly efficient multiplex PCR (Polymerase Chain Reaction) screening assays to identify L. nasus body parts (e.g. Shivji et al. 2002; Pade et al. 2006). Furthermore, Testerman et al. (2007) have developed a simple and rapid PCR test that can simultaneously identify *L. nasus* body parts and distinguish between Southern and Northern Hemisphere stocks, which may be used to easily confirm species identification and product origin for enforcement purposes. Cost per sample processed ranges from US$12–60, depending upon sample condition, less for large numbers. Turn-around time is 2–7 days from receipt of sample, depending upon urgency.

11.2.3 Non-detriment findings (NDF): CITES (2006) provides first considerations on preparing NDF for shark species. The Spanish Scientific Authority (García-Núñez 2008) reviewed 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 to useful resources, and adapted to elasmobranch species IUCN's NDF checklist (Rosser & Haywood 2002). Similarly, the Expert Workshop on Non-Detriment Findings report (Anon. 2008) points to the information considered essential for making NDF for sharks and other fish species, and 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 yet 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 7)