Inclusion of Porbeagle *Lamna nasus* in Appendix II

Proponent: Sweden, on behalf of the European Community's Member States acting in the interest of the European Community.

Summary: The Porbeagle *Lamna nasus* is a large warm-blooded shark occurring in temperate waters of the North Atlantic and in a circumglobal band in the Southern Hemisphere (30–60^{0}S). While it grows faster than many cold-blooded sharks, the Porbeagle has several life history characteristics that make stocks highly vulnerable to over-exploitation and slow to recover subsequently. These include: relatively slow growth rate, late maturation (8–18 years), long life span (29–65 years), large body size (up to 357 cm), small numbers of young (average is four pups per litter), long gestation (8–9 months) and long generation time (18–26 years) leading to a low intrinsic rate of population increase (5–7% annually in the North Atlantic, 2.6% in the South West Pacific) and low productivity.

The Porbeagle is one of relatively few shark species directly exploited for its meat and there is a well documented history of Porbeagle fisheries that have over-exploited stocks, as well as declines in the amount of reported by-catch of other fisheries. Following the collapse of the North East Atlantic Porbeagle fishery in 1960 (with 85–99% declines in landings in 69 years), Norwegian, Faroese and Danish fleets moved into the North West Atlantic where the fishery collapsed after six years. Stock assessments by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the International Council for the Exploration of the Sea (ICES) in 2009 identified historical declines to 6% of baseline in the North East Atlantic in 82 years (1926 to 2008), to 22–27% in the North West Atlantic in 44 years (1961 to 2005), and in the South West Atlantic to 18% in 47 years (1961 to 2008) and also a 60% decline from 1982 to 2008. Catch per unit effort (CPUE) of Porbeagle by pelagic longliners in the South West Pacific may also have declined by 50–80% in 10 years (1992 to 2002) and 80–95% in 17 years (1983 to 2000). Porbeagles have virtually disappeared from the areas of the Mediterranean where they were previously abundant, with catches in tuna traps declining by over 99.99% in some areas. Porbeagles continue to be targeted in the North Atlantic, including by five French vessels, Canadian vessels (185-t quota) and vessels from the USA (11-t quota). Fleets from Spain, Japan, Taiwan (Province of China) and South Korea take unquantified by-catch of Porbeagles in the South East Pacific. Assessments of the North West Atlantic stock indicate that numbers remain at a low but relatively stable level with a slight continuous decline in the number of reproductively mature females, a likely contributing factor to the limited recovery of stocks to date despite catch restrictions. Future projections suggest a recovery to Maximum Sustainable Yield (MSY) in the North West Atlantic would take place between 2030 and 2060, if the fishery were to be closed. Total reported catch in New Zealand has declined steadily from 300 t in the period 1988–89 to 50 t in the period 2005–06, despite increased catch effort.

Porbeagle meat is of high quality and high value and is traded internationally, but patterns and trends in international trade are largely unknown owing to lack of species-level trade records. Porbeagle fins are of questionable value for the fin trade but are traded internationally, largely as a by-product of the meat industry. A large proportion of Porbeagles caught in New Zealand waters are landed as fins and all fins are exported for the fin trade. Porbeagle fisheries are managed in only a small portion of their global range, with catch quotas in Canada, the USA and New Zealand, and a zero catch quota set for 2010 in the European Union (EU). The total allowable catch (TAC) in New Zealand is not based on a stock assessment and only around 20% has been reported as landed in recent years. The amount of unreported and unregulated fishing on the high seas is unknown but believed to be substantial, and a threat to stock recovery. The species is listed globally as Vulnerable in *The IUCN Red List of Threatened Species*, and regional populations have been assigned individual listings ranging from Near Threatened (Southern Ocean) to Critically Endangered (North East Atlantic and Mediterranean).

The Food and Agricultural Organization (FAO) Committee on Fisheries (COFI) recognized the need to improve management of shark fisheries with the adoption in 1999 of the International Plan of Action for the Conservation and Management of Sharks (IPOA–Sharks), endorsed by the FAO Council in 2000. In 2009, FAO reported that, out of 68 members responding to a questionnaire, 50% had conducted assessments as to whether a National Plan of Action (NPOA) was needed; 90% of those have gone on to develop and implement an NPOA. To date there have been no assessment of the effectiveness of

NPOAs.

The proposed listing would include an annotation to delay entry into effect by 18 months to enable Parties to resolve related technical and administrative issues.

Analysis: Porbeagles are inherently vulnerable to over-exploitation owing to their life history characteristics. They have a long history of being caught in unsustainable target and non-target fisheries. In all areas for which they are available, landing and CPUE statistics and stock assessments indicate marked recent declines or historic collapses, ascribed in all cases to the impact of fishing. There is undoubtedly high demand for Porbeagle meat, which has high economic value; fins are apparently in less demand. Both products are traded internationally, but a lack of species-specific data means it is not possible to gauge the exact scale of international trade. The relative overall importance of trade on observed and predicted declines compared to other factors, chiefly by-catch and harvest for domestic use, is also unknown. However, at least one fishery (New Zealand) appears to be driven very largely by international demand and it seems likely that such demand is an important contributing factor in other fisheries.

Several stocks, notably those in the North Atlantic and Mediterranean, already appear to meet the biological criteria for inclusion in Appendix I with recorded historical extents of decline in abundance and landings to <10% of baseline. In addition, available trend data for South West Atlantic and Pacific populations have shown declines of at least 50%, some displaying declines to near the quantitative guidelines for Appendix I. No information is available on one stock (South East Atlantic/South West Indian Ocean) but this stock occupies a relatively small proportion of the range of the species and its status is unlikely to affect an assessment of the overall status of the species as a whole. There is also no reason to assume that it would not respond in the same way as all other stocks if harvesting is occurring or were to occur.

Given the observed declines, and the known role of trade in at least one fishery and its likely role in others, it would appear that the Porbeagle meets the criteria for inclusion in Appendix II in that regulation of trade is required to prevent its becoming eligible for inclusion in Appendix I in the near future.

Supporting Statement (SS)	Additional information
Taxonomy	
Range	
Lamna nasus falls within the jurisdiction of 57 countries and overseas territories in temperate waters of the North Atlantic Ocean (30–70^{o}N) and in a circumglobal band in the Southern hemisphere (30–60^{0}S). There are separate stocks in the North East and North West Atlantic, and also in the South East and South West Atlantic, which extend into the South West Indian Ocean and South East Pacific, respectively.	
IUCN Global Category	
Global–VU	*Global species assessment Vulnerable A2bd+3d+4bd. (Assessed 2006, Criteria*

North East Atlantic–CR North West Atlantic–EN Mediterranean–CR Southern Ocean–NT	*version 3.1).*

Biological and trade criteria for inclusion in Appendix II (Res. Conf. 9.24 (Rev. CoP14) Annex 2 a)

A) Trade regulation needed to prevent future inclusion in Appendix I

Porbeagles have several life history characteristics that make them highly vulnerable to over-exploitation in fisheries, including relatively slow growth rate, late maturation (eight to 18 years), long life span (29–45 years), large body size (up to 357 cm), small numbers of young (four pups, on average, per litter), long gestation time (eight to nine months), long generation time (18–26 years) and low intrinsic rate of population increase (5–7% in the North Atlantic, 2.6% in the South West Pacific). Therefore, Porbeagle should be considered as a species with low productivity (estimated natural mortality of 0.1–0.2). The animals are also highly migratory and, in at least some regions, they segregate by age, reproductive state and sex.

Porbeagles have undergone marked historic and recent declines in the North and South West Atlantic as evidenced by landings and notably stock assessments conducted in 2009 by ICCAT and ICES indicating declines to 10–30% of baseline in 44–72 years. Porbeagles have virtually disappeared from the areas of the Mediterranean where they were previously abundant, with catches in tuna traps declining by >99.99% in some areas.

The severe declines in Porbeagle stocks and landings are described in detail in the SS and summarized below:

Year	Location	Data	Trend
1936–2007	NE Atlantic (Norway)	L	>99% decline from baseline
1973–2007	NE Atlantic (Norway)	L	96% decline
1954–2007	NE Atlantic (Denmark)	L	99% decline from baseline
1973–2007	NE Atlantic (Denmark)	L	90% decline
1973–2007	NE Atlantic (Faroe Isles)	L	Decline and closure
1936–2007	NE Atlantic (all targeted catches)	C	80% decline since post WWII
1926–2008	NE Atlantic	SA	94% biomass decline, 93% number decline from baseline
Var	Mediterranean	B + A	>99% decline in tuna

1800–2006			traps over 50–100 years
1963–1970	NW Atlantic	L	~90% decline & fishery collapse
1961–2005	NW Atlantic	SA	73–78% decline from baseline
1961–2005	NW Atlantic	SA	84–88% decline in mature females
1961–2008	SW Atlantic	SA	82% decline
1982–2008	SW Atlantic	SA	60% decline
1992–2002	SW Pacific (NZ)	CPUE	>50–80% decline*
1998–2005	SW Pacific (NZ)	L	75% decline

L=Landings (tonnage), C=Catches, SA=Stock Assessment, CPUE=catch per unit effort, B + A= Biomass and Abundance.
* Declines may not reflect stock abundance because of potential sources of variation.

Unsustainable serial depletions of Porbeagle populations have occurred. Following collapse of the North East Atlantic Porbeagle fishery in 1960, Norwegian, Faeroese and Danish shark fleets moved to the North West Atlantic where the fishery was only sustained for six years before also collapsing. In 2005, ICES noted that while directed Porbeagle fisheries in the North East Atlantic stopped in the 1970s owing to low catches—with only small sporadic fisheries occurring since then—the high market value of the species means that a directed fishery would develop again if abundance increased. The ICCAT/ICES specialist meetings in 2009 recommended that high seas fisheries should not target Porbeagles.

Porbeagles continue to be targeted in the North Atlantic, including by a small French fleet in the North East (five vessels) and Canadian (185-t quota) and USA fleets (11-t quota). Unquantified by-catch of Porbeagle are taken by Spanish, Japanese, Taiwanese and Korean longliners.

Despite catch restriction in the North West Atlantic, it has taken 25 years for only very limited recovery to take place; total population numbers have remained relatively stable since 2002, with a possible continuing decline in reproductively mature females. Catch rates of mature sharks in the North West Atlantic in 2000 were 10% of those in 1992 and biomass estimated as 11–17% of virgin biomass; estimated numbers of mature females in North West Atlantic in 2009 were 12–16% of 1961 levels. Unreported and unregulated fishing in the high seas jeopardize stock recovery.

Year	*Location*	*Data*	*Trend*
1983–2000	*SW Atlantic (Uruguay)*	*CPUE*	*80–95% decline*

(Domingo et al*., 2002).*

Stock assessment of North West Atlantic populations indicates that if the fishery is closed, recovery to MSY would take place between 2030 and 2060; an annual catch of 185–192 t should allow recovery to 20% of virgin biomass within 10–30 years.

An assessment based on the South West Atlantic stock revealed declines in biomass that mirror the decline in CPUE previously identified. This stock probably extends into the South East Pacific.

Data are not available to support an assessment of the South East Atlantic/ South West Indian Ocean Porbeagle stock.

Southern Hemisphere Porbeagle stocks have lower annual rate of population increase, longer generation time, longer life span (approximately 65 years), and greater age at maturity than northern stocks, making them significantly more vulnerable to overfishing than the depleted North Atlantic populations.

Japan also takes Porbeagle in its Southern Bluefin Tuna fishery in the Indian Ocean and in the Western and Central Pacific (CCSBT ERSWG, 2009; WCPFC Scientific Committee, 2009) and Spain reports catch of Porbeagle from its fishing operations in the South East Pacific (FAO FishStat, 2009).

B) Regulation of trade required to ensure that harvest from the wild is not reducing population to level where survival might be threatened by continued harvest or other influences

Unsustainable target fisheries for Porbeagle in parts of its range have been driven by international demand for its high value meat (for details of population declines see section A above). Based on past fisheries' development and shifting of effort from the North East to North West Atlantic, it can be projected that other Southern Hemisphere stocks are likely to experience similar decreases unless international trade regulation provides an incentive to introduce sustainable management.

Findings indicate that the demand for high quality and high value fresh, frozen or processed meat, and other Porbeagle products is sufficiently high to justify the existence of an international market. However, lack of species-specific landings and trade data make it impossible to assess the proportions of global catches that supply national demand and enter international trade.

Important, but largely unreported by-catch fisheries for Porbeagle include demersal longlining and trawling for Patagonian Toothfish and Mackerel Icefish in the Southern Ocean and southern Indian Ocean, and longline, Swordfish and tuna fisheries off the Atlantic coast of South America, including the Argentinean and Chilean fleets.

Between 1985 and 1991, imports of shark to Italy consisted of 29% Porbeagle although the country of origin is unclear (Laurenti and Rocco, 1996).

Traders in the Netherlands reported Porbeagle among the imported shark species (Rose, 1996).

Of US imports of sharks, 40% consist of a group of several species, including Porbeagle, which are imported from Chile, Ecuador, Mexico, Panama, Peru, Surinam, Uruguay, Canada, Portugal, Japan, Philippines, Taiwan (Province of China) (Rose, 1996).

Norway exports fresh and frozen Porbeagle meat to EU markets and fins are exported to Asian countries as by-products of the meat processing (Fleming and Papageogiou, 1997).

According to Kreuzer and Ahmed (1978), preferred species for shark leather production include Porbeagle. However, Rose (1996) suggests that Porbeagle leather is unlikely to appear in markets and trade owing to the different processing requirements for leather and meat production.

In Australia, small quantities of Porbeagle are taken as by-catch in pelagic tuna longline fisheries in the Pacific and Indian Oceans and gillnet fisheries of southern Australia (Patterson and Tudman, 2009).

New Zealand commercial landings of Porbeagles reported by fishers and processors (LFRR), 1989/90 to 2004/5. TAC for New Zealand set at 249 t.

Unquantified commercial transactions include Canadian exports of meat to the USA and the EU, Japanese exports to the EU, EU exports to the USA, and Australian exports to the USA.

Porbeagle has been identified in the fin trade in Hong Kong. Some sources indicate a low value for Porbeagle fins in the trade; nonetheless their large size means they are frequently used.

New Zealand longline fisheries report about 80% of by-catch is alive when retrieved, although survival of unprocessed discarded sharks is unknown.

*Of the landings of Porbeagle in New Zealand, 85% were fins (with carcasses discarded at sea) and the remainder headed and gutted (Francis, 2007). Since the period 1998–99, there has been a 75% decline in the total weight of Porbeagle reported in this fishery, to a low of 54 t in the period 2005–06 (Ministry of Fisheries, 2008). This decline began during a period of rapid increase in domestic fishing effort in the tuna longline fishery in New Zealand, but has accelerated since tuna longline effort dropped during the last four years, thus suggesting that reduction in longline effort does not fully explain the reduced catches (*Ibid*).*

*Given that virtually all shark fins landed in New Zealand are exported (mainly to Hong Kong), this provides a conservative estimate of the exported volume of Porbeagle from New Zealand (Francis, 2007). It is possible some Porbeagle meat is also exported (*Ibid*).*

In New Zealand, the TAC is not based on a stock assessment. Current reported catch is well below the commercial TAC providing ample scope for increased catch to supply unmet demand. "It is not known whether current catches or the TAC are at levels that will allow the stock to move towards the biomass that would support the maximum sustainable yield. However, declining catches over a period when effort has increased rapidly, low CPUE in recent years, combined with the low productivity of the species and a history of fishery collapses in the North Atlantic, are all cause for concern." (Ministry of Fisheries, 2008).

Fin traders are aware of the low needle count in Porbeagle fins, which mean they are less valued than other shark species fins, despite their large size, meaning they are less desirable and rarely appear in trade (Clarke, 2009). Where they are traded, many traders do not sort Porbeagle fins separately from Longfin Mako and sometimes Shortfin Mako (non-caudal) because of the low value of all of these fins (Clarke, 2009).

An estimated 54% of Porbeagles are still alive on gear retrieval in the French Atlantic fishery (Jung, 2008), and 25-68% arrive at the boat alive in the New Zealand fishery (Francis et al*., 2001).*

Inclusion in Appendix II to improve control of other listed species

A) Specimens in trade resemble those of species listed in Appendix II under *Resolution Conf. 9.24 (Rev. CoP14)* Annex 2 a or listed in Appendix I

It is proposed that all stocks of Porbeagle that do not currently qualify for listing in Appendix II under Annex 2a meet the criteria at Annex 2b, because of look-alike issues. Complex patterns of export, processing and re-export of meat make it difficult to distinguish products from different stocks, unless DNA analysis is used to confirm the origin of processed products. DNA analysis has been developed to confirm identification of Porbeagle products at a cost of USD20–60 per sample and takes two to seven days. Tests can distinguish between Northern and Southern Hemisphere stocks.

A split listing could facilitate illegal, unrecorded and unreported fishing for stocks listed in Appendix II.

Not considered further since the species as a whole has been assessed against criteria in Annex 2a.

Other information

Threats

The principal threat is from over-exploitation in target and by-catch fisheries, which catch both adults and juveniles of all age classes.

Conservation, management and legislation

International:
Porbeagles are listed in:

- Annex 1 (Highly Migratory Species) of the UN Convention on the Law of the Sea (UNCLOS);
- Annex III (Species whose exploitation is regulated) of the Barcelona Convention Protocol (Mediterranean population only);
- Appendix III of the Bern Convention (Mediterranean population only) as a species whose exploitation must be regulated in order to keep it out of danger;
- Appendix II of the Convention on the Conservation of Migratory Species (CMS);
- OSPAR Convention list of Threatened and/or Declining Species and Habitats (species and habitats in need of protection or conservation).

Porbeagles are listed as a high priority species on the Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Convention); although no management action to address this has been taken (Lack and Sant, 2009).

No management action has yet followed these listings.

The IPOA–Sharks urges all States with shark fisheries to implement conservation and management plans. However, fewer than 20 States have produced Shark Assessment Reports or Shark Plans. Many regional fisheries management organizations (RMFOs) have adopted shark finning bans.

In 2009, FAO reported that, of 68 members responding to a questionnaire, 50% had conducted assessments as to whether an NPOA was needed; 90% of those have gone on to develop and implement an NPOA (Lack and Sant, 2009); several of these have important Porbeagle fisheries, including the EU, New Zealand, Taiwan (Province of China), the USA and Japan. However, there is no evidence yet that these plans will lead to improved management.

*There have been no assessments of the effectiveness of any NPOAs to date and no RFMO has yet adopted a regional plan of management for sharks (Lack, 2009). Many RFMOs, e.g. the Commission for the Conservation of the Southern Bluefin Tuna (CCSBT) and the Western and Central Pacific Fisheries Commission (WCPFC), pertaining to regions in which Porbeagle is known to be taken as by-catch, do not require the submission of catch data on sharks (*Ibid*).*

In the Adriatic, Croatia has listed Porbeagle as a strictly protected species within waters under Croatian jurisdiction (Soldo, 2009).

North East Atlantic:
In 2008, the EU Porbeagle fishery entered management through TACs and maximum landing size to protect large females. Finning of Porbeagles is prohibited by an EC Regulation that is binding for EU vessels in all waters and all non-EU vessels in EU waters.

The EU TAC for Porbeagle was 581 t in 2008 (Camhi et al*., 2009). This was reduced by 25% to 436t in 2009 (see http://ec.europa.eu/fisheries/doc_et_publ/liste_publi/tac09/en/index_en.htm). The EU Council agreed a zero TAC for 2010 following scientific advice from ICES (EU Press release IP /09/1948, 15 December 2009).*

North West Atlantic:
Porbeagle quotas (under the Highly Migratory Species Fisheries Management Plan) were reduced to 11 t for all US fisheries in 2008, including a domestic commercial quota of under two tonnes, leading to a closure of the fishery before the end of the year. US Atlantic sharks must be landed with their fins naturally attached. Annual quotas in Canadian waters were reduced to 185 t in 2006.

Southern Hemisphere:
The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) adopted a moratorium on directed shark fishing in 2006. Live release of sharks taken as by-catch is encouraged but not mandatory. In Australian longline fisheries, the possession of shark fins separated from carcasses is prohibited. New Zealand includes Porbeagle in its Quota Management System, with an unrestrictive TAC of 249 t.

*The requirement to land sharks with fins attached applies in all Australian Commonwealth-managed fisheries, except target shark fisheries (Lack, 2009). It is possible that Porbeagle is taken in some State-managed Australian fisheries (which must adhere to a finning ratio) but no estimate of catch is available (*Ibid*). New Zealand does not have any restrictions on finning (*Ibid*).*

Because Porbeagles are primarily killed for their meat, finning bans alone will not improve their population status.

An ecological risk assessment process conducted by the Secretariat of the Pacific Community (SPC) on behalf of the WCPFC identified Porbeagle as at higher risk from Western and Central Pacific Oceans (WCPO) fisheries than most other shark species encountered in those fisheries (Kirby and Molony, 2006).

Captive breeding/artificial propagation

None known.

Other comments

Trade records are generally not species-specific; international trade levels, patterns and trends are largely unknown.

The entry into effect of the inclusion of Porbeagle in Appendix II of CITES is proposed to 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. It will be important to develop species-specific commodity codes and identification guides for Porbeagle meat and fins.

Reviewers:
M. Lack, S. Clarke, A. Domingo, E. McManus, A. Soldo, TRAFFIC Europe.

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