

**PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE
CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF
WILD ANIMALS**

- A. PROPOSAL:** Inclusion of *Lamna nasus* (Bonnaterre, 1788) on Appendix II
- B. PROPONENT:** European Community and its Member States
- C. SUPPORTING STATEMENT:**

1. Taxon

Kingdom:	Animalia
Phylum:	Chordata
1.1 Classis:	Chondrichthyes, subclass Elasmobranchii
1.2 Ordo:	Lamniformes
1.3 Familia:	Lamnidae
1.4 Species:	<i>Lamna nasus</i> (Bonnaterre, 1788)
1.5 Common Name(s):	English: porbeagle French: requin-taupe commun (market name: veau de mer) Spanish: marrajo sardinero; cailón marrajo, moka, pinocho Dutch: Neushaai Danish: sildehaj German: heringshai (market name: kalbfish, see-stör) Italian: talpa (market name: smeriglio) Japanese: mokazame Swedish: hábrand; sillhaj

2. Biological data

The large, highly migratory and aggregating, 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 a high value species, whose aggregations may be targeted by fishers, and is therefore highly vulnerable to over-exploitation in fisheries.

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.

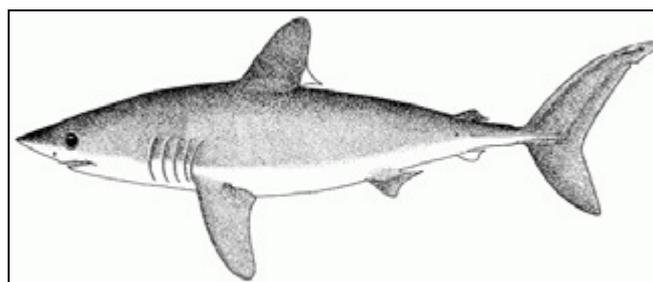


Figure 1. Porbeagle *Lamna nasus* (Source: FAO Species Identification Sheet)

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 *	20–25 years (Northwest Atlantic); possibly 30–50 (South Pacific)	
Gestation time	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)	

Table 1. Life history parameters of the porbeagle shark (*Lamna nasus*, Bonnaterre, 1788)

2.1 Distribution

Lamna nasus occurs largely between latitude 30–60 degrees South, in a circumglobal band in the southern hemisphere, and 30–70 degrees North in the North Atlantic Ocean (Compagno 2001, see Figure 2). 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).

This species is wide-ranging in the following 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.
 - Range States and areas, FAO Fisheries Areas and ocean distribution are listed under point 5.

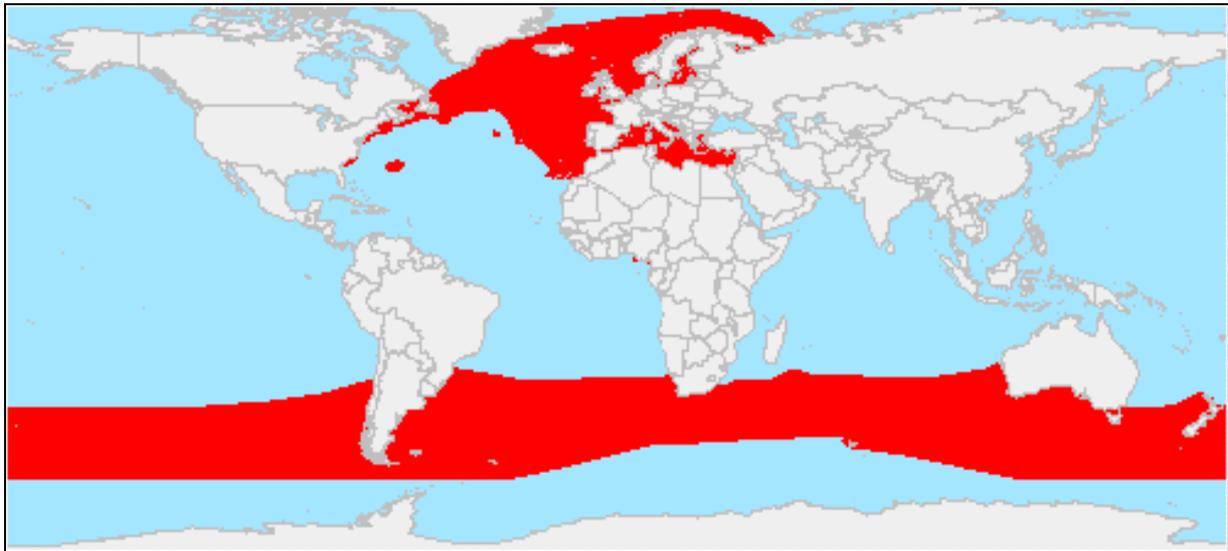


Figure 2. Global *Lamna nasus* distribution (Source: FAO FIGIS 2004)

2.2 Population

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. 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).

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.

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 and ICES data
1936–2005	Northeast Atlantic	All landings data	85% decline from baseline	Norwegian (pre-1973) and ICES data
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)

Table 1. Summary of population and catch trend data

Lamna nasus has been fished in the **Northeast Atlantic** region by many European countries. 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. This is attributed to a decline in heavily fished and depleted inshore populations and redirection of effort to previously lightly exploited offshore areas. The International Council for the Exploration of the Sea ICES (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." Both ICES and the European Scientific, Technical and Economic Committee for Fisheries (STECF) consider porbeagle to be depleted in the NE Atlantic, and stocks elsewhere in the world, including the NW Atlantic, are also considered depleted (ICES WGEF, 2007). A full stock assessment is not currently available, but because this population was depleted well before that in the Northwest Atlantic and has not benefited from 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).

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). Since then there have been only a few new records (A. Soldo unpublished data). 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).

Targeted *Lamna nasus* fishing in the **Northwest Atlantic** started in 1961, following depletion of the Northeast Atlantic stock. 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. Catches of 1,000–2,000 t/year throughout the 1990th 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, Total population numbers remained relatively stable between 2002 and 2005, although reproductive females continued to decline slightly. Population recovery from this depleted state is possible, but sensitive to human-induced mortality. 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).

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). 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. The abundance of *Lamna nasus* in shark bycatch of the Uruguayan pelagic tuna longline fleet declined during 1981–1998 (Domingo 2000). Japanese tuna longline vessels take an unknown quantity of bycatch of *L. nasus* in the southern bluefin tuna fishing grounds. Current stock levels are under investigation. The IUCN Red List categorises Southern Ocean *L. nasus* stocks as **Near Threatened** (Stevens *et al.* 2005).

2.3 Habitat

Lamna nasus is an active, warm-blooded, epipelagic shark inhabiting boreal and temperate waters, sea temperature 2–18°C, preferring 5–10°C 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 Mediterranean may be a nursery ground (Stevens *et al.* 2005).

2.4 Migrations

The ‘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). Extensive long distance migrations occur within the two North Atlantic stocks, 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) annual seasonal movements along the edge of the continental shelf between the Gulf of Maine and Newfoundland (Campana *et al.* 1999, Campana and Joyce 2004). with sharks moving into higher latitudes in summer here and also in the southern hemisphere stocks (Francis *et al.* 2008). Distances travelled by 143 porbeagle tagged in a US study ranged 4 to 1,005 nautical miles (nm), with a mean distance of 234 nm, with over 90% moving less than 500 nm from their original tagging location (Kohler *et al.* 2002). 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.) ICES Working Group on Elasmobranch Fishes (WGEF) 2007 and Heessen 2003 consider that there is a single Northeast Atlantic stock, from the Arctic Ocean to Northwestern Africa. FAO (2007), however, noted that evidence from Japanese catches in high seas longline fishing fleets (Matsumoto 2005) indicates the potential for a third North Atlantic stock off Iceland.

There is also direct evidence of trans-Atlantic movements from tagging studies and indirectly from the virtually identical genetic population structure on both sides of the North Atlantic. In contrast, significant genetic differences between the northern and southern hemisphere populations imply little or no geneflow across the Atlantic equatorial waters that separate them (Pade *et al.* 2006).

Information is not available on migrations or stock structure in the southern hemisphere.

2.5 Movement between international borders

L. nasus tagged off southern England (the United Kingdom of Great Britain and Northern Ireland) have been recaptured off Spain, Denmark and Norway, having travelled 2,370km to the Norwegian recapture site. Sharks tagged off the Republic of Ireland have been recaptured off the Faroes, France and Canada, with movements of 2,300 km and 4,260km, suggesting not only mixing throughout their range in the Northeast Atlantic, but also across the Atlantic (Campana *et al.* 1999, Kohler and Turner 2001, Kohler *et al.* 2002, Stevens 1976 and 1990, Green 2007, Figure 3).

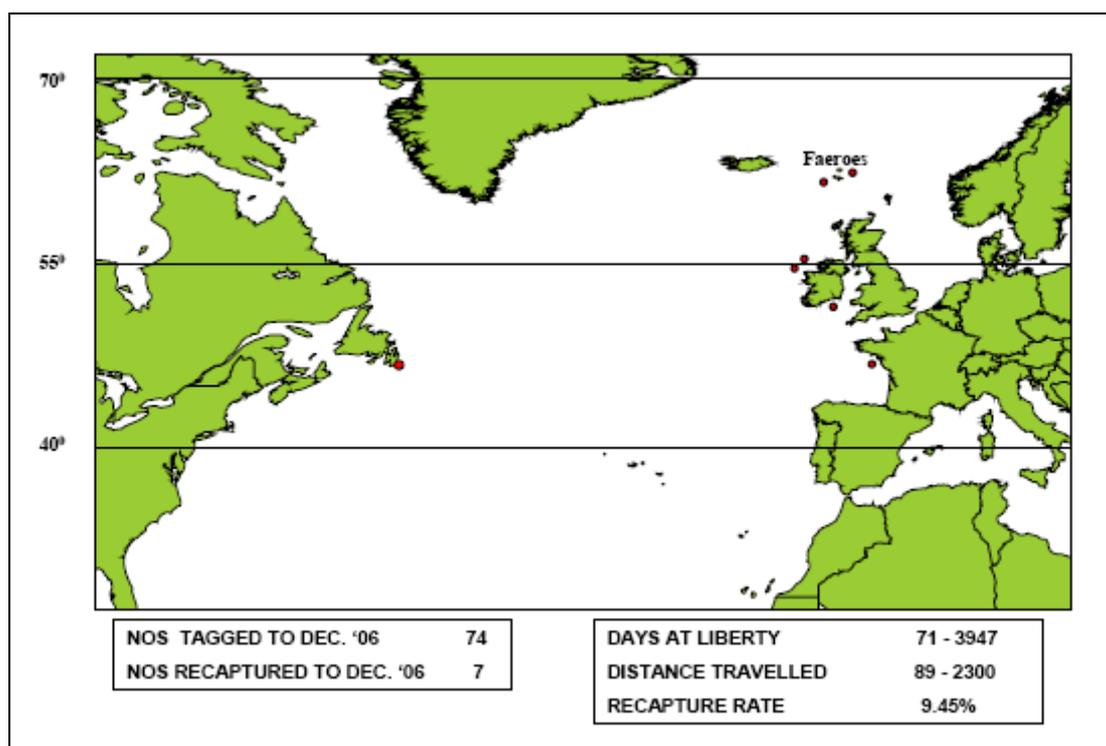


Figure 3. Recapture locations of porbeagle sharks in the Northeast Atlantic, from Irish Central Fisheries Board tagging programme (Green 2007).

3 Threat data

3.1 Direct threat or threat of the population

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.

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 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."

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. 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 26–36°S (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).

3.2 Habitat destruction

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.

3.3 Indirect threat

3.4 Threat connected especially with migrations

The Porbeagle shark is not only a highly migratory but also a highly aggregating species, with migrating portions of the population thought to aggregate by age class, maturity and sex. Its aggregating habit makes this species highly vulnerable to fisheries, which can target areas where these aggregations may reliably be found and hence particularly sensitive portions of the population (such as large, mature females). There is significant potential for collaborative management to protect vulnerable aggregations, such as juveniles in nursery grounds or mature females on pupping grounds, but management initiatives by single range States (such as Norway, which has adopted ICES advice and prohibited targeted fishing for this species) is insufficient for the effective conservation of a highly migratory species such as this.

3.5 National and international utilization

Domestic and international trade has been the driving force behind depletion of populations in the North Atlantic and may potentially also threaten southern hemisphere populations. 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). Despite the high value of its meat 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).

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. 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).

The large size of *L. nasus* fins 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)).

4 Protection status and needs

4.1 National protection status

Sweden prohibits the fishing and landing of porbeagle sharks. Norway has adopted ICES advice by prohibiting target fisheries for *Lamna nasus* in Norwegian waters and ICES divisions I–XIV (bycaught fish must be landed). Canada allows a small, directed fishery regulated under a total allowable catch (TAC) limit. In mid 2008, the USA will reduce its annual Atlantic, commercial porbeagle quota from 92t to 1.7t, while allotting 9.5t for commercial discards and 0.1t for recreational catches. The North American limits are intended to rebuild the population within 100 years, based on the Canadian assessment. Canada's 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. The Committee On the Status of Endangered Wildlife In Canada (COSEWIC) recommended that porbeagle sharks be protected as endangered species under the country's Species at Risk Act, but their advice was not heeded. New Zealand introduced quota management for porbeagle in 2004. In the Northeast Atlantic, the conservation and management of sharks in waters under the sovereignty or the jurisdiction of Member States of the European Community falls within the domain of the European Common Fishery Policy (CFP). Proposals by the European Commission for establishing porbeagle TAC under the CFP need to be approved by Member States in the Council of the European Union. EC Regulation 40/2008 allotted quota shares of a new, 2008 EC porbeagle TAC (581 tn in EC and international waters of the the Northeast Atlantic) to France, Spain, Denmark, Portugal, Ireland, Germany, UK and Sweden. In addition a few States adopted domestic fisheries management measures. They have not yet delivered sustainable harvest of *L. nasus*. In addition, EC Regulation 1185/2003 prohibits shark "finning" (the removal of shark fins and subsequent discarding of the body) of this and other shark species, and subsequent discarding of the body. This regulation is binding on EC vessels in all waters and non-EC vessels in Community waters.

4.2 International protection status

'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 cooperation 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.

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.

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.

4.2.1 Atlantic

In 2004, the International Commission for the Conservation of Atlantic Tunas (ICCAT) adopted a binding Recommendation to ban shark finning and promote the collection of shark fisheries data. In 2007, ICCAT passed a binding Recommendation for countries without peer-reviewed stock assessments (currently all countries but Canada) to reduce fishing mortality on *L. nasus*. Measures to achieve this goal have been left up to individual country members and the EC. Also in 2007, ICCAT directed its scientists to review the population status of porbeagle sharks and report back to the Commission with management recommendations by 2009. ICCAT scientists may well complete this task in 2008 as a major shark population assessment meeting is planned for September 2008.

4.2.2 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). WCPFC has banned shark finning (except for vessels under 24 meters). CCAMLR appears not to be specifically monitoring or managing porbeagle sharks, but in 2006 banned targeted shark fishing at least until populations can be assessed and sustainable limits determined.

4.3 Additional protection needs

ICES (2005) recommended: "Given the apparent depleted state of this stock, no fishery should be permitted on this stock" and has since reiterated this advice. The European Scientific, Technical and Economic Committee on Fisheries (STECF 2006) recommended "that no directed fishing be allowed, while other measures be taken to prevent bycatch of porbeagles in other fisheries." ICES has noted that mandatory release may be an effective means to achieve the latter, as most

porbeagles are “captured” (come to the boat) alive.

The CMS Scientific Council agreed in March 2007 following consideration of a taxonomic review prepared by the IUCN SSC Shark Specialist Group (2007) that this threatened migratory species meets the criteria for listing on the Appendices and should be considered by the Conference of Parties to CMS in December 2008.

The inclusion of *Lamna nasus* in Appendix II of the CMS convention would highlight the urgency for effectively restricting mortality of the species and facilitate coherency among the broad range of management options.

Successful engagement of CMS in migratory shark conservation requires consultation and engagement with FAO, RFMOs (regional fisheries management organisations) and CMS Party Fisheries Departments. If such consultation is undertaken and opportunities are pursued for developing synergies between these two schools of living natural resource management, then there is considerable potential for CMS to focus needed attention on this particularly vulnerable and under-protected species and prompt improvement in the fisheries management measures.

Lamna nasus would benefit from conservation attention from CMS and its partners. As the greatest threat to shark stocks arise from overfishing through target and bycatch fisheries, it follows that CMS may have greatest impact if it is able to promote higher priority for porbeagle shark conservation and develop measures that complement and strengthen existing fisheries management initiatives, for example by identifying and addressing the gaps left by the implementation of traditional fisheries measures and the potential for synergistic efforts.

Summary:

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 from 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. 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 and possibly more seriously depleted Northeast Atlantic and Mediterranean population, or for southern stocks. Whereas ICCAT has encouraged conservation and requested scientific advice for porbeagles and it will undertake a stock assessment of sharks, including porbeagle, in September 2008, no RFMOs are actively managing porbeagle stocks.

An Appendix-II listing is proposed for *Lamna nasus*. The North Atlantic stocks have experienced marked historic and recent declines. Management in the Northwest Atlantic has stabilized the population but recovery is estimated to take 100 years and may not have begun. 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 prompt and facilitate focused, enhanced international cooperation among Parties and relevant international organisations, in order to ensure that porbeagle mortality is limited to levels that prevent population collapse and allow for rebuilding and sustainable fishing.. Enhanced international cooperation 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.

5. Range States¹

ALBANIA, ALGERIA, ARGENTINA, AUSTRALIA, BELGIUM, Bosnia and Herzegovina, Brazil, Canada, CAPE VERDE, CHILE, CROATIA, CYPRUS, DENMARK, EGYPT, FINLAND, FRANCE, GERMANY, GREECE, Iceland, IRELAND, ISRAEL, ITALY, Lebanon, LIBYAN ARAB JAMAHIRIYA, MALTA, MONACO, MOROCCO, Montenegro, NETHERLANDS, NEW ZEALAND, NORWAY, PORTUGAL, Russian Federation, SLOVENIA, SOUTH AFRICA, SPAIN, SWEDEN, SYRIAN ARAB REPUBLIC, TUNISIA, Turkey, UNITED KINGDOM, United States, URUGUAY.

FAO Fisheries Areas:

21, 27, 31, 34, 37, 41, 47, 48, 51, 57, 58, 81 and 87.

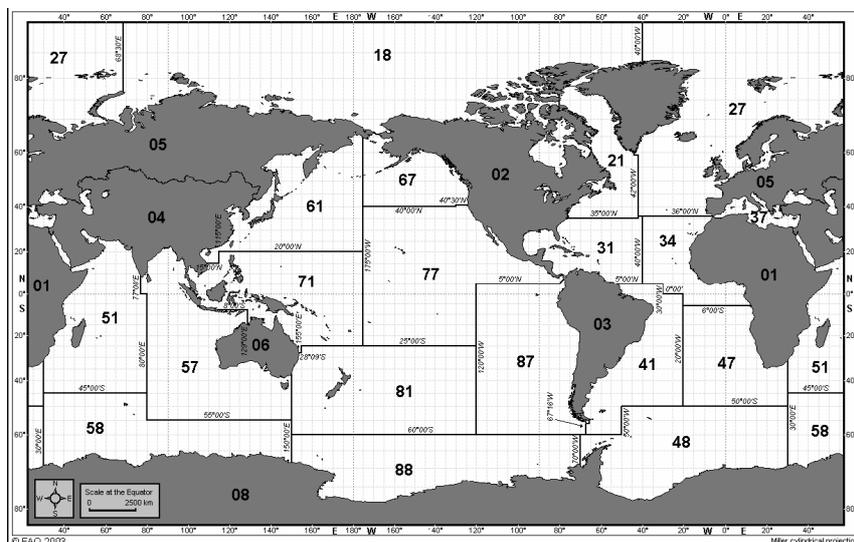


Figure 4. FAO fishing areas.

6. Comments from Range States

In the context of the proposal for inclusion of this species in Appendix I and II of the CITES convention, 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,

¹ CMS Parties in capitals.

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).

No additional inquiries were made in preparation of this document.

7. Additional remarks

8. References

- 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.
- Big Game Fishing Council, undated. Submission to New Zealand government on quota proposals. <http://www.option4.co.nz/pdf/sharksnzbgfc04.pdf>.
- 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. and W.N. Joyce. 2004. Temperature and depth associations of porbeagle shark (*Lamna nasus*) in the northwest Atlantic. *Fish. Oceanogr.* 13:52–64.
- Cites, 2007 Proposal for Inclusion of *Lamna nasus* (Bonnaterre, 1788) in Appendix II in accordance with Article II 2(a). Document CoP14 Prop. 15, Fourteenth meeting of the Conference of the Parties, The Hague, Netherlands.
- 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).
- 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*.
- 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 Elasmobranchios Pelágicos Capturados por la flota de longline Uruguay. 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. 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.
- 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 pêche 37. Volume 2. Vertébrés. FAO, Rome. 761–1530.
- 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.
- Francis, M.P., Natanson, L.J. and Campana, S.E. In press. Porbeagle (*Lamna nasus*). In: E.K. Pikitch, & M. Camhi (eds). *Sharks of the open ocean*. Blackwell Scientific Publications.
- 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.
- Green, P. 2007 WD. Central Fisheries Board marine sportfish tagging programme 1970 to 2006. Working document to ICES WGEF, 2007.
- Heessen, H. J. L. (Ed.) 2003. Development of elasmobranch assessments DELASS. Final report of DG Fish Study Contract 99/055, 603 pp.
- ICES. 2005. Report of the ICES Advisory Committee on Fishery Management. Copenhagen, Denmark.
- ICES WGEF, 2007. Report of the Working Group on Elasmobranch Fishes (WGEF), ICES Advisory Committee on Fishery Management.
- ICES. 2008. Report of the Working Group on Elasmobranch Fishes (WGEF). ICES CM 2008/ACOM: In prep.
- 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 Ocean. 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.
- 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.

- 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.
- 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.
- 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., 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>.
- 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.

