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

Fourteenth meeting of the Conference of the Parties
The Hague (Netherlands), 3-15 June 2007

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 [Resolution Conf. 9.24 (Rev. CoP13) Annex 2 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 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.

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.

Lamna nasus is or has been subjected to unsustainable target fisheries in parts of its range, because of international trade demand for its high-value meat. Other stocks are likely to experience similar declines unless trade regulations provide an incentive to introduce sustainable management.

Annotation

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

B. Proponent

Germany, on behalf of the European Community Member States acting in the interest of the European Community. (This proposal was prepared by Germany.)

C. Supporting statement

1. Taxonomy

1.1 Class: Chondrichthyes (Subclass: Elasmobranchii)

1.2 Order: Squaliformes

1.3 Family: Squalidae

1.4 Genus, species or subspecies, including author and year: *Lamna nasus* (Bonnaterre, 1788)

1.5 Scientific synonyms: See Annex 2.

1.6 Common names:

English:	porbeagle
French:	requin-taupe commun (market name: veau de mer)
Spanish:	marrajo sardinero; cailón marrajo, moka, pinocho
Danish:	sildehaj
German:	heringshai (market name: kalbfish, see-stör)
Italian:	talpa (market name: smeriglio)
Japanese:	mokazame
Swedish:	hábrand; sillhaj

1.7 Code numbers:

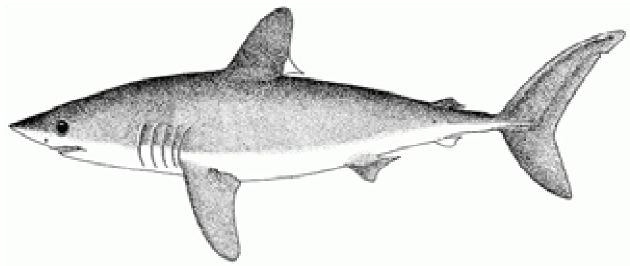

Figure 1. Porbeagle *Lamna nasus*
(*Source*: FAO Species Identification Sheet)

2. Overview

The large warm-blooded porbeagle shark (*Lamna nasus*) occurs in temperate North Atlantic and southern ocean waters. It is relatively slow growing, late maturing, and long-lived, bears small litters of pups and has a generation period of 20–50 years and an intrinsic rate of population increase of 5-7% per annum. It is therefore highly vulnerable to over-exploitation in fisheries.

Lamna nasus meat is high quality and high value. Its large fins are valuable. It is taken in target fisheries and is also an important retained and utilised component of the bycatch in pelagic longline fisheries. Meat and fins enter international trade, but are generally not recorded at species level and as a result the level, pattern and trends in international trade in these products are largely unknown. Other products are less fully utilised. A highly efficient DNA test for parts and derivatives in trade should soon also be able to identify the regional origin of products.

Unsustainable North Atlantic target *Lamna nasus* fisheries are well documented. These depleted stocks severely; landings fell from thousands of tonnes to a few hundreds in under 50 years. Very few data are available for southern hemisphere stocks, which are a high value target and bycatch of longline fisheries, but those data that are available show declining trends.

Northwest Atlantic stock assessments document a decline in stock biomass to 11–17%, total abundance to 21–24% and numbers of mature females to 12–15% of virgin levels. Management since 2002 has maintained a relatively stable population, but with a slight decline in mature females. There is no stock assessment for the more heavily fished, unmanaged and possibly more seriously depleted Northeast Atlantic and Mediterranean population, or for southern stocks.

Quota management based on stock assessment and scientific advice has been in place in the Canadian EEZ since 2002. There is a quota in the United States of America. Fisheries in the Northeast Atlantic are effectively unrestricted (quotas greatly exceed landings). Scientific advice in 2005 that no fishery should be permitted in the Northeast Atlantic was not adopted. New Zealand introduced quota management in 2004. Regional Fishery Organisations (RFOs) are not managing high seas stocks.

An Appendix-II listing is proposed for *Lamna nasus* in accordance with Article II, 2(a) and Resolution Conf. 9.24 (Rev. CoP13). The North Atlantic stocks have experienced marked historic and recent declines and only one is managed. Data for Southern Ocean stocks of *L. nasus* are lacking, but these are also exploited, largely unmanaged, and their products enter international trade.

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) and the extent and rate of population declines have exceeded the recommended qualifying levels for listing.

The purpose of an Appendix-II listing for *Lamna nasus* is to 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. These trade controls will complement and reinforce traditional fisheries management measures, thus also contributing to implementation of the UN FAO International Plan of Action for the Conservation and Management of Sharks.

3. Species characteristics

3.1 Distribution

Lamna nasus occurs largely between latitude 30–60ºS, in a circumglobal band in the southern hemisphere, and 30–70ºN in the North Atlantic Ocean (Compagno 2001, see Annex 1 Figure 2). Its Range States and areas, FAO Fisheries Areas (Annex 1 Figure 3), and ocean distribution are listed in Annex 3.

3.2 Habitat

Lamna nasus is an active, warm-blooded epipelagic shark inhabiting boreal and temperate waters, sea temperature 2–18°C, preferring 5–10ºC in the Northwest Atlantic (Campana and Joyce 2004, Svetlov 1978). They are most common on continental shelves from near the surface to depths of 200m, but have occasionally been caught at depths of 350–700m. They range from close inshore (especially in summer), to far offshore (where they are often associated with submerged banks and reefs). They occur singly, in shoals, and in feeding aggregations. Stocks segregate (at least in some regions) by age, reproductive stage and sex and adults undertake seasonal sex-specific north-south migrations. Mature *L. nasus* are rarely seen in winter and early spring in the Northwest Atlantic, with monthly catches exhibiting a seasonal and sex-specific spring migration of mature sharks along the coast and outer edge of the Scotian shelf from the Gulf of Maine towards the mating grounds off southern Newfoundland and the approaches to the Gulf of Saint Lawrence, but pupping grounds are unknown. Smaller immature sharks resident on the Scotian shelf appear not to undertake the same extensive migrations. (Campana *et al*. 1999, 2001, Campana and Joyce 2004, Compagno 2001, Jensen *et al*. 2002.) The French targeted fishery takes most catches in summer (Biseau 2006). The Mediterranean may be a nursery ground (Stevens *et al*. 2005).

3.3 Biological characteristics

Despite being warm-blooded, *Lamna nasus* is relatively slow growing and late maturing, long-lived and bears only small numbers of young. Its intrinsic rate of population increase is 5–7% *per annum* in an unfished population (DFO 2001a), and it has a generation time (defined as the average reproductive age of females in an unfished population) of at least 20–50 years.

Life history characteristics vary between stocks (Table 2). *L. nasus* in the North Atlantic reach a maximum length of 355cm, weight of 230kg, and age of 26–46 years. Females mature at an age of 13 years and total length of 217–259cm in the Northwest Atlantic, but at only 185-202cm (fork length 170–180cm, Francis and Duffy 2005), perhaps 15–19 years in the southern hemisphere (Ministry of Fisheries 2006). Males mature at eight to 10 years old and a smaller size (165cm TL or fork length 140–150cm) in New Zealand waters. (Campana *et al*. 2002 a, b, Compagno 2001, Fischer *et al*. 1987, Francis and Duffy 2005, Francis *et al*. in press, Jensen *et al*. 2002, Ministry of Fisheries 2006, Natanson *et al*. 2002.) Age estimates for North Atlantic *L. nasus* have been validated up to 26 years (Campana *et al*. 2002). Theoretical estimates of longevity of 29–46 years (Natanason *et al*. 2002) are based on assumptions about natural mortality rate, and are unverified. Ministry of Fisheries (2006) reports that longevity in the southwest Pacific is unknown but is probably at least 40 years and possibly twice that.

L. nasus produce litters of 1–5 pups (usually four), 65–80cm long after an 8–9 month pregnancy. They may breed every year, or some on alternate years. Birth occurs in spring off Europe, spring-summer off North America and winter in Australasia and the Eastern Pacific off Chile. (Aasen 1963, Acuña *et al*., Stevens *et al*. 2005, Compagno 2001, Francis and Stevens 2000, Francis *et al*. in press, Gauld 1989, Jensen *et al*. 2002.)

Prey species are predominantly pelagic fish and squid in deepwater, and pelagic and demersal teleost fishes in shallow water (Compagno 2001, Joyce *et al*. 2002).

3.4 Morphological characteristics

Heavy cylindrical body, two spineless dorsal fins (first originates over abdomen, well in front of pelvic fin origins) and an anal fin. Vertebral axis extends into long upper tail lobe. Strong keels on caudal peduncle, short secondary keels on base, crescent-shaped tail. Conical head, fairly short conical snout, five long and broad gill openings (rear two in front or above pectoral fin origin), large mouth extending behind eyes, nostrils free from mouth, no barbels or grooves. Very small spiracles well behind eyes. Dark grey or blackish dorsal surface. First dorsal fin with a very distinctive white patch on lower free trailing edge. Underside white in northern hemisphere, but with underside of snout is dark and some dusky blotches on abdomen in adults in the southern hemisphere.

3.5 Role of the species in its ecosystem

L. nasus is an apex predator, occupying a position near the top of the marine food web (it feeds 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 this species (Compagno 2001). Fisheries and Oceans Canada (2006) considers that the abundance of NW Atlantic population is now too low for this species still to have any indirect value through its role in ecosystem function or regulation. Stevens *et al*. (2000) warn that the removal of populations of top marine predators may have a disproportionate and counter-intuitive impact on trophic interactions and fish population dynamics, including by causing decreases in some of their prey species.

4. Status and trends

4.1 Habitat trends

Critical habitats for this species and threats to these habitats are unknown. High levels of heavy metals (particularly mercury) bio-accumulate and may be bio-magnified in top oceanic predators, but their impacts on *L. nasus* population fitness is unknown. Effects of climatic changes on world ocean temperatures, pH and related biomass production could potentially impact *L. nasus* populations.

4.2 Population size

The only stock for which population size data are available is in the Northwest Atlantic. The most recent stock assessments (DFO 2005a, Gibson and Campana 2006) have estimated the total population size for this stock as 188,000–191,000 sharks (21–24% of virgin numbers; possibly 800,000 to 900,000 fishes) and 9,000–13,000 female spawners (12–15% of virgin abundance, which might have been 60,000 to 110,000 mature females). Northeast Atlantic and southern hemisphere population sizes are unknown.

4.3 Population structure

The population structure of exploited populations is unnatural. Large mature females are not well represented in heavily fished, depleted stocks (e.g. Campana *et al*. 2001). Extensive long-distance migrations occur within the two North Atlantic stocks (see section 3.2), which appear to be thoroughly mixed. Tagging studies in the Northwest Atlantic by Norwegian, American and Canadian researchers identified mainly short to moderate (1,500km) movements along the edge of the continental shelf. *L. nasus* tagged off the United Kingdom of Great Britain and Northern Ireland have been recaptured off Spain, Denmark and Norway, travelling up to 2,370km, and a shark tagged off Ireland moved 4,260km (Campana *et al*. 1999, Kohler & Turner 2001, Kohler *et al*. 2002, Stevens 1976 & 1990.). There is evidence of trans-Atlantic movements from tagging studies and minimal genetic population differentiation across the North Atlantic, but significant differences between the northern and southern hemisphere populations implies little or no geneflow between them (Pade *et al*. 2006).

4.4 Population trends

Population trends are presented in the context of Annex 5 of Resolution Conf. 9.24 (Rev. CoP13), which recommends considering both *historical extent of decline and recent rate of decline*. A ‘marked historical extent of decline’ is a percentage decline to 5%–30% of the baseline (the guideline is 15–20% for low productivity species), or 5–10% above that guideline for an Appendix-II listing. 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, or a rate of decline that *would drive a population down within approximately a 10-year period from the current population level to the historical extent of decline guideline*. The estimated generation time for *L. nasus* is between 20 and 25 years in the North Atlantic, possibly 30–50 years in the Southern Oceans (see section 3.3). The three-generation period against which recent declines might be assessed is at least 60 to 75 years, greater than the historical baseline for most stocks. Table 1 summarises the trend data described below.

Table 1. Summary of population and catch trend data

Year	Location	Data used	Trend	Source
1936–2005	Northeast Atlantic	Norwegian landings	99% decline from baseline	Norwegian and ICES data
1936–2005	Northeast Atlantic	Target fishery catches	90% decline from baseline	Norwegian, French & ICES data
1936–2005	Northeast Atlantic	All landings data	85% decline from baseline	Norwegian (pre-1973) & ICES
1978–2005	Northeast Atlantic	French landings	~50% decline in ~30 yrs	French & ICES data
1994–2005	Northeast Atlantic	Landings per vessel	~70% decline in ~10 years	French data
1964–1970	Northwest Atlantic	Norwegian landings	~90% decline in catch	Landings data
1961–2000	Northwest Atlantic	Stock assessment	83–89% decline from virgin biomass	Canadian DFO 2001a
1961–1966	Northwest Atlantic	Stock assessment	>50% decline in abundance	Canadian DFO 2005a
1961–2004	Northwest Atlantic	Stock assessment	85–88% decline in mature female abundance	Canadian DFO 2005a
1992–2002	Southwest Pacific	Pelagic longline CPUE	>50–80% decline in 10 yrs	New Zealand Ministry of Fisheries 2006
1983–1993	Southwest Atlantic	CPUE by pelagic tuna longlines, Uruguay	80–90% decline in 10 yrs	Domingo (2000)

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 highly 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*.), presumably through under reporting.

Stock assessments are available for only the Northwest Atlantic stock (Campana *et al*. 1999, 2001, 2003; DFO 1999, 2001a, 2002, 2005a; Gibson and Campana 2006; O'Boyle *et al*. 1998). These illustrate a correlation between steep declines in landings and catch per unit effort (CPUE), and declining biomass/stock size in an unmanaged fishery. In the absence of stock assessments in other regions, CPUE and landings are used as indicators of population trends for this valuable commercial species, while recognizing that other factors may also affect catchability.

4.4.1 Northeast Atlantic

Lamna nasus has been fished in this region by many European countries, principally Denmark, France, Norway and Spain (Annex 1 Figure 5). Norway began a target longline fishery for *L. nasus* in the 1920s. Landings reached their first peak of 3,884t in 1933. About 6,000t were taken in 1947, when the fishery reopened after the Second World War, followed by a progressive drop in landings to between 1,200–1,900t from 1953–1960. The collapse of this fishery led to the redirection of fishing effort by Norwegian 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 (Annex 1 Figure 7), while average Danish landings 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 United Kingdom 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, while catches from the offshore ICES sub-regions west of Portugal (IX), west of the Bay of Biscay (VIII) and around the Azores (X) have increased since 1989 (Annex 1 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 and Spanish longliners have operated directed fisheries for *L. nasus* since the 1970s; there are now only 8–11 French vessels targeting this species. Reported landings from the main French fishing grounds in the Celtic Sea and Bay of Biscay decreased from over 1,092t in 1979 to 3–400t in the late 1990s to present (Annex 1 Figure 8). CPUE in the French target fishery has declined from 3t/vessel in 1994, to less than 1t in 2005 (Annex 1 Figure 9, data from Biseau 2006). Spanish vessels appear to have taken *L. nasus* opportunistically both in the early and late 1970s and since 1998. Some of these Spanish landings are bycatch from the longline swordfish fishery in the Mediterranean and Atlantic Ocean (Bonfil 1994), some from the target blue shark fishery that also catches mako and porbeagle. Landings off Spain tend to be greater during the spring and autumn, lower in summer (Mejuto 1985, Lallemand-Lemoine 1991), while the highest French catches are in summer (Biseau 2006). It is unclear whether the very variable early landings data from the Spanish fleet (from nil to nearly 4000 t/year, Annex 1 Figure 5) represents huge variations in catches, possibly the result of 'boom and bust' fisheries removing different segments of the stock, or inconsistent reporting (including shortfin mako *Isurus oxyrinchus*).

Tuna longliners from Japan, the Republic of Korea and Taiwan, province of China, take an unknown bycatch of *L. nasus* 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).

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. There are no indications of stock recovery." No stock assessment is available, but because this population was depleted well before that in the Northwest Atlantic and has not benefited from restrictions on catch or effort or technical fisheries management measures, it is presumed to be at least as seriously depleted than that in Canadian waters, where unrestricted catch trends were very similar. The UNITED KINGDOM identified *L. nasus* as a species of conservation concern in its response to the Convention on Biological Diversity in 1995. It is included as Vulnerable on Germany's (1998) and Sweden's Red Lists. The IUCN Red List assessment for the Northeast Atlantic is **Critically Endangered**, taking into account past, ongoing and estimated future reductions in population size exceeding 90% (Stevens *et al.* 2005).

4.4.2 Mediterranean Sea

Lamna nasus has virtually disappeared from Mediterranean records. Two or three tonnes per annum were recorded during the late 1970s, but the last catch record was for one tonne landed by Malta in 1996 (FAO FIGIS 2006). 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). Orsi Relini and Garibaldi (2002) reported two newborn *L. nasus* caught as bycatch of the swordfish longline fishery in the Western Ligurian Sea. A possibly newborn porbeagle and one of less than two years were reported in the central Adriatic Sea (Orsi Relini and Garibaldi 2002, Marconi and De Maddalena 2001). These records indicate a possible nursery area in Central Mediterranean. No *L. nasus* were caught during research into western Mediterranean swordfish longline fishery bycatch (De La Serna *et al*. 2002). Just 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).

The IUCN Red List assessment for the Mediterranean population is **Critically Endangered**, on the basis of past, ongoing and estimated future reductions in population size exceeding 90%, but this may be part of the Northeast Atlantic stock (Stevens *et al.* 2005).

4.4.3 Northwest Atlantic

Targeted *Lamna nasus* fishing started in 1961, following depletion of the Northeast Atlantic stock, when the fleet of Norwegian shark longliners switched their operations to the coast of New England and Newfoundland. Catches increased rapidly from about 1,900t in 1961 to more than 9,000t in 1964 (Annex 1 Figure 10). By 1965 many vessels had switched to other species or moved to other grounds because of the population decline (DFO 2001a). The fishery collapsed after only six years, landing less than 1,000t in 1970, and took 25 years for only very limited recovery to take place. Faeroese fishing vessels reported smaller landings during this period and throughout the 1970s and 1980s. Norwegian and Faroese fleets have been excluded from Canadian waters since the establishment of Canada's EEZ in 1995. The authorities of Canada and of the United States reported all landings after 1995; high seas catches are unknown.

Three offshore and several inshore Canadian vessels entered the targeted Northwest Atlantic fishery during the 1990s. Catches of 1,000–2,000 t/year throughout much of this decade reduced population levels to a new low in under 10 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). Based on scientific advice that an annual catch of 200–250t would correspond to fishing at about MSY (Maximum Sustainable Yield) and allow population growth (DFO 2001a), a quota of 250 tonnes was adopted for the period 2002–2007 to allow population growth and recovery (DFO 2001b). Landings have since ranged from 139t to 229t. Total population numbers remained relatively stable between 2002 and 2005, although female spawners continued to decline slightly and are now ~12–15% of their 1961 level, and ~86–92% of the level in 2002 (Gibson and Campana 2006, DFO 2005a, Annex 1 Figure 11).

DFO (2005b) determined that population recovery from this depleted state is possible, but sensitive to human-induced mortality. Human-induced mortality of about 2 to 4% of the vulnerable biomass of 4,500t to 4,800t (equivalent to a catch of 185t to 192t in 2005) is expected to 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}. The quota was reduced to 185t in 2006 on the basis of this advice (Lynda Maltby, Canadian Wildlife Service, in litt. May 2006).

In addition to the Canadian quota, there is a small quota (92t) for *L. nasus* in the EEZ of the United States, which is presumed to be part of the same stock. Estimates of catches by foreign (Japanese) vessels fishing outside these EEZs have ranged from 15t to 280t annually in 2000–2002 (DFO 2005b).

The IUCN Red List categorises Northwest Atlantic *L. nasus* as **Endangered**, on the basis of estimated reductions in population size exceeding 70% that have now ceased through management (Stevens *et al*. 2005).

4.4.4 Southern hemisphere

Although porbeagle landings from the southern hemisphere are only reported to FAO by New Zealand, New Zealand catch data for the Pacific southwest, primarily bycatch in tuna longlines, but also trawl and bottom longline catches, exceed total southern ocean catch records in FAO FIGIS (2006).

New Zealand commercial catch, discard and processing records are illustrated in Annex 1 Figure 12. 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, but 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 (Ministry of Fisheries 2006). There has been a 75% decline in the total weight of *L. nasus* reported since 1998–99, to a low of 60 t in 2004-05. 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 2001–02 varies considerably, but values in the two most recent years are the lowest recorded (Annex 1 Figure 13). This may not reflect stock abundance because of low observer coverage and other potential sources of variation (e.g., vessel, gear, location and season).

The abundance of *Lamna nasus* in shark bycatch of the Uruguayan pelagic tuna longline fleet declined during 1981–1998 (Domingo 2000). Initially, only the two most valuable shark species, *L. nasus* and mako *Isurus oxyrinchus*, were retained for their meat, representing about 10% of the total catch and peaking at 150t and 100t landed, respectively, in 1984. By 1991, their abundance had fallen considerably but shark fin prices were rising and blue sharks *Prionace glauca* and eight other species of large sharks were now also being retained in large quantities (Annex 1 Figure 14) (Domingo *et al*. 2001). This was accompanied by a decrease in unstandardised catch per unit effort from 110kg/1,000 hooks (1988) to 1kg/1000 (1999) in the Uruguayan tuna and swordfish fleet. This does not necessarily reflect stock abundance because changes in the distribution and depth of fishing operations and rising mean temperature of water masses in the area had also occurred (Domingo pers. comm.).

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).

The IUCN Red List categorises Southern Ocean *L. nasus* stocks as **Near Threatened** (Stevens *et al*. 2005).

4.5 Geographic trends

No information is available on any changes in the geographic range of *Lamna nasus*, but this species now appears to be scarce, if not absent, in areas where it was formerly commonly reported (e.g. in the Western Mediterranean, Alen Soldo *in litt*. 2003).

5. Threats

The principal threat to *L. nasus* worldwide is over-exploitation, in target and bycatch fisheries, with many products entering international trade. This species is particularly vulnerable to fisheries because these target both mature and large juvenile animals, the latter well before maturity. Sharks recruit to New Zealand and northwest Atlantic fisheries in their first year (Ministry of Fisheries 2006, Francis *et al*. in press).

5.1 Directed fisheries

Intensive directed fishing for the valuable meat of *L. nasus* was the major cause of population declines during the 20th century, but it is also a valuable utilised 'bycatch' or secondary catch of longline pelagic fisheries for tuna and swordfish (Buencuerpo *et al*. 1998). *L. nasus* is also an important target game fish species for recreational fishing in Ireland and the United Kingdom. The recreational fishery in Canada and the United States is very small (FAO 2003, DFO 2001b). 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."

5.2 Incidental fisheries

Lamna nasus bycatch is a valuable secondary target of many fisheries, particularly longline fisheries, but also gill nets, driftnets, trawls, and handlines. The high value of its meat means that the whole carcass is usually retained and utilised. The exception is in those high seas tuna and billfish fisheries where vessels' holding space is too limited to enable even valuable shark carcasses to be retained; in these cases the fins alone may be retained (e.g. far seas longline fisheries for southern bluefin tuna, and other pelagic fishing fleets in the southern Indian Ocean and probably elsewhere in the southern hemisphere (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." Bycatch is often inadequately recorded in comparison with captures in target fisheries.

Despite the large amount of fishing activity that will result in *L. nasus* captures in the southern hemisphere, New Zealand is the only country that reports landings to FAO (but total FAO landings data are still lower than New Zealand's published data). Examples of important but largely unreported bycatch fisheries include the demersal longlines for Patagonian toothfish in the southern Indian Ocean (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*. in press); the Chilean artisanal and industrial longline swordfish fishery within and outside the Chilean EEZ, between 26–36ºS (E. Acuña unpublished data; Acuña *et al*. 2002). *L. nasus* is rare in warm currents off the South

African coast, but taken as bycatch in colder waters. A small bycatch occurs in Australian trawl fisheries for Patagonian toothfish and mackerel icefish around Heard and Macdonald islands (van Wijk and Williams 2003).

6. Utilization and trade

Porbeagle are one of relatively few shark species targeted for their meat, with target fisheries still operating in Canada and France and short-term opportunistic target fisheries in other States as and when aggregations are located. Porbeagle shark products include fresh, frozen and dried-salted meat for human consumption, oil and fishmeal for fertilizer, and fins for shark-fin soup (Compagno 2001). The commercial value of the species has been documented through market surveys (Fleming and Papageorgiou 1997, Rose 1996, and unpublished TRAFFIC Europe 2003 market surveys). Findings indicate that the demand for fresh, frozen or processed meat, as well as fins and other products of *L. nasus* is sufficiently high to justify the existence of an international market, in addition to national utilisation. 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 species level. This makes it difficult to assess the importance and scale of its utilisation worldwide. The species is also utilised for sport fishing in Ireland, the United States and the United Kingdom (FAO FIGIS 2006), with catches 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 the South Island of New Zealand (Big Game Fishing Council, undated)

6.1 National utilization

According to Gauld (1989), *L. nasus* was one of the most valuable (by weight) marine species landed in Scotland in the 1980s. In 1997 and 1998 *L. nasus* meat was auctioned 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). Recent anecdotal reports from the German market suggest that availability is now very low (R. Melisch, in litt. May 2006).

Porbeagles may also be utilised nationally in some range States for their 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 landings are now so small, particularly in comparison with other species.

6.2 Legal trade

There is a considerable internal market for these products within the European Union (EU).

International trade in *Lamna nasus* products is unregulated, and all is therefore legal. While there is very little recent information available, earlier studies have reported that Canada exports *L. nasus* meat to the United States and the EU (including Italy), Japan exports to the EU and EU exports *L. nasus* to the United States where it is consumed in restaurants (Vannuccini 1999, S. Campana *in litt*.). However, these commercial transactions could not be quantified nor their economic value estimated.

The lack of trade data arises from the lack of any Customs code for *L. nasus* products in the Customs Harmonised System or in the Combined Nomenclature of the EU. In the EU, codes such as 0302 65 90–Fresh or chilled shark (excluding 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 mix products of a variety of shark species and would therefore lead to incorrect conclusions. In Australia, data on exports of *L. nasus* to the United States are grouped with mako sharks (Ian Cresswell, CITES Management Authority of Australia, *in litt*. to BMU, February

2004). *L. nasus* is imported by Japan (Sonu 1998). 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, being traded in fresh and frozen form (see sections 6.1 and 6.2).

6.3.2 Fins

Porbeagle appears on the list of preferred species for its fins in Indonesia (along with guitarfish, tiger, mako, sawfish, sandbar, bull, hammerhead, blacktip, thresher and blue shark; Vannuccini 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 frequently utilised in the global fin market (including makos, blue, dusky and silky sharks (Shivji *et al*. 2002)). New Zealand has established conversion factors for *L. nasus* for wet fin (45) and dried fin (108.00) (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% (Steve Campana, DFO, April 2004).

6.3.3 Others

Porbeagle hides have been 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

Because 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 depletion of populations in the North Atlantic and may potentially also threaten southern hemisphere populations.

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) and presented this assessment to Environment Canada in 2005. Canada's Environment and Fisheries Ministers agreed in August 2006 not to list this and some other aquatic species under the Canadian Species at Risk Act [which would have restricted the purchase, sale and trade of porbeagle (DFA, 2006)], but to "continue to enforce the protections offered by the Fisheries Act, while pursuing action plans to help these species recover" (Anon 2004). The current five-year porbeagle management plan is delaying recovery, but no further declines are occurring. Recovery of porbeagle will not take place if harvest rates remain above 4%. At 4%, the stock would rebuild to maximum sustainable yield (MSY, 31,000 to 41,000 female spawner) during the 22nd century or later. Strict protection would enable recovery to MSY between 2030 and 2060 (DFO 2005).

7.2 International

'Family Isurida' (now Lamnidae, including *L. nasus*) is listed on 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 on Annex III, 'Species whose exploitation is regulated' of the Barcelona Convention Protocol concerning specially protected areas and biological diversity in the Mediterranean, signed in 1995 but not yet ratified (Anon. 2002). The Mediterranean 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.

Annex V of the OSPAR Convention on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area requires OSPAR to develop a list of threatened and/or declining species and habitats in need of protection or conservation in the OSPAR maritime area (Northeast Atlantic). Portugal's proposal, on behalf of the Azores, to list *Lamna nasus* in the wider Atlantic because of its biological sensitivity, keystone importance and severe population decline was not adopted. New nominations are under discussion in 2006 (including *Lamna nasus*).

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. However, this initiative is voluntary and fewer than 20 States have produced Shark Assessment Reports or Shark Plans. 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 management is yet underway.

8.1.1 North Atlantic

The International Commission for the Conservation of Atlantic Tunas (ICCAT), the pelagic fishery management body, has not yet included *L. nasus* in its stock assessment or management programme.

In the Northeast Atlantic, the conservation and management of sharks falls within the domain of the European Common Fishery Policy (CFP). EC Regulation 1185/2003 prohibits the removal of shark fins of this species, and subsequent discarding of the body. This regulation is binding on EC vessels in all waters and non-EC vessels in Community waters. ICES (2005) recommended: "Given the apparent depleted state of this stock, no fishery should be permitted on this stock". The Council of the European Union subsequently invited the Commission to make a proposal to regulate both directed fisheries and bycatches of this stock. The European Scientific, Technical and Economic Committee on Fisheries (STECF 2006) was requested to advise, *inter alia*, on the ICES advice and possible management measures. It recommended "that no directed fishing be allowed, while other measures be taken to prevent bycatch of porbeagles in other fisheries." The latter might include releasing live bycatch. Meanwhile, unrestricted fishing for this species continues. The Total Allowable Catches (TAC) set in Community waters for Faeroe and Norwegian fisheries have been set at such high levels that they fail to limit fishing pressure on this stock.

In the Northwest Atlantic, shark fisheries management is underway in Canadian and United States' waters. The 1995 Canadian fisheries management plan limits the number of licences, 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 historical reported landings and the observation that recent catch rates had decreased (DFO 2001). Following two analytical stock assessments (Campana *et al.* 1999, 2001), the Shark Management Plan for 2002–2006 reduced the TAC to 250t. This has caused total population numbers to remained relatively stable for 2002–2005, although female spawners declined slightly (Gibson and Campana 2006, DFO 2005a). Population projections indicate that the population will eventually recover if harvest rates are kept under 4% (~185 mt, DFO 2005b). There is also an annual quota of 92t in United States' waters under the Highly Migratory Species Fisheries Management Plan.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2004) expressed concern that, although the quota for 2002–2007 of 200–250t represents a substantial reduction from catches in the mid-1990s, even this amount now corresponds to a high exploitation rate because of the low population abundance and may not be sufficient to halt the *L. nasus* decline or to enable the population to recover (see 7.1). These concerns appear to be confirmed by DFO (2005b) (see 4.4.3).

8.1.2 Southern hemisphere

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). In 1991, Australia brought in legislation that prevented Japanese longliners fishing in the EEZ from landing shark fins unless they were accompanied by the carcass. They have not fished in the Australian EEZ since 1996. Finning is currently prohibited on domestic Australian tuna longliners. A small regulated fishery is permitted by New Zealand which has included *L. nasus* in its Quota Management System (QMS) since 2004, with the TAC set at 249t (Sullivan *et al*. 2005). There are presently no other management measures applicable to the Antarctic and Southern Oceans (CCAMLR appears not to be monitoring or managing this species).

8.2 Population monitoring

Population monitoring requires routine monitoring of catches, collection of reliable data on indicators of stock biomass and good knowledge of biology and ecology. In most States, however, catch, bycatch and discard data for *Lamna* and most other shark and ray species are not recorded at species level, making stock assessments and population evaluation almost impossible. Those commercial landings and research survey data available indicate that many stocks are seriously depleted.

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*. In most cases, it is lumped with other shark products under a general code, No. 0303 7500, which does not allow estimation of trade at species level.

8.3.2 Domestic

The domestic fisheries management measures adopted by a few States are described in section 8.1. They have not yet delivered sustainable harvest of *L. nasus*. 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 an Appendix II, on its own, would not be sufficient to prevent catching of porbeagle, it could be considered an ancillary measure.

8.4 Captive breeding

None known.

8.5 Habitat conservation

No efforts have been made to identify and protect critical *L. nasus* habitat, although some is incidentally protected from disturbance inside marine protected areas or static gear reserves.

8.6 Safeguards

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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*. The other member of its genus is the salmon shark *Lamna ditropis*, which most resembles *L. nasus* but is restricted to the North Pacific where *L. nasus* does not occur. The mako shark *Isurus oxyrinchus* may be misidentified as *L. nasus* in Mediterranean fisheries although the two are quite distinct (http://www.zoo.co.uk). The identification of whole sharks by the non-expert is straightforward using existing keys.

10. Consultations

Range States and other bodies were consulted twice in 2006. Responses were received from Albania, Argentina, Australia, Austria, Bulgaria, Canada, China, Cuba, Croatia, the Czech Republic, Estonia, the Faeroe Islands (Denmark), Finland, France, Georgia, who had offered to support the proposal as co-sponsor, Hungary, Ireland, Israel, Italy, Latvia, Lithuania, Madagascar, Monaco, Morocco, New Zealand, Norway, Poland, Romania, the Republic of Korea, the Russian Federation, Serbia, Spain, Turkey, the United Kingdom, Uruguay and the United States; also from the European Commission, the International Council for the Exploration of the Seas (ICES), International Scientific Committee for Tuna and Tuna-like Species in the Pacific Ocean (ISC), Northwest Atlantic Fisheries Organization (NAFO), Ocean Conservancy and the UNEP Mediterranean Regional Activity Centre for Specially Protected Areas (RAC/SPA).

11. Additional remarks

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

It is unclear to what extent introduction from the sea will be a significant issue for this species. Canadian fisheries records, even for the shelf edge fishery, are all recorded inside the EEZ. Pelagic vessels from Japan, the Republic of Korea and Taiwan, province of China, however, take a bycatch of porbeagle 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 therefore 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 a fisheries expert. It would need to be capable of making a non-detriment finding based upon stock assessments and a fishery management plan that defines sustainable harvest levels (e.g. quotas).

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, therefore, identified by name. The dorsal fin (with skin on) has a characteristic white rear free edge. Shivji *et al*. (2002) have developed a species-specific primer and highly efficient multiplex PCR (Polymerase Chain Reaction) screening assay for the products of several lamnid sharks, including *L. nasus* and the makos (also silky, blue, sandbar and dusky sharks). Cost per sample processed starts from USD 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 can already distinguish between northern and southern stocks, and should soon be capable of simultaneously identifying the species and population of origin (M. Shivji in litt. July 2006). They are not suitable as initial screening tools, but could be used to confirm identification and product origin for enforcement purposes.

11.2.3 Non-detriment findings

NDFs can be declared for species that are the subject of a management plan, as long as the proposed export is consistent with the sustainable management provisions of that plan (CITES AC22 Doc. 17.2). Management for *L. nasus* would ideally be based upon stock assessments and scientific advice on sustainable fisheries harvest levels (e.g. quotas) or technical measures. For example, similar techniques are applied in DFO 2005b to determine recovery rates under different levels of human-induced mortality. This is standard fisheries management practice – albeit currently not widely applied for this species. As noted by STECF (2006), requiring the release of live bycatch would be a useful mitigation policy.

12. References

Aasen, O. (1963). Length and growth of the porbeagle (*Lamna nasus*, Bonaterre) in the North West Atlantic. FiskDir. Skr. Serie Havundersokelser 13 (6), 20–37.

Acuña, E., Villarroel, J.C. y Grau, R. 2002. Fauna Ictica Asociada a la Pesquería de Pez Espada (*Xiphias gladius* Linnaeus). Gayana (Concepc.), 66(2):263–267.

Anonymous, 2002. Report of the meeting of experts for the elaboration of an Action Plan for the conservation of Mediterranean species of cartilaginous fish. UNEP, RAC/SPA, Tunis.

Anonymous 2004. Forty-two new species added for protection under the Species At Risk Act (SARA). News Release, Environment Canada, Ottawa, August 24 2006. http://www.ec.gc.ca/default.asp?lang=En&n=714D9AAE-1&news=620F030E-0FFB-409E-9A56-A0E63747218B.

Ayers, D.; Francis, M.P.; Griggs, L.H.; Baird, S.J. (2004). Fish bycatch in New Zealand tuna longline fisheries, 2000-01 and 2001-02. *New Zealand Fisheries Assessment Report 2004/46*. 47 pp.

Big Game Fishing Council, undated. Submission to New Zealand government on quota proposals. http://www.option4.co.nz/pdf/sharksnzbgfc04.pdf.

Binot, M., Bless, R., Boye, P., Gruttke, H. & Pretscher, P. (ed.) 1998. Rote Liste gefährdeter Tiere Deutschlands. *Schriftenreihe für Landschaftspflege und Naturschutz*. vol. 55. Bonn-Bad Godesberg (Bundesamt für Naturschutz).

Biseau, A. 2006. Untitled summary of french porbeagle fisheries and market data. Working Document, ICES Working Group on Elasmobranch Fishes.

Bonfil, R. 1994. Overview of world elasmobranch fisheries. *FAO Fisheries Technical Paper* No. 341 119 pp.

Buencuerpo, V., Rios, S., Moron, J. 1998. Pelagic sharks associated with the swordfish, *Xiphias gladius*, fishery in the eastern North Atlantic Ocean and the Strait of Gibraltar. Fishery Bulletin (96): 667–685

Campana, S., L. Marks., Joyce, W., Hurley, P., Showell, M., and Kulka, D.1999. An analytical assessment of the porbeagle shark (*Lamna nasus*) population in the northwest Atlantic. Canadian Science Advisory Secretariat. *CSAS. Res. Doc*.99/158.

Campana, S., Marks, L., Joyce, W. and Harley, S. 2001. Analytical assessment of the porbeagle (*Lamna nasus*) population in the Northwest Atlantic, with estimates of long-term sustainable yield. Canadian Science Advisory Secretariat. *CSAS Res. Doc*. 2001/067. 17 pp.

Campana, S.E., L.J. Natanson and S. Myklevoll. 2002. Bomb dating and age determination of large pelagic sharks. *Can. J. Fish. Aquat. Sci*. **59**:450–455.

Campana, S.E., W. Joyce, L. Marks, L.J. Natanson, N.E. Kohler, C.F. Jensen, J.J. Mello, H.L. Pratt Jr., and S. Myklevoll. 2002. Population dynamics of the porbeagle in the Northwest Atlantic Ocean. *North. Am. J. Fish. Management* 22:106–121.

Campana, S., Joyce, W., and L. Marks. 2003. Status of the Porbeagle Shark (*Lamna nasus*) population in the Northwest Atlantic in the context of species at risk. Canadian Science Advisory Secretariat. *CSAS Res. Doc*. 2003/007. 27 pp.

Campana, S.E. and W.N. Joyce. 2004. Temperature and depth associations of porbeagle shark (*Lamna nasus*) in the northwest Atlantic. *Fish. Oceanogr*. **13**:52–64.

CITES 2006. Conservation and Management of Sharks: Implementation of CITES shark listings. AC22 Doc.17.2. 5pp. www.cites.org.

Compagno, L.J.V. 2001. Sharks of the World. Volume 2. Bullhead, mackerel and carpet sharks (Heterodontiformes, Lamniformes and Orectolobiformes). An annotated and illustrated catalogue of the shark species known to date. *FAO Species Catalogue for Fisheries Purposes* (1): i–v, 1–269.

COSEWIC 2004. COSEWIC assessment and status report on the porbeagle shark *Lamna nasus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 43 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

De la Serna, J.M., Valeiras,J., Ortiz, J.M., Macias D., 2002. Large Pelagic sharks as by-catch in the Mediterranean Swordfish Longline Fishery : some biological aspects. NAFO SCR Doc.02/137 Serial No. N4759.

DFO (Department of Fisheries and Oceans – Canada). 1999. Porbeagle shark in NAFO subareas 3–6. DFO Science Stock Status Report B3–09 (1999).Department of Fisheries and Oceans, Maritimes Region, Canada. 2001a. Porbeagle Shark in NAFO Subareas 3–6. DFO Science Stock Status Report B3-09(2001). Pp 1–9.

DFO. 2001a. Porbeagle shark in NAFO subareas 3–6. *Scientific Stock Status Report*. B3-09. 9 pp.

DFO. 2001b. Canadian Atlantic Pelagic Shark Integrated Fishery Management Plan, 2000–2001. Pp. 1–72.

DFO, 2005a. Stock assessment report on NAFO Subareas 3–6 porbeagle shark. *CSAS Science Advisory Report* 2005/044.

DFO, 2005b. Recovery Assessment Report on NAFO Subareas 3–6 Porbeagle Shark. *CSAS Science Advisory Report* 2005/043.

DFO. 2005b. Recovery Assessment Report on NAFO Subareas 3 - 6 Porbeagle Shark. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/043. www.dfo-mpo.gc.ca/csas/Csas/status/2005/SAR-AS2005_043_E.pdf

DFO 2006. Potencial Socio-economic Implications of Adding Porbeagle Shark to the List of Wildlife Species at Risk in the *Species at Risk Act* (SARA). Fisheries and Oceans Canada, Policy and Economics Branch – Maritimes Region, Dartmouth, Nova Scotia.

Domingo, A., O. Mora y M. Cornes. 2001. Evolución de las capturas de elasmobranquios pelágicos en la pesquería de atunes de Uruguay, con énfasis en los tiburones azul (prionace glauca), moro (Isurus oxyrinchus) y porbeagle (*Lamna nasus*). Col. Vol. Sci. Pap. ICCAT 54(4): 1406–1420.

Domingo, A. 2000. Los Elasmobranquios Pelágicos Capturados por la flota de longline Uruguaya. In: M. Rey (Editor). Consideraciones Sobre la Pesca Incidental Producida por la Actividad de la Flota Atunera Dirigida a Grandes Pelágicos. "Plan De Investigación Pesquera". Inape – Pnud Uru/92/003.

FAO. 2000. An appraisal of the suitability of the CITES criteria for listing commercially-exploited aquatic species. FAO Circulaire sur les pêches No. 954, FAO, Rome. 76pp.

FAO. 2001. Report of the second technical consultation of the CITES criteria for listing commercially exploited aquatic species. FAO Fisheries Report No. 667. FAO, Rome.

FAO–FIGIS. 2006. Capture production statistics. FAO website, downloaded 2006.

FAO–FIGIS. 2004. *Lamna nasus* Species Fact Sheet. *In*: A world overview of species of interest to fisheries. FIGIS Species Fact Sheets. SIDP -Species Identification and Data Programme. FAO–FIGIS. <http://www.fao.org/figis/servlet/species?fid=2798> downloaded 2006.

Fischer, W., Bauchot, M.-L. and Schneider, M.-L 1987. *Fiches FAO d'identification des espèces pour les besoins de la pêche*. *Méditerranée et Mer Noire*. Zone de peche 37. Volume 2. Vertébrés. FAO, Rome. 761–1530.

Fishery Agency of Japan. 2004. Salmon Shark *Lamna ditropis*; Porbeagle Shark *Lamna nasus*, Pacific, Atlantic and Indian Oceans. *In*: The current status of international fishery stocks (summarised edition). Pp. 82–83. Fishery Agency, Japan.

Fisheries and Oceans Canada. 2006. Potential Socio-economic Implications of Adding Porbeagle Shark to the List of Wildlife Species at Risk in the *Species at Risk Act* (SARA). Policy and Economics Branch – Maritimes Region, Dartmouth, Nova Scotia, Canada.

Fleming, Elizabeth. H. and Papageorgiou, P.A. 1997. *Shark fisheries and trade in Europe*. TRAFFIC Europe. 78 pp.

Fong, Q.S.W. and J.L. Anderson (1998). Assessment of Hong Kong shark fin trade. Department of Environmental and Natural Resource Economics, University of Rhode Island, Kingston, 9 pp.

Francis, M. P. and Duffy, C. (2005). Length at maturity in three pelagic sharks (*Lamna nasus, Isurus oxyrinchus* and *Prionace glauca*) from New Zealand. *Fishery Bulletin 103*: 489–500.

Francis, M. P., and Stevens, J. D. (2000). Reproduction, embryonic development and growth of the porbeagle shark, *Lamna nasus,* in the South-west Pacific Ocean. *Fishery Bulletin 98*: 41–63.

Francis, M. P., Natanson, L. J. and Campana, S. E. In press: Porbeagle (*Lamna nasus*). In: Pikitch, E. K. and M. Camhi (Eds). *Sharks of the open ocean*. Blackwell Scientific Publications.

Gauld, J.A. (1989). Records of porbeagles landed in Scotland, with observations on the biology, distribution and exploitation of the species. *Scottish Fisheries Research Report* 45, ISSN 0308 8022. 15 pp.

Gibson, A.J. and S. E. Campana. 2006. Status and recovery potential of porbeagle shark in the Northwest Atlantic. CSAS Res. Doc. In press.

Hazin, F., M. Broadhurst, A. Amorim, C. Arfelli and A. Domingo. In press. Catch of pelagic sharks by subsurface longline fisheries in the South Atlantic Ocean: A review of available data with emphasis on Uruguay and Brazil In: "Sharks of the open Ocean" M. Camhi and E. Pikitch (Eds.) Blackwell Scientific, New York.

Hutchings, J.A. 2001. Influence of population decline, fishing, and spawner variability on the recovery of marine fishes. Journal of Fish Biology (2001) 59 Supplement A 306–322.

ICES. 2005. Report of the ICES Advisory Committee on Fishery Management. Copenhagen, Denmark.

Jensen, C. F., L.J. Natanson, H.L. Pratt, N.E. Kohler, and S.E. Campana. 2002. The reproductive biology of the porbeagle shark, *Lamna nasus*, in the western North Atlantic Ocea*n. Fish. Bull*. **100**:727–738.

Joyce, W., S.E. Campana, L.J. Natanson, N.E. Kohler, H.L. Pratt, and C.F. Jensen. 2002. Analysis of stomach contents of the porbeagle shark (*Lamna nasus*) in the northwest Atlantic. *ICES J. Mar. Sci*. **59**:1263–1269.

Kohler NE, Turner PA 2001. Shark tagging: A review of conventional methods and studies. *Environmental Biology of Fishes* 60 (1–3): 191–223.

Kohler, N.E., P.A. Turner, J.J. Hoey, L.J. Natanson, and R. Briggs. 2002. Tag and recapture data for three pelagic shark species, blue shark (*Prionace glauca*), shortfin mako (*Isurus oxyrinchus*), and porbeagle (*Lamna nasus*) in the North Atlantic Ocean, ICCAT Collective Volume of Scientific Papers SCRS/2001/064 1231–1260.

Lallemand-Lemoine, L. 1991. Analysis of the French fishery for porbeagle *Lamna nasus* (Bonnaterre, 1788). ICES-CM-1991/G:71, 10 pp.

Marconi, M., De Maddalena, A. 2001. On the capture of a young porbeagle, *Lamna nasus* (Bonnaterre, 1788), in the western Adriatic Sea. Annales, Ser.hist.nat. 11, 2 (25): 179–184

McCoy, M.A. and H. Ishihara (1999). *The Socio-economic Importance of Sharks in the U.S. Flag Areas of the Western and Central Pacific* (Admininstrative Report AR-SWR-99-01), prepared for U.S. Department of Commerce, National Marine Fisheries Service, Southwest Region, Long Beach, California, United States.

Megalofonou, P., Damalas, D., Yannopoulos, C., De Metrio, G., Deflorio, M., De La Serna, J.M., Macias, D. 2000. By catches and discards of sharks in the large pelagic fisheries in the Mediterranean Sea. Final report of the Project No 97/50 DG XIV/C1, Comm. Of the Eu. Communities.

Mejuto, J. 1985. Associated catches of sharks, *Prionace glauca, Isurus oxyrinchus* and *Lamna nasus*, with NW and N Spanish swordfish fishery in 1984. ICES C.M. 1985/H:42: 16pp.

Ministry of Fisheries. 2005. New Zealand Gazette of Thursday, November 3 2005. Issue No. 184. Wellington, New Zealand.

Ministry of Fisheries, Science Group (Comps.). 2006. Report from the Fishery Assessment Plenary, May 2006: stock assessments and yield estimates. 875pp. (Porbeagle on pp. 592–596.) Unpublished report held in NIWA Library, Wellington, New Zealand.

Natanson, L. J., J.J. Mello and S.E. Campana. 2002. Validated age and growth of the porbeagle shark, *Lamna nasus*, in the western North Atlantic Ocean. *Fish. Bull., U.S*. **100**:266–278.

O'Boyle, R. N., Fowler, G. M., Hurley, P. C. F., Joyce, W., and Showell, M. A. (1998). Update on the status of NAFO SA 3–6 porbeagle shark (*Lamna nasus*). Canadian Stock Assessment Secretariat Research Document 98/41: 2–58.

Orsi Relini L. & Garibaldi F. 2002. Pups of Lamnid sharks from the Ligurian Sea: morphological and biometrical characteristics of taxonomic value. *In* M. Vacchi, G. La Mesa, F. Serena & B. Seret (eds.) *Proc. 4th Elasm. Assoc. Meet.,* Livorno (Italy) 2000. ICRAM, ARPAT & SFI: 199.

Pade, N., Sarginson, J., Antsalo, M., Graham, S., Campana, S., Francis, M., Jones, C., Sims, D., and Noble, L. 2006. Spatial ecology and population structure of the porbeagle (*Lamna nasus*) in the Atlantic: an integrated approach to shark conservation. Poster presented at 10th European Elasmobranch Association Science Conference. 11–12 November 2006. Hamburg, Germany.

Rose, D.A. 1996. *An overview of world trade in sharks and other cartilaginous fishes*. TRAFFIC International. 106 pp.

Serena, F. & Vacchi, M. 1997. Attivita di studio sui grandi pesci cartilaginei dell'alto Tirreneo e Mar Ligure nell'ambito del programma L.E.M. (Large elasmobranchs monitoring). *Quad. Civ. Staz. Idrobiol*. N. 22: 17–21

Shivji, M., Clarke, S., Pank, M., Natanson, L., Kohler, N., and Stanhope, M. 2002. Rapid molecular genetic identification of pelagic shark body-parts conservation and trade-monitoring. *Conservation Biology* 16(4): 1036–1047.

Soldo, A. & I. Jardas. 2002. Large sharks in the Eastern Adriatic. *In* M. Vacchi, G. La Mesa, F. Serena & B. Seret (eds.) *Proc. 4th Elasm. Assoc. Meet.,* Livorno 2000. ICRAM, ARPAT & SFI: 141–155.

Sonu, S.C. 1998. Shark fisheries, trade, and market of Japan. *NOAA Technical Memorandum NMFS*.

STECF 2006. Report of subgroup on porbeagle. European Scientific, Technical and Economic Committee on Fisheries. Brussels.

Stevens, J.D. (1976). Preliminary results of shark tagging in the north-east Atlantic, 1972–1975. *Journal of the Marine Biological Association of the United Kingdom* 56, 929–937.

Stevens, J.D. (1990). Further results from a tagging study of pelagic sharks in the north-east Atlantic. *Journal of the Marine Biological Association of the United Kingdom* 70, 707–720.

Stevens, J.D., Bonfil, R., Dulvy, N.K. and Walker, P.A. 2000. The effects of fishing on sharks, rays, and chimaeras (chondrichthyans), and the implications for marine ecosystems. *ICES Journal of Marine Science*, Volume 57, Issue 3, 476–494 pp.

Stevens, J., Fowler, S.L., Soldo, A., McCord, M., Baum, J., Acuña, E., Domingo, A. & Francis, M. 2005. *Lamna nasus*. In: IUCN 2006. *2006 IUCN Red List of Threatened Species.* <www.iucnredlist.org>.

Sullivan, K. J., P. M. Mace, N. W. M. Smith, M. H. Griffiths, P. R. Todd, M. E. Livingston, S. Harley, J. M. Key & A. M. Connell (ed.). 2005. Report from the Fishery Assessment Plenary, May 2005: stock assessments and yield estimates. Ministry of Fisheries, Wellington. 792 pp.

Svetlov, M.F. (1978). The porbeagle, *Lamna nasus,* in Antarctic waters. *Journal of Ichthyology* 18 (5), 850–851.

Vannuccini, S. 1999. Shark utilization, marketing and trade. *FAO Fisheries Technical Paper*. No. 389. Rome, FAO. 470 pp.

Van Wijk, E.M. and R. Williams (2003). Fishery and invertebrate by-catch from Australian fisheries for *D. eleginoides* and *C. gunnari* in Division 58.5.2. CCAMLR WG-FSA 03/73. 26 pp.

Vas, P. and Thorpe, T. 1998. Commercial landings of sharks in South-Western England. *Shark News* 12: November 1998.

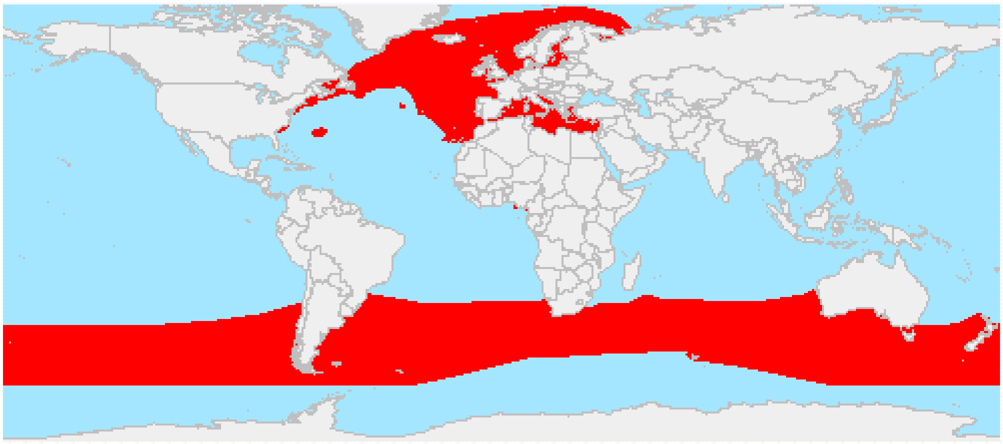

Figure 2. Global *Lamna nasus* distribution (Source: FAO FIGIS 2004)

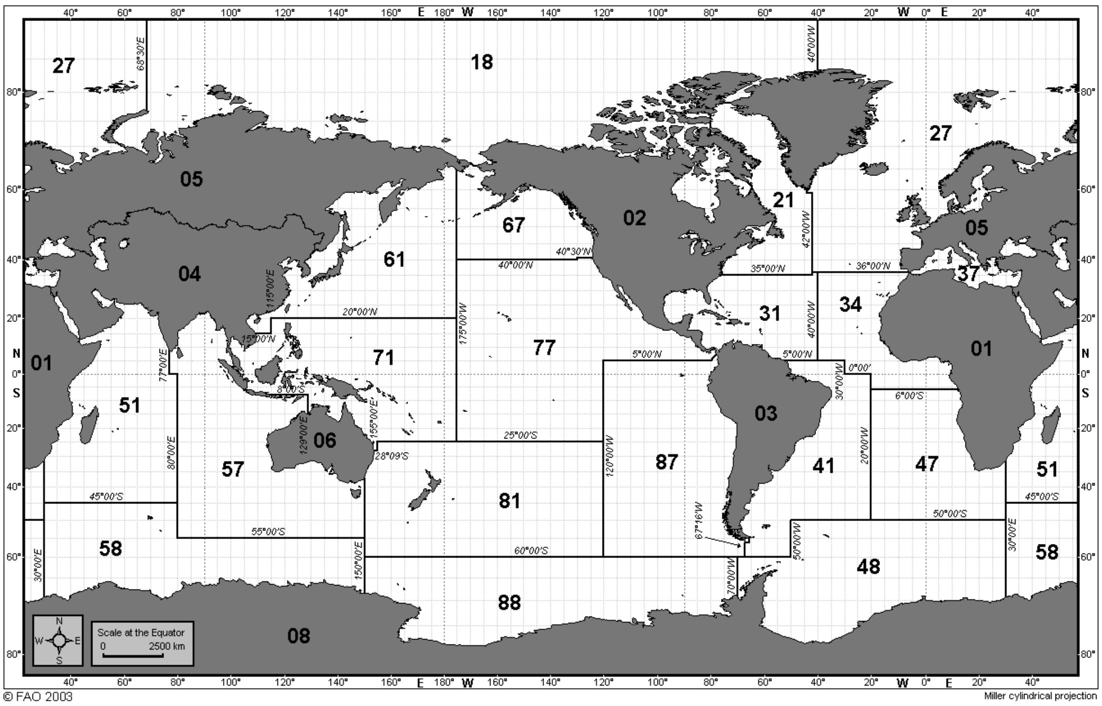

Figure 3. FAO fishing areas.

Key: *Lamna nasus* is reported from the fishing areas underlined below.

01 Africa-Inland Water	31 Atlantic, Western Central	58 Indian Ocean, Antarctic
02 America-Inland Water	34 Atlantic, Eastern Central	61 Pacific, Northwest
03 America, South-Inland Water	37 Mediterranean & Black seas	67 Pacific, Northeast
04 Asia-Inland Water	41 Atlantic, Southwest	71 Pacific, Western Central
05 Europe-Inland Water	47 Atlantic, Southeast	77 Pacific, Eastern Central
06 Oceania-Inland Water	48 Atlantic, Antarctic	81 Pacific, Southwest
21 Atlantic, Northwest	51 Indian Ocean, Western	87 Pacific, Southeast
27 Atlantic, Northeast	57 Indian Ocean, Eastern	88 Pacific, Antarctic

Table 2. *Lamna nasus* life history parameters (various sources in text)

Age at maturity (years)	female:	13 years at 50% maturity (North Atlantic); 15–19 years (South Pacific)
	male:	8 years at 50% maturity (North Atlantic); 8–10 years (South Pacific)
Size at maturity (total length cm)	female:	195 cm (South Pacific), 245 cm (North Atlantic)
	male:	165 cm (South Pacific), 195 cm (North Atlantic)
Maximum size (total length cm)	female:	≥355
	male:	≥260
Longevity (years)		>26 in fished population, theoretical estimates up to 46 years in unfished population need verification (Northwest Atlantic); probably at least 40 years and possibly twice that (South Pacific)
Size at birth (cm)		68–78
Average reproductive age (years)*		20–25 years (Northwest Atlantic); possibly 30–50 (South Pacific)
Gestation time (months)		8–9 months
Reproductive periodicity		Annual
Average litter size		1–5 pups (average 4)
Annual rate of population increase		0.05–0.07
Natural mortality		0.10 (immatures), 0.15 (mature males), 0.20 (mature F) (Northwest Atlantic)

* This is the generation period that may be required when using the population decline criterion for listing.

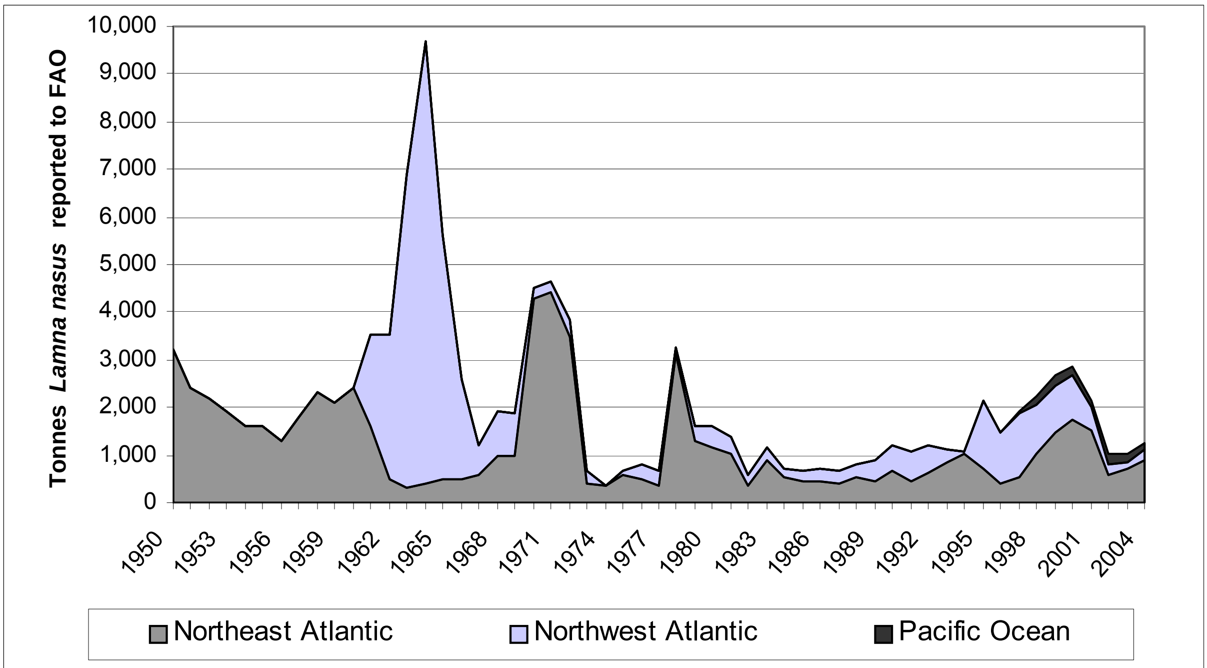

Figure 4. Global reported landings (tonnes) of *Lamna nasus* by FAO fishing area, 1950–2004. See Figure 3 for map of FAO fishing areas, and Figure 5 for pre-1950 landings. Reported landings from most FAO fishing areas are too small to be visible on this graphic. (*Source*: FAO FishStat, downloaded July 2006)

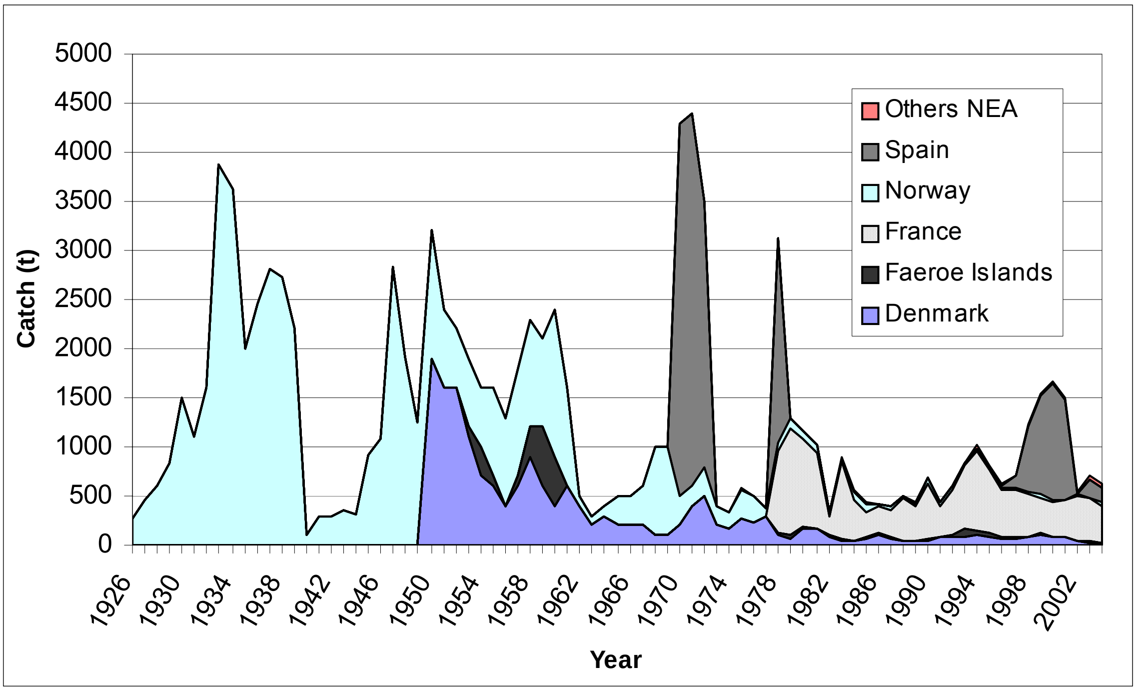

Figure 5. Landings (tonnes) of *Lamna nasus* from the Northeast Atlantic by major fishing States and territories, 1926–2004. (*Source*: ICES Working Group on Elasmobranch Fishes 2006)

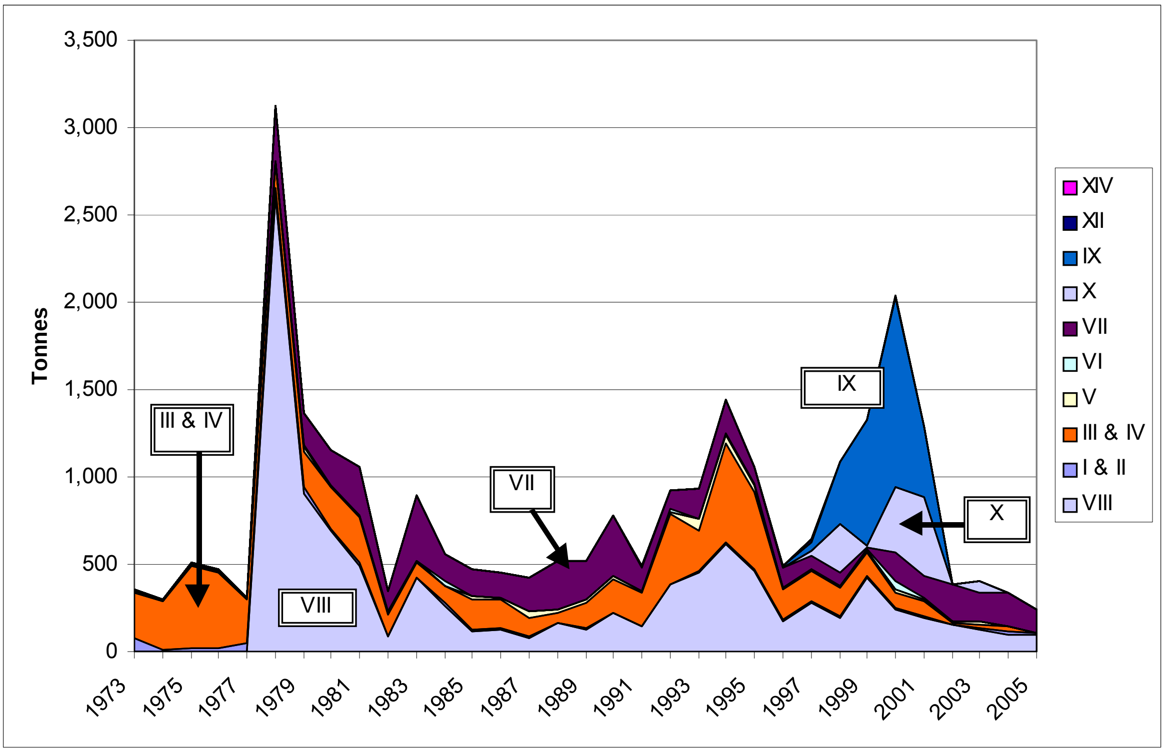

Figure 6. Landings (tonnes) of *Lamna nasus* from ICES Areas (Northeast Atlantic), 1973–2004. (*Source*: ICES Working Group on Elasmobranch Fishes 2006)

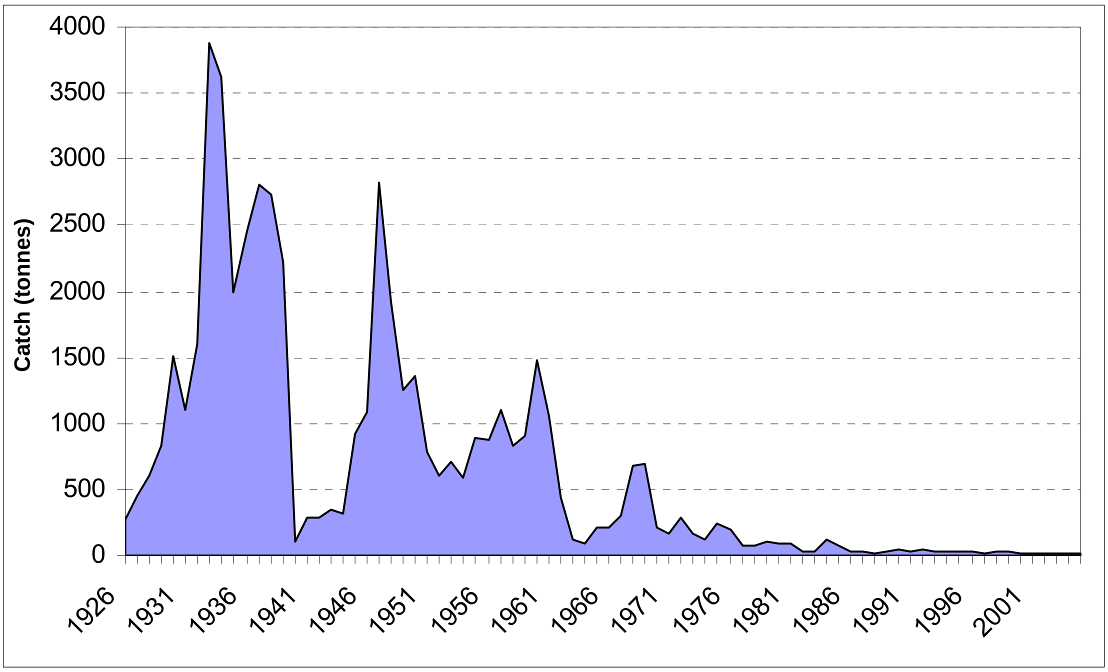

Figure 7. Landings (tonnes) of *Lamna nasus* by Norway in the Northeast Atlantic, 1926–2005. (*Source*: Norwegian fisheries data & ICES Working Group on Elasmobranch Fishes)

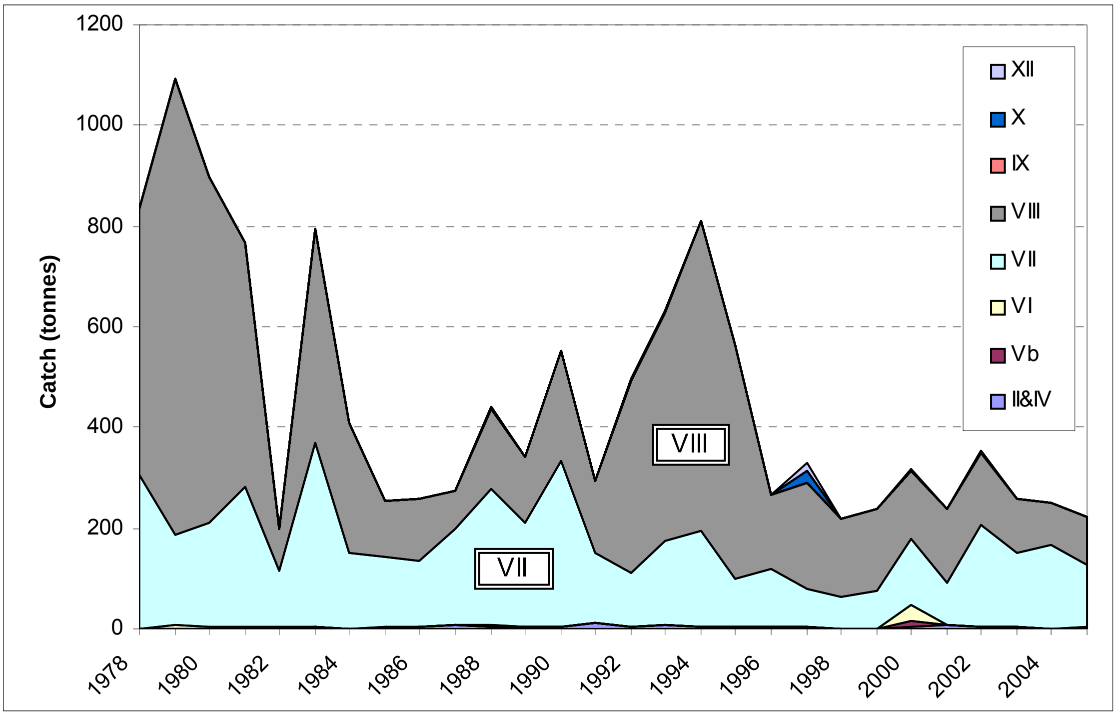

Figure 8. French landings (tonnes) of *Lamna nasus* in the Northeast Atlantic, 1978–2005. (*Source*: ICES Working Group on Elasmobranch Fishes)

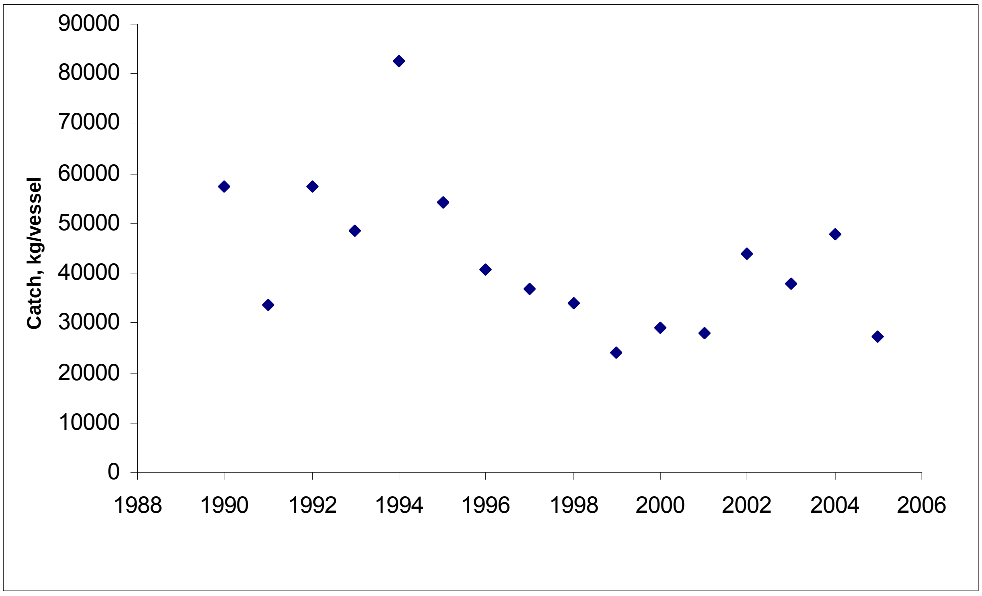

Figure 9. Catch per vessel in the French target *Lamna nasus* fishery, 1989–2005. (*Source*: Biseau 2006, ICES Working Group on Elasmobranch Fishes)

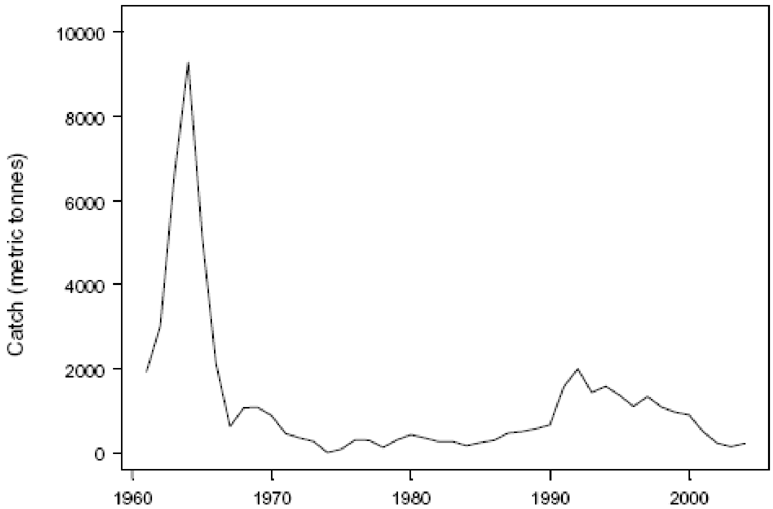

Figure 10. *Lamna nasus* landings in the Northwest Atlantic, 1961–2004. (From DFO 2005a)

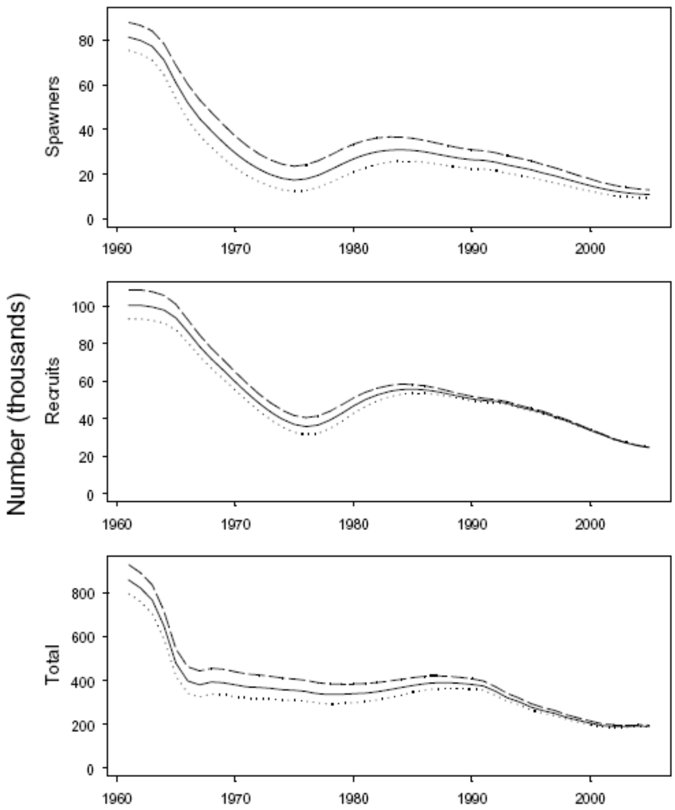

Figure 11. Estimated trends in numbers of mature females (top), age-1 recruits (centre) and total number of *Lamna nasus* in Canadian waters from three population models. (From DFO 2005a)

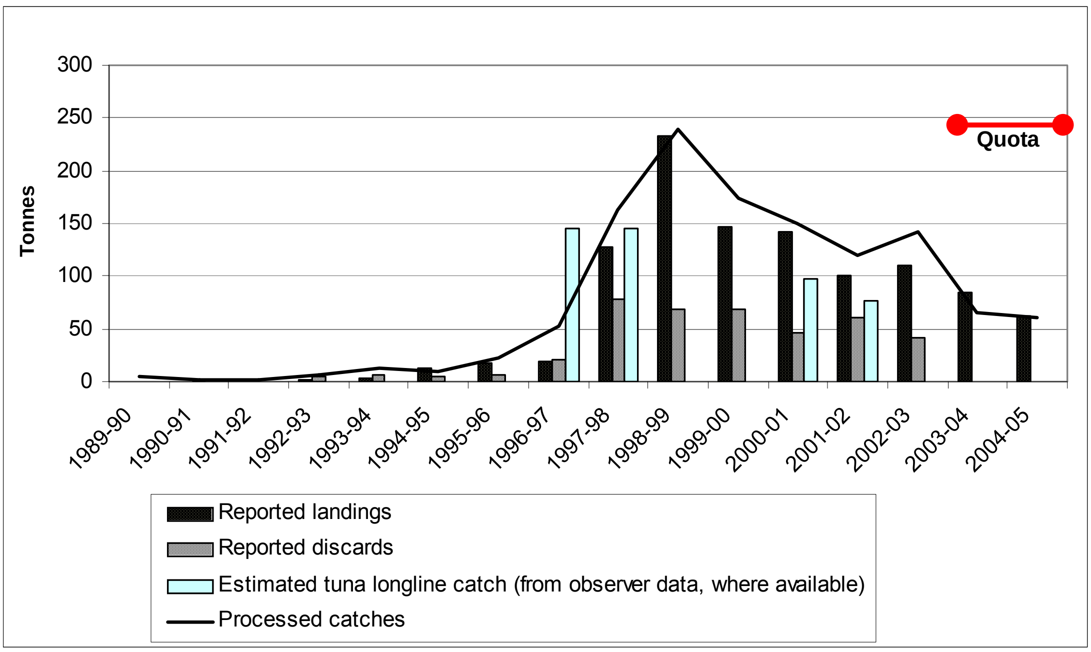

Figure 12. Reported commercial landings, discards and processing of *Lamna nasus* from New Zealand fisheries, 1989/90 to 2004/05. (Source Ministry of Fisheries 2006.)

Substantial foreign landings up to about 1992–93 have not been quantified and are not included here. Domestic tuna longline fishing effort rose until 2002/03, but has fallen in the last two years.

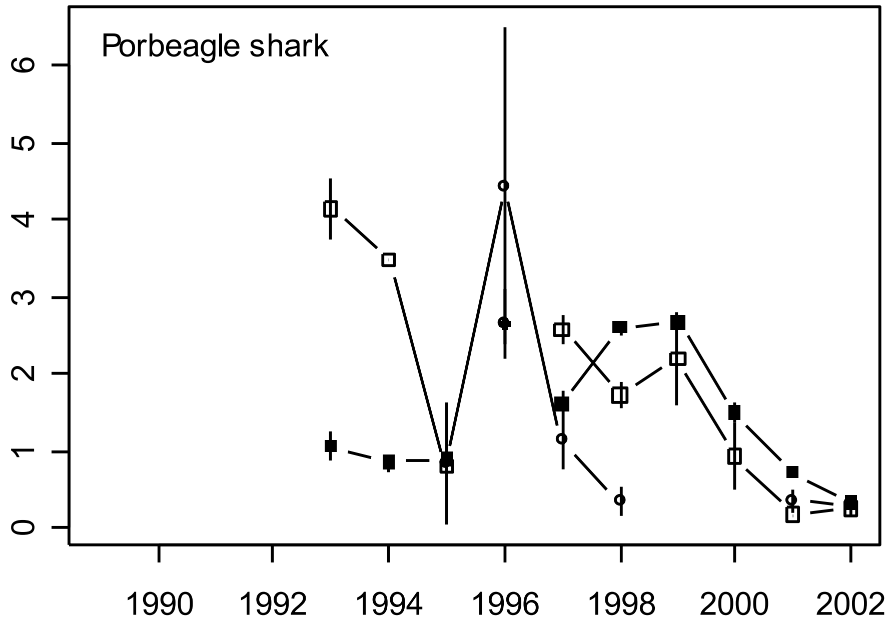

Figure 13. Unstandardised CPUE indices (number of *Lamna nasus* per 1000 hooks) for the New Zealand tuna longline fishery based on observer reports.

Years are fishing years (1993 = October 1992 to September 1993). Confidence intervals are from bootstrapped data. -■- foreign and charter fleet, southern New Zealand; -□- foreign and charter fleet, northern New Zealand; -●- domestic fleet, southern New Zealand; -○- domestic fleet, northern New Zealand. (Taken from Ministry of Fisheries 2006, Source: Ayers *et al*. 2004.)

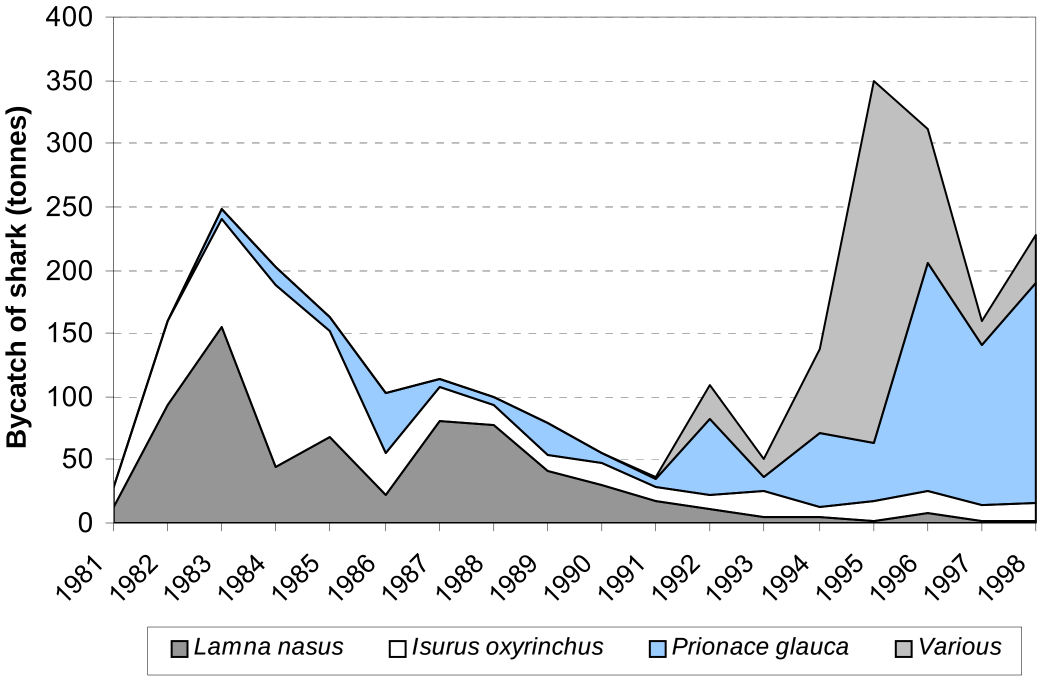

Figure 14. Sharks landed by the Uruguayan long line fleet, 1981–1998. (Source: Domingo 2000). ('Varios' includes eight species of large sharks.)

(English only / Únicamente en inglés / Seulement en anglais)

SCIENTIFIC SYNONYMS OF *LAMNA NASUS*

(*Source*: FAO Species Identification Sheet 2003)

- *Squalus glaucus* Gunnerus, 1768 (not *S. glaucus* Linnaeus, 1758 = *Prionace glauca*);
- *Squalus cornubicus* Gmelin, 1789;
- *Squalus pennanti* Walbaum, 1792 (also *Lamna pennanti*, Desvaux, 1851);
- *Squalus monensis* Shaw, 1804;
- *Squalus cornubiensis* Pennant, 1812;
- *Squalus selanonus* Walker, in Leach, 1818;
- *Selanonius walkeri* Fleming, 1828;
- *Lamna punctata* Storer, 1839;
- *Oxyrhina daekayi* Gill, 1862;
- *Lamna philippi* Perez Canto, 1886;
- *Lamna whitleyi* Philipps, 1935.

RANGE STATES AND AREAS WHERE *LAMNA NASUS* HAS BEEN RECORDED

(Source: based on Compagno 2001)

Albania
Algeria
Antarctica
Argentina
Australia (New South Wales; Queensland; South Australia; Tasmania; Victoria; Western Australia)
Azores Islands (Portugal)
Belgium
Bermuda (United Kingdom)
Bosnia and Herzegovina
Brazil
Canada (New Brunswick; Newfoundland; Nova Scotia; Prince Edward Island)
Canary Islands (Spain)
Cape Verde
Channel Islands (United Kingdom)
Chile
Croatia
Cyprus
Denmark
Egypt
Faeroe Islands (Denmark)
Falkland Islands (Islas Malvinas)*
Finland
France
France (including Corsica)
French Polynesia (France)
Germany
Gibraltar
Greece (East Aegean Islands; Kriti)
Greenland (Denmark)
Iceland
Ireland
Isle of Man (United Kingdom)
Israel
Italy (including Sardinia and Sicily)
Kerguelen Islands (France)
Lebanon
Libyan Arab Jamahiriya
Madeira Islands (Portugal)
Malta
Monaco
Morocco
Montenegro
Netherlands
New Zealand
Norway
Portugal
Russian Federation
Slovenia
South Africa
South Georgia and the South Sandwich Islands*
Spain
Sweden
Syrian Arab Republic
Tunisia
Turkey
United Kingdom (England, Wales, Scotland, Northern Ireland)
United States (Maine; Massachusetts; New Jersey; New York; Rhode Island; South Carolinas?)
Uruguay

FAO Fisheries Areas:

21, 27, 31, 34, 37, 41, 47, 48, 51, 57, 58, 81 and 87 (see Figure 3).

Oceans:

Northwest Atlantic: Greenland, Canada, United States, and Bermuda.

Northeast Atlantic: Iceland and western Barents Sea to Baltic, North and Mediterranean Seas, including Russia, Norway, Sweden, Denmark, Germany, Holland, United Kingdom, Ireland, France, Portugal, Spain, and Gibraltar; Mediterranean (not Black Sea); Morocco, Madeira, and Azores.

Southern Atlantic: southern Brazil and Uruguay to southern Argentina; Namibia and South Africa.

Indo-West Pacific: South-central Indian Ocean from South Africa east to between Prince Edward and Crozet Islands, between Kerguelen and St. Paul Islands, and southern Australia, New Zealand. Sub Antarctic waters off South Georgia, Marion, Prince and Kerguelen Islands.

Eastern South Pacific: southern Chile to Cape Horn.

* *A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas).*

The following comments by the Russian Federation were received late and could not be incorporated into the proposal:

Dear Dr. von Gadow,

Many thanks for preparation of proposal regarding the inclusion of porbeagle shark and spurdog to Annex II of CITES. We share your concern over the decline in

fishing. Many sharks and skates are long-living species having low growth and reproduction rates which makes their stocks most vulnerable to fishing. Besides, as the top predators, the elasmobranchs are tremendously important in the global ocean ecosystems. That is why their intensive harvesting may both deteriorate some populations of these species and restructure individual ecosystems, perhaps irreversibly. The cause of conservation of cartilaginous fish stocks today is a matter of concern not only among some conservation bodies like IUCN, WWF and Greenpeace but for regional fishery management and scientific organizations (ICES, NAFO, NEAFC, CCAMLR, ICCAT, etc.). This year only, the problems relating to conservation of cartilaginous fish stocks in Northeast Atlantic were the subject of discussions at expert meetings of the Shark Specialists Group (SSG) of the Survival Species Commission (SSC) of IUCN (February 13-15, Peterborough, UK) and the ICES Working Group of Elasmobranch Fisheries – WGEF (June 14-21, Copenhagen, Denmark). This problem was also discussed at the recent annual scientific Conference of the European Elasmobranch Association in Hamburg, Germany on November 11-12.

As is known, the present Annex II of CITES includes three species of sharks whose stocks globally, as experts believe, are in a more dramatic state compared to those of the porbeagle shark and spurdog: great white shark, whale shark and basking shark. We agree that the resources of the two species in question were reduced by many times after several recent decades which compelled the SSG to refer the spurdog and porbeagle shark to VU category (Vulnerable) in global terms, i.e. the highly endangered species (by IUCN classification). However, the status of these species throughout the global ocean is not uniform. Hence, as that very SSG sees it, the most deplorable situation with the spurdog is in the Northwest Atlantic where it is in the group of critically endangered species (CR). In the Mediterranean Sea, Northeast Atlantic and Northwest Pacific the species is regarded to be endangered (EN). At the same time, there are some regions where the stock condition of spurdog is a matter of least concern (LC) (Australasia and South Africa). Placing of the Northwest Pacific spurdog into this category is, in our view, unjustified, and it was probably referred to this group on the basis of information from the waters of Japan where there has been a target fishery for this species for a long time which caused a significant decline in these stocks. Russia has no target fisheries for spurdog in Pacific waters, though, as our studies show, its incidental catch in the last several years in the fisheries employing various gears (trawls, bottom long-lines, driftnets) rose considerably off Kamchatka and the Kuril Islands which indicates that its abundance is going up in the Pacific waters of Russia. The presence of a large number of juveniles and gravid females in catches is an evidence of reproduction of this species in the area. In Russia there has been a limited spurdog fishery in the Black Sea for several recent years with an annual catch of 20-30 tons; this species' stocks in the Russian waters are 10-20 thousand tons. Meanwhile, the total catch of spurdog in the Black Sea is about 2,000 tons of which 85% is taken by Turkey; the overall stocks are nearly 100,000 tons.

The status of porbeagle shark stocks in various parts of its range is dissimilar as well. For example, the most threatening situation with these stocks is in the Northeast Atlantic and Mediterranean Sea where this is a critically endangered species (CR), whereas it is an endangered (EN) species in the case of the Northwest Atlantic.

It was recognized by the SSG that the main reason for such a decline in the abundance of the spurdog and porbeagle shark was the unregulated fishing (target and incidental catch), and that it is the main threat to those species. ICES WGEF is of a similar view, and they have worked out quite specific advice for conservation of the spurdog and porbeagle shark stocks which are to restrict their fishery: banning target fishing, and reducing their bycatch in other fisheries. That was approved by ACFM. We believe that the ICES – recommended measures for conservation of the spurdog and porbeagle shark stocks are quite adequate, effective and capable of protecting the populations considered from the adverse effect of fishing. Hence, there is no need to put them into CITES Annex II. On the other hand, the introduction of these species to CITES lists would limit the commercial exploitation of the populations which are in a satisfactory condition. Consequently, we share the view of ICES regarding the measures being proposed by it to conserve the stocks of spurdog and porbeagle shark,

and we do not consider it reasonable to have them in Annex II of CITES. This discussion about putting these species on CITES lists may be resumed if the existing regulations fail to be effective.