CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Inclusion of the Basking Shark (*Cetorhinus maximus*) on Appendix II of CITES.

B. Proponent

United Kingdom of Great Britain and Northern Ireland (on behalf of the Member States of the European Community).

For the Executive summary, please see Annex 7 (English only).

C. Supporting statement

1. Taxonomy

1.1	Class:	Chondrichthyes (subclass Elasmobranchii)	
1.2	Order:	Lamniformes	
1.3	Family:	Cetorhinidae	
1.4	Species:	*Cetorhinus maximus* (Gunnerus, 1765)	
1.5	Scientific synonyms:	See Annex 1.	
1.6	Common names:	English:	Basking shark, (traditionally sunfish or sailfish, hoe mother)
		French:	Pélerin
		Spanish:	Peregrino
		Gaelic:	Cearban (Scotland), liabhán mór, liabhán chor gréine (Ireland)
		German:	Riesenhai
		Greek:	Sapounas
		Italian:	Squalo elefante
1.7	Code numbers:		

2. Biological parameters

2.1 Distribution

Basking sharks occur in the temperate waters of continental and insular shelves of the Atlantic and Indo-Pacific Oceans and Mediterranean Sea, and have been recorded from the states listed in Annex 2. They are occasionally recorded well offshore in oceanic waters but are most commonly seen very close to the coast. They are not recorded from the tropics, and records from the warmest areas are often of dead, stranded or moribund specimens. Although widely distributed, they are infrequently recorded except in a few favoured coastal areas, where they are usually seen in relatively large numbers for only part of the year.

Distribution records are characterised by highly seasonal appearances, and the species is highly migratory, undertaking extensive horizontal (of >3000km) and vertical movements (Sims, Southall & Metcalfe, in prep.). Records in higher latitudes are most common during the spring and summer months, suggesting a seasonal migration occurs. This migration may take place from deep to shallow water or from lower to higher latitudes as sea temperatures rise, or as a combination of

both. Previous suggestions that basking sharks hibernated over-winter are now in doubt (Francis & Duffy, 2002; Sims *et al*., in prep.). Basking sharks are caught from near to well beyond the edge of the continental shelf off the west coast of New Zealand in winter, both in mid water and on or near the bottom (Francis and Duffy, 2002). Recent UK-funded satellite tagging work has shown that basking sharks remain in continental shelf edges during winter spending more of their time at greater depths and less near the surface (Sims *et al*., in prep.). Some individuals move into shallower shelf waters in higher latitudes as the summer season progresses, with a greater proportion of time spent feeding at the surface, particularly after the thermocline has developed and zooplankton densities are at their height.

There is a pronounced spatial and seasonal population segregation; groups of animals of similar sizes and the same sex may be sighted together. Most basking sharks caught in surface fisheries in Scottish waters were recently mated females (F:M ratio of 18:1, Watkins 1958), and 65-70% of sharks taken in Japan were also female. Conversely, catches in sub-surface gill nets off Newfoundland included twice as many male as female sharks (Lien & Fawcett 1986). Segregation by sex was also evident in bycatch from different regions of the waters around New Zealand (Francis & Duffy, 2002). Despite the large numbers of mature females taken in fisheries, there is only one known record of a pregnant female (with a litter of six). Newborns and juveniles are also only rarely seen (comprising 2.6-2.8% of sightings by Sims *et al*. 1997 and Lien & Fawcett 1986), perhaps suggesting that their populations occur elsewhere, or that recruitment rates are very low. Research programmes using satellite transmitters and other electronic tags are helping to elucidate the movements of these sharks (Sims, Southall & Metcalfe, in prep).

2.2 Habitat availability

Habitat availability in terms of horizontal and vertical extent in boreal to warm-temperate regions of the ocean is not considered to be a constraint for this species. However, appropriate foraging habitat may be limited by the availability of suitable zooplankton species and their abundance, and the persistence of summer stratification and front formation in continental shelf areas. Surface waters preferred for feeding, and possibly for mating activity, appear to be ocean fronts, close inshore off headlands and islands, and in bays where 'tide lines' (tidal slacks) are formed in areas of strong tidal flow and where zooplankton aggregate (Earll 1990, Sims *et al.* 1997, Sims and Quayle 1998).

2.3 Population status

The global status of the basking shark is assessed as **Vulnerable** (A1a,d, A2d) in the 2000 *IUCN Red List*. The IUCN assessment is based on past records of rapidly declining local populations of basking sharks as a result of short-term fisheries exploitation and very slow population recovery rates recorded (see fisheries accounts in the following pages). It also takes into account the likely potential for similar population declines to occur in the future from directed fisheries, driven at least in part by the demand for fins in international trade, and from continued global by-catch. Compagno (1984) considers the basking shark "to be extremely vulnerable to overfishing, perhaps more so than most sharks ... ascribed to its slow growth rate, lengthy maturation time, long gestation period, probably low fecundity and probable small size of existing populations (belied by the immense size of individuals in their small schools)." The best estimates of age at maturity for basking sharks are 12-16 years for males, up to 20 years for females, with a litter size of six, and gestation period from 12 to 36 months. Longevity is likely to be 50 years. The interval between litters may be two to four years. (Pauly 1978, in press; Compagno 1984; Fowler in press.).

No firm estimates are available for the total global population or regional populations of this species. Owen (1984) suggested that the unexploited population in the Gulf of Maine and off the New England coast (USA) during the summer months may number as many as 6,700 - 14,300 sharks. He compared this with an estimated population of 2,000 sharks in the Monterey Bay area of the United States of America west coast (Squire 1967). As pointed out by Compagno (1984), it should

be noted that basking shark populations are probably very small compared with most other sharks. Most recorded fisheries have taken only hundreds or about one thousand individuals annually for a few years before collapsing. Where observations of basking sharks have been recorded, the total annual number of records is usually in the tens, hundreds, or at most low thousands, including repeat sightings. The total number removed from the whole of the Northeast Atlantic during the past 50 years is probably between 80,000 and 106,000 animals (Annex 5a; Sims & Reid, 2002).

Siccardi (1960, 1971) suggested that there are four species of *Cetorhinus*, two in the North Atlantic and Mediterranean (*C. maximus* and *C. rostratus*), one from southern Australia (*C. maccoyi*), and one from the South Atlantic (*C. normani*). Compagno (1984) and Springer and Gilbert (1976) consider there is insufficient evidence to separate these species, although there are apparently clear morphological differences between some populations (e.g. Tomás and Gomez, 1989). Genetic research currently underway (e.g. Hoelzel, 2001) may help to clarify the status of populations in different oceans and/or hemispheres.

2.4 Population trends

A few well documented declines in catches by directed fisheries for the basking shark suggest that reductions in numbers caught of at least 50% to over 90% have occurred in some areas over a very short period (usually ten years or less, Fowler in press; Annex 4). These declines have resulted in long-term (lasting several decades) reductions in local populations, with apparently little or no migration into the area from other sources. Examples from NE Atlantic are given below (Figures 2-4). However, most other basking shark fisheries described in literature (also summarised below) lack accurate recorded data on landings, market conditions and catch per unit effort. It is not always possible, therefore, to determine conclusively whether a short-term fishery ends for market reasons, or because the local population has declined to a point where difficulty in finding the target animals damages the viability of the fishery. Where similar patterns of exploitation and declining catches are recorded during fisheries for other large sharks, however, and fishery independent data and stock assessments are available, these have demonstrated that such crashes are the result of depletion of these vulnerable species (Camhi *et al*. 1998).

The most recent estimates of population resilience or productivity (r_{msy}) range from 0.013 to 0.023 (S.E. Smith, pers. comm.), based on methodology described in Smith, Au & Show (1998) and assumptions of maximum age of 50, age of female maturity of 18 years, annual fecundity (female pups per litter)of 1.5, and a natural mortality of 0.091. This productivity is very low for a marine fish species. Earlier estimates of r of 0.16 (www.Fishbase.org) now appear to have been significantly over-estimated. Calculations of natural mortality (M = 0.06, www.Fishbase.org) and fisheries mortality derived from north-west European landings (Pauly, 1978 and 2002) strongly suggest this species is unable to withstand targeted exploitation for long, and confirm that stock depletion is likely to be a major factor affecting fisheries yields. Pauly (1978 and 2002) re-analysed previously published length-frequency data for north-west European basking sharks. Fishing mortality (F) was considered to be 0.094/year in adults, with the ratio of F/Z = 0.6 (where Z = total mortality). Pauly (2002) states that this is 'an exploitation rate that no fish – especially not a long-lived, low-fecundity fish such as the basking shark – can withstand for long (Beddington and Cooke 1983)'. Indeed, this species has among the lowest natural mortality and productivity yet calculated for a commercially fished marine species (Smith, Au & Show 1998).

An additional explanation for the rapid collapse of localised fisheries for a widely distributed and apparently seasonally migratory species, is that some basking sharks are (like many other large sharks – e.g. Walker 1996, Hueter 1998) site-faithful and tend to return to the same coastal summer 'basking' and feeding locations. Despite their wide-ranging nature, they may be effectively part of local stocks that are particularly vulnerable to depletion by fisheries activity (Fowler 1996 and in press), although this movement pattern may not apply to all individuals within a population (Sims, Southall & Metcalfe, 2002). Current work invdlving satellite tagging and photo-identification of basking sharks should help to resolve this issue.

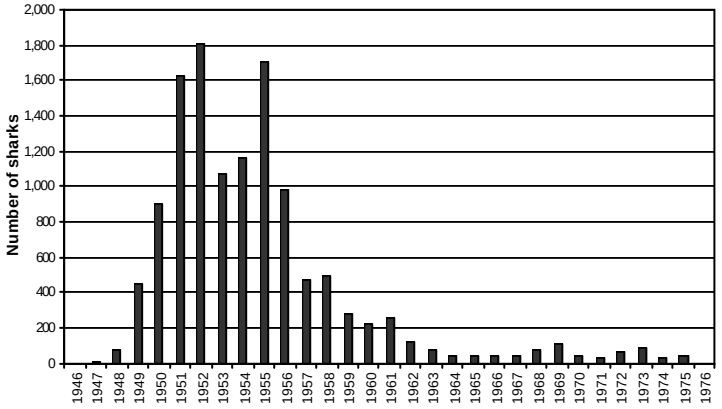
There is only very limited information available on wider population trends; data indicating changes in catch per unit effort or annual variation in numbers of sightings are only obtainable on a local, or at most regional, scale. Some evidence exists for unpredictable cycles in the numbers of basking sharks entering coastal waters. Certain years have seen very large influxes of sharks to some United Kingdom areas, while in others the numbers recorded are low (Kunzlik 1988, Speedie 1998, Fairfax 1998). Landings throughout the Northeast Atlantic have also fluctuated, but with a continued downwards trend evident over the past few decades. Annual variations in sightings and catch records may be strongly influenced by weather conditions, water temperature and cyclical fluctuations in the distribution and abundance of zooplankton. For example, some of the fluctuations in north-east Atlantic catches (Figure 4 and Annex 4) could be linked to broad-scale oceanic changes controlled by factors such as summer stratification, the North Atlantic Oscillation or climate (Sims and Reid 2002). Associated changing patterns of basking shark activity may make populations more, or less, vulnerable to fisheries in some years than in others. Fishing effort affects catches but is often difficult to quantify. The life history of the basking shark, with late maturity, low natural mortality and low birth rate probably means, however, that any short-term fluctuations in sightings or catches are not reflections of natural fluctuations in total abundance, but of variations in distribution and/or vulnerability to surface fisheries.

Details of three major fisheries for basking sharks, from Norway, Ireland and Japan, are summarised here. Similar trends have been noted from fisheries in the Canadian Pacific, Scotland, China and California, United States of America. These, and incidental, fisheries are detailed in Annex 6 (in English only).

Irish fisheries

The apparent collapse of two historical fisheries off the Irish west coast are well documented: the 18th to 19th Century Sunfish Bank fishery, and the mid-20th Century Achill Island fishery (McNally 1976, Parker & Stott 1965). Large numbers of basking sharks were taken in these areas at the end of the 18th and first quarter of the 19th Century. Records from this period suggest that this fishery was active for several decades between 1770 and 1830. The season only lasted for a few weeks in April and May, but at least 1,000 fish seem likely to have been taken each year at the height of the fishery. In the early 1830s, sharks became very scarce. Despite continued high prices for 'sunfish' (basking shark) oil (indicating that the decline in the fishery was not due to market factors), the fishery collapsed in the second half of the 19th Century. This scarcity of sharks lasted for several decades.

Figure 1. Number of basking sharks landed at Achill Island, 1947-75.



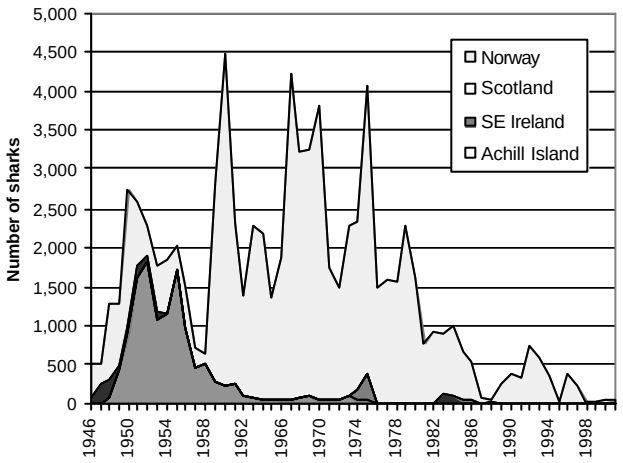
Basking sharks were next recorded in abundance around Achill Island in 1941 (McNally 1976). This was some 50 years after the previous fishery in the area had ceased, and more than 100 years since large numbers of shark had been taken off this coast A new fishery started in 1947. Between 1,000 and 1,800 sharks were taken each year from 1951 to 1955 (an average of 1,475/year), but a significant decline in catch records occurred from 1956, the last year in which shark catchers were employed. From 1957 onwards, continued declining sightings and catches made the fishery less profitable for the free-lance fishermen who took over from them. Average

annual catches were 489 in 1956-1960, 107 in 1961-65, and then about 50-60 *per annum* for the remaining years of the fishery (Figure 1).

There is no evidence that the continued decline in catches from the late 1950s onwards was the result solely of a significant decline in fishing effort from this shore-based fishing station. Rather, it is considered to reflect decreasing catch per unit effort. Indeed, effort increased significantly again in the early 1970s, as a result of increasing oil prices and re-investment, and catches rose elsewhere (see below). Regardless, the fishery was unable to increase landings and closed in 1975 (Kunzlik 1988). A total of 12,360 fish had been taken in 29 years at this one site, with 10,676 of these caught from 1949-58 (Figure 1 and Annex 4).

Sims and Reid (2002) note that the decline in the Achill Island fishery is correlated with a decline in copepod abundance (a major component of basking shark diet) off the west coast of Ireland. The subsequent recovery in copepod populations (Chris Reid pers. comm.) has not, however, been matched by increased sightings of sharks in this area (Berrow and Heardman 1994). The copepod decline obviously did not affect landings in the Norwegian basking shark fishery (see Figure 2), which may have accelerated the decline of the Achill fishery by taking basking sharks in west Irish waters and off the Scottish west coast (S. Myklevoll pers. comm., quoted in Kunzlik 1988). Total Norwegian landings for the whole northeast Atlantic (including Norwegian and Scottish coastal waters) were still relatively low during the initial period of decline at Achill Island (Figure 2, Annex 5b). It seems likely that, as in later years, the majority of their catches were taken off the Norwegian coast at this time, and that the basking shark population decline off western Ireland was at least partly due to over-exploitation at Achill Island.

Figure 2. Targeted Northeast Atlantic basking shark catches, 1946-2001.



Fowler (1996, in press) suggests that the percentage decline in basking sharks which occurred off the west coast of Ireland during both Irish fisheries was greater than 50%. Indeed, the most recent Achill Island fishery appears to have caused a local population decline of over 80% in less than ten years, which still persists 40 years later. The fishery collapse therefore seems unlikely to be wholly due to a decline in zooplankton abundance during the 1960s and 1970s, as suggested by Anon (2000), but could be in part due to this trophic influence (Sims & Reid, 2002).

Northeast Atlantic Norwegian fishery

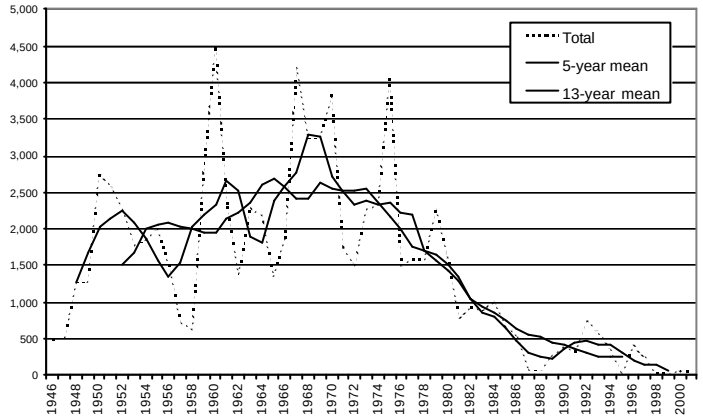
A very wide-ranging Norwegian fleet, whose geographical and temporal distribution changes markedly from year to year (Stott 1982), has undertaken the major basking shark fishery in the Northeast Atlantic. Landings have been made from local fisheries from the Barents Sea to the Kattegat, across the North Sea to the south and west of Ireland, west coast of Scotland, Iceland and Faeroe (Pawson and Vince 1998), and have fluctuated widely (see Figure 2 and Annex 5).

Catches were at their highest (> 1,000 and up to > 4,000 in some years) between 1959 and 1980, when over 30 vessels were active for all or part of the season (ICES 1995, Figure 2). Shark oil

prices were particularly high from the mid-1970s to the early 1980s, and fishing effort is therefore thought to have remained fairly constant over this period. The subsequent decline in this fishery has been attributed (ICES 1995) to the ageing inshore whaling fleet, a proportion of which targets basking sharks, and a decline in value of basking shark liver oil in the late 1980s. This trend would, however, appear to have been offset by the greatly increased value of the fins in international trade in the 1990s (with fins from an individual shark now worth over USD2,000 - see section 3.2). Indeed, Norwegian catches have been reported as weight of fins since at least 1992 (previously they were reported as weight of liver) (Norwegian Directorate for Nature Management in lit., 2002).

Since the precise locations in which the Norwegian fleet fished for basking sharks are uncertain for the first 27 years of the fishery, it is difficult to detect and evaluate trends in catches, effort, and hence population. Figure 3 presents all landings data combined from the Northeast Atlantic since fisheries restarted in the 1940s, with running means added to smooth the fluctuations that may (as discussed above) be the result of climatic or oceanographic factors. This clearly shows a persistent decline in average landings from the early 1970s to the early 1990s. This period of decline includes a period of peak demand and high value for basking shark oil from the mid 1970s to mid 1980s, which encouraged the establishment of new fisheries in southern Ireland and the Firth of Clyde, Scotland. According to ICES (1995), the Norwegian fleet only declined significantly after 1980. Effort has largely been concentrated off the Norwegian coast since 1984.

Figure 3. Total and mean Northeast Atlantic basking shark landings.



Although no effort data are available, it is inferred that the declining catches from 1970 to 1980 represent falling yields from declining stocks (possibly despite increased fishing effort), rather than declining fishing effort. This pattern of steeply declining catches is certainly a familiar pattern in other fisheries for large sharks, where much better records, including catch per unit effort data, are available (Camhi *et al*, 1998).

Landings increased slightly in the early 1990s (Figures 2 and 3), when the fishery was being sustained by the high value of the fins (ICES 1995, quoting Dr S Myklevoll). The main market for Norwegian fins appears to be Japan, and exports to this market were also increasing steadily in the early 1990s (Directorate for Nature Management 1995 (quoted in Castro *et al*. 1999), and personal communication from Mr Kuniaki Takahshi 2000). This coincided with the onset of a North Sea regime shift and increased abundance and landings of other species in the NE Atlantic (e.g. horse mackerel, Reid pers. comm.). Despite the combination of high values and an apparent increased availability of sharks, however, the highest catches in the early 1990s still represented only 10-20% of peak catches in the 1960s and increased landings were short-lived. Norwegian basking shark landings have since declined to a new low, despite the continued increasing value of these products and demand in international markets, and an increase in the numbers of vessels fishing for basking sharks. In 1999, fewer than ten vessels were reported by the Norwegian delegation to the 11th CITES CoP (verbal intervention in Committee I, April 2000) to be fishing for sharks, while the Norwegian Directorate for Nature Management (in lit. 2002) reported that in 2000 and 2001 respectively 30 and 13 Norwegian vessels participated in the basking shark fishery.

Japanese fishery

The main targeted Japanese basking shark fishery took place from March (the peak month) to May, the main basking shark mating and migration period near Nakiri (Shima Peninsula, Mie Prefecture). Basking shark hunting had been a traditional activity here since the Edo era (1772), but became more intensive in 1967 when oil prices rose and Nakiri fishermen began harpooning larger numbers of sharks. Fishing vessels of under 3 tons with a crew of two (one harpooner and one skipper) usually worked in pairs, one as the catcher and the other towing the sharks. The main use for the sharks during this period was the valuable squalene-rich liver oils. Shark fin was also important and considered to be a middle ranked shark fin in Taiwan. Shark meat was sold for human consumption, or processed into fishmeal for animal feed.

Table 1. Norwegian basking shark catches from 1992-2001 (Directorate for Nature Management)

Year	Fins (kg)	Estimated catch weight (tons)	Estimated no. of sharks	Notes:
1992	37,145	3,715	675	**Column 3**: Estimated catch weight calculated by DNM as 100 x fin weight (although a fin:body ratio of 1% is much lower than other estimates of 2-4%). **Column 4**: Estimated number of sharks calculated using an average 55 kg of fin per shark.
1993	34,360	3,436	625	
1994	26,922	2,692	489	
1995	15,571	1,557	283	
1996	19,789	1,979	360	
1997	11,520	1,152	209	
1998	1,366	137	25	
1999	770	77	14	
2000	2,926	293	53	
2001	1,997	200	36	

During the 12 years from 1967 to 1978, an estimated 1,200 individual basking sharks were harpooned (an average of about 100 per year). During the last few years of the fishery, from 1975 to 1978, catches gradually decreased, from about 150 sharks in 1975, to about 20 in 1976, nine in 1977, and six in 1978. The fishery ceased completely in the early 1980s as a result of falling oil prices and the declining numbers of sharks sighted (Annex 4). In the 1990s, only 0-2 basking sharks were sighted each year off Nakiri during the migration season, compared with a peak year in 1972 when more than 60 basking sharks were processed for sale in Nakiri market in one day. (Yano 1976 and 1979, Uchida 1995.)

2.5 Geographic trends

The species is widely distributed in temperate waters, but large numbers tend to be concentrated in only a few favoured coastal areas where feeding and possibly breeding activity takes place at or near the surface. As noted above, basking sharks are most vulnerable to targeted fisheries where they occur in such surface aggregations. In addition, cyclical variations in patterns of sightings or catches of this species have been reported. These may be linked to alterations in oceanic currents, water temperature and zooplankton aggregations. Long and short-term cycles in plankton abundance have been reported in the Northeast Atlantic and North Sea, with different patterns of abundance being recorded in different areas (Reid *et al*. 1998 a and b). As noted above, this may have affected patterns of basking shark catches, but these have been superimposed upon a general downwards trend.

2.6 Role of the species in its ecosystem

Presumed similar to small plankton-feeding whales.

2.7 Threats

The main threat to basking shark populations is from fishing operations – both targeted on basking sharks and incidental or by-catch in other fisheries. However, because these fish congregate in bays and shallow water, they are also at risk from collisions with vessels and may be harassed by shark watchers. Collisions seem to be relatively frequent – large areas of scarring are often observed on the head and dorsal surfaces.

2.7.1 Directed fisheries

Targeted basking shark fisheries use nets to deliberately entangle the fish or harpoon guns to take basking sharks swimming or feeding on the surface. Targeted fisheries have been recorded from Norway, Ireland, Scotland, Iceland, California, China, Japan, Peru, Ecuador (Compagno 1984) and Northern Spain (Evaristo Alfaya pers. comm.). Some of these are described in detail above. All the available evidence suggests that basking shark populations are very vulnerable to targeted fisheries. Populations rapidly decline due to over-exploitation (Annex 4) and numbers may be depressed for many decades thereafter.

2.7.2 Incidental fisheries

Take by incidental fisheries is mainly recorded in set nets and trawls, and is most common in coastal waters. It naturally occurs over a much larger area than targeted fisheries. There is evidence from Newfoundland (Lien and Fawcett 1986, section 3.4) that some incidental fisheries may become targeted fisheries as markets for the products develop. Take from incidental catch (Annex 6) may be significant and either contribute to declines from targeted catch or prevent the recovery of over-fished populations. Some range states (e.g. New Zealand and United States of America) have ensured that the increasing value of bycatch does not stimulate a target fishery, thereby posing a threat to populations, by respectively prohibiting target fisheries and legally protecting the species (see section 4.1).

Basking sharks caught incidentally during fishing operations for other species are sufficiently resilient to be released, apparently unharmed in many cases, possibly even after up to three hours on the deck of a fishing boat (Lien pers. comm. and Watterson in lit.). The survival of sharks returned in this way is not monitored. However, the high value of their fins (and to a lesser extent liver oil, flesh and cartilage), is a strong incentive for fishermen to kill and utilise rather than release this species.

3. Utilization and trade

The lack of detailed fisheries landings records and trade data at species level, and for specific shark products (even where these are easy to identify, as is the case for basking shark fins), presents a major obstacle to determining precisely which products and what quantity are utilised nationally by fishing nations, and which enter international trade (Rose 1996). However, some information can be obtained from literature, personal communications from researchers and fin traders, and TRAFFIC reports on international trade in shark products.

3.1 National utilization

Liver oil: This was, until recently, the main product utilised. Indeed, some fisheries formerly removed the livers from the fish at sea and discarded the remainder of the fish. The liver comprises about 17-25% of the total body weight (of up to 7 t (metric tonnes) and yields 60-75% oil (Phillips

1947, McNally 1976). Although a large shark can provide about 0.7 t of oil, the average is considered to be about 0.4 to 0.5 t per fish. This oil has a very high squalene content (up to 55%), characteristic of deep water sharks, and is therefore primarily of industrial rather than medicinal value. It traditionally supplied domestic oil markets, including the cosmetic and health supplement markets in Norway (Fleming and Papageorgiou 1996). The large amount of oil derived from a single shark has made these fisheries viable in the past, but the liver oil market has suffered from competition from the gulper shark *Centrophorus granulosus* and kitefin shark *Dalatias licha* fisheries (ICES 1995). It is uncertain how much of the liver oil landed in most countries is utilised nationally today, but all or most oil landed in the United Kingdom in 1980s-90s appears to have entered international trade, mainly through export to Norway.

Flesh: The meat of basking sharks has been used both for fish meal and, dried or fresh, for human consumption. Its low value GBP 2.50 to GBP 3 per ton in the early 1960s made processing uneconomic (McNally 1976). Basking shark meat was sold in Billingsgate market, London in the 1970s, and in fish and chip shops in Scotland in the 1980s and early 1990s. Prices for the meat were GBP 0.30 to GBP 0.80/kg in the early 1990s (Fleming and Papageorgiou 1996). Chen *et al*. (1996 in Phipps 1996) give a landing value at fishery markets for whole basking sharks in Taiwan as USD1.10/kg.

Fins: Fins landed in Europe and other fishing nations outside southeast Asia are mainly thought to be directed into the international trade, and are not utilised nationally to any significant extent. Fins landed in China and Japan may be used by domestic markets, or exported for processing.

Cartilage, skin and other products: Basking shark cartilage is probably only used domestically in small quantities. It may be exported in 'raw' form before possible re-importation as a processed product for use in its country of origin. The large size of the basking shark will likely make the processing of its cartilage more cost-effective and desirable than that from smaller sharks. No information was obtained on present national utilisation of basking shark skin for leather manufacture, or on uses of other products.

3.2 Legal international trade

Four basking shark products are known to enter the international trade in significant (albeit largely unrecorded) quantities; liver oil, fins, cartilage and meat. However, little or no customs data are available on quantities of shark fin, cartilage or oil imports and exports by individual species, and most countries which keep any records of trade in sharks separately from other fish, combine all shark products into a single category. It is therefore impossible to determine precisely the volume of basking shark products which enter international trade or from which populations these products originate. Additional data on trade in basking shark products may become available following the United Kingdom's listing of the species on Appendix III of CITES in 2000 and Annex C of European Community (EC) CITES Regulations. Although the reservations entered by Japan and Norway will preclude provision of information on the fin trade between these Parties, trade from the EC should be monitored under the provisions of EC Regulations 338/97 and 1808/2001 (none was available at the time of writing). The following information was obtained from literature and fin trader interviews.

Liver oil: The value of the oil has declined in recent decades. Fleming and Papageorgiou (1996) give values of GBP 600/t for liver oil landed in Scotland in the early 1980s, but this had fallen to GBP 230/t in the late 1980s. Fairfax (1998) reports liver prices of GBP 250/t (USD 375/t) in the early 1990s, and notes that the liver was no longer landed in the last years of the recent Firth of Clyde fishery in Scotland because the high costs of exporting oil to Norway made exports uneconomic. The Norwegian fishery reportedly no longer lands basking shark oil either, although Norway has imported large quantities of shark oil (of various species) in past decades. Basking sharks caught incidentally in New Zealand fisheries (see Annex 6) were processed for their oil since at least 1965 (Anon 1991a), but their fins had become more valuable by the early 1990s (Anon 1991b). Where

data are available for shark oil exports and imports, these do not differentiate between species of origin. Shark oil records may therefore represent products from basking shark, gulper shark, spiny dogfish, kitefin shark and other fisheries. Norway is the only country that reports information to Food & Agriculture Organisation (FAO) on the shark oil trade.

Fins: The fins have a very high value in oriental markets. McNally (1976) notes that sales of fins had provided the Achill Island fishery with "a secondary, if relatively small source of income since 1960", when they were exported to Spain from Ireland. By 1970 fins were being exported directly to Hong Kong. Prices paid to fishermen for fins were GBP 3,000/t in the 1970s, but had climbed to GBP 20,000 (USD 30,000)/t by 1994 (Fairfax 1998). Fleming and Papageorgiou (1996) record that fins were exported from Scotland to Norway for USD 6/kg (GBP 4/kg) in 1983. Prices then rose, with a particularly rapid increase in the early 1990s, and fins for export were USD 6.25/kg (GBP 17.50/kg) in 1994, an increase of over 300% in nine years (Anon 1991b). Fairfax (1998) reported that the largest quantity of fins yielded by a single large female in the recent Firth of Clyde fishery was 92 kg, which would be worth well over USD 1,500 (GBP 1,000), and up to USD 2,400 (GBP 1,600) to the fisherman. A few years later (August 2000), www.fis.com/fis/hotnews reported that basking sharks caught as bycatch in Norway could yield up to 70-90 kg of fins which, at over NOK 200/kg, represents up to NOK 20,000 (GBP 1,500 or >USD 2,000) per shark (meat is dumped at sea).

Norsk Medicinal Union A/S buys fins from fishermen and markets them in South-east Asia. Norwegian fin exports to Japan had been steadily increasing: 0.096 t of fins were exported in 1992, 7.218 t in 1993, and 26.859 t in 1994 (from letter of Directorate for Nature Management, 21 September 1995, quoted in Castro *et al*. in preparation). A Japanese fin trader (Mr Kuniaki Takahashi, President of Chinese Cuisine Takahashi, Tokyo), reports that he visited Norway to obtain basking shark fins before the stock collapsed. He personally imported 3 t from Norway in 1995, at USD 14/kg, and 16 t in 1996 at USD 23/kg (the latter transaction represented all the fins available that year, although a comparison with declared fin landings (see Table 1) implies that other exports were also taking place). Mr Takahshi reported criticism by other fin traders for the high wholesale price paid, because this might drive up world fin prices. These prices are warranted by the top quality ranking of basking shark fins in Kwang Tong Cuisine (one of the four major Chinese cuisines in China) and by the demand for their use as 'sign boards' at the entrance to Chinese restaurants. (They are considered to be a fin of second-rank in other cuisines because of their calcified or partly calcified nature.)

Prices for fins dried for processing are, of course, much higher. A Norwegian fin processor reported that the April 1996 price for dried basking shark fins was about USD 130/kg (GBP 90/kg) (Fleming and Papageorgiou 1996). Some fins might be used nationally by oriental restaurants in the countries of origin, but it is thought that virtually all fins taken from basking sharks in European waters and other areas outside Southeast Asia are likely to enter the international trade; some may later be re-imported in processed form. Lum (1996) reports that basking shark fins imported from Norway are the most expensive available in Singapore, at SGD 400 (GBP 200 or >USD 300) per kilogram (dried), or SGD 88 (GBP 44) per bowl in restaurants.

Parry-Jones (1996b in Phipps 1996) quotes retail prices supplied by an experienced Hong Kong trader of USD 25/kg, USD 256/kg and USD 330/kg respectively for frozen, dried and processed sets of basking shark fins (a fin set usually comprises two pectoral, dorsal and lower caudal fins). Another trader quoted a price of USD 846/kg for a single (dried) fin weighing 7.3 kg (USD 6,176 for the whole fin), presumed to be from either a basking shark or whale shark. In June 1998, a single 1 m high shark fin, considered likely to be from a basking shark, was on sale in a restaurant just outside Chengdu, Sichuan, China, for 80,000 yuan (slightly less than USD 10,000) (Antony Whitten, pers. comm.). Prices of 138,000 yuan (USD 16,600) and over were reported in Beijing for similar fins in 1999 and 2000 (S. Fowler, pers. comm.). In Hong Kong, fins from basking sharks are known in trade as Na Wei Tian Jiu Chi (Norway Nine Heavens shark) and are, apparently, readily

recognisable by traders. Auction records from December 1999 and November 2000 list such fins with prices ranging from USD 51 to USD 114 per kg.

Cartilage: It is impossible to determine the volume of cartilage entering international trade. However, Fleming and Papageorgiou (1996) report that cartilage capsules manufactured and on sale in pharmacies, homeopathic shops and health practitioners in Belgium are labelled as '*ex Ceatarinus maximus pulvis*'. If this labelling is accurate, then the cartilage will certainly have been imported to Belgium; there is no basking shark fishery in the southern North Sea. This product is also exported from Belgium to France, Portugal, Germany and Switzerland.

Meat: Fleming and Papageorgiou (1996) reported that the market for basking shark meat exports (value USD 1/kg in 1996) from Norway to Eastern Europe was increasing, but most low-value meat is discarded.

3.3 Illegal trade

All known international trade in basking shark products is legal. Illegal trade will only be taking place if products are derived from areas where the species is protected and where it has been taken illegally (e.g. from areas listed in 4.1); there is no evidence of this based on the limited trade records for this species.

3.4 Actual or potential trade impacts

The high value of basking shark fins in international trade is reportedly the reason why the Northeast Atlantic fishery for this species is still viable, now that liver oil prices have fallen (see above). The lack of a significant domestic market in Norway or other European countries for unprocessed basking shark fin implies that international trade in this product is the main impetus for this targeted fishery.

The value of international trade is also likely having a significant impact on mortality from incidental fisheries. As reported by Lien and Fawcett (1986), the presence of a market for basking shark products, including fins for international trade, encouraged Newfoundland cod and salmon fishermen to continue to leave their nets in the water when basking sharks were present, risking collision, entanglement and damage to fishing gear. This is because the value of the shark products exceeded the cost of the damage caused to nets. In the absence of a market for basking shark products, nets will be removed from the water when these fish are known to be in the area. In effect, the international market for basking shark products had turned an incidental fishery into a targeted fishery. The high value of international trade in basking shark fins also encourages the finning of basking sharks caught incidentally in other fisheries, which might otherwise often be released alive. These considerations have led to the introduction of management measures under nature conservation or fisheries legislation in the United Kingdom, United States of America and New Zealand (see section 4), but recent increased landings in New Zealand (Annex 6) imply that increased fin values in international trade are encouraging utilisation of bycatch previously discarded.

3.5 Captive breeding for commercial purposes

None possible.

4. Conservation and Management

4.1 Legal status

4.1.1 National

United Kingdom: The intentional killing, capture or disturbance of basking sharks is prohibited in British waters (to 12 miles offshore) and they are protected from sale, offering

for sale, or possessing for the purpose of sale under a 1998 listing on the Wildlife and Countryside Act (1981), Schedule 5. In England & Wales, under the Countryside & Rights of Way Act (2000), the species is also protected against intentional and reckless disturbance.

Isle of Man: The basking shark is protected within a radius of twelve miles around the Isle of Man (a United Kingdom Crown Dependency). Despite protection here since 1990, numbers of basking sharks recorded around the Island in recent years have been falling (K Watterson in lit.).

Guernsey, Channel Islands: The basking shark is strictly protected under fisheries legislation around Guernsey (a United Kingdom Crown Dependency).

Malta: The basking shark was protected under domestic legislation in September 1999.

Florida state waters, United States of America: The basking shark (at the southern edge of its range in Florida), is fully protected in State waters (out to the three mile limit on the east coast, and nine miles on the Gulf coast).

Atlantic and Gulf federal waters (3-200 miles), United States of America: The basking shark is strictly protected under the US Fishery Management Plan. Directed commercial fishing and landing or sale (either by commercial or recreational fishermen) of the species is prohibited. This prohibition recognises the biological vulnerability (limited reproductive potential and slow surface movements) of the species and was enacted in order to prevent targeted fisheries from developing.

New Zealand: The basking shark is one of several fish species (including some teleosts) which have received partial protection through fisheries legislation (the Fisheries Act 1983). Commercial target fishing for the species has been banned since 1991, although they are allowed to be taken as by-catch and finning is not prohibited (see Annex 6).

4.1.2 International

Mediterranean

The basking shark is listed on Annex II to the Protocol 'Endangered or Threatened Species' of the Barcelona Convention for the Protection of the Mediterranean Sea (1976) Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (signed 10 June 1995). It will receive full protection in the Mediterranean once the Convention is ratified and appropriate legislation is in place (see Malta, above). The Mediterranean population was added to Appendix II (strictly protected species) of the Bern Convention on Conservation of European Wildlife and Natural Habitats in December 1997.

4.2 Species management

Consultations with International Fisheries Bodies suggest that no regional fisheries organisation is undertaking or proposing to undertake management of basking shark stocks.

4.2.1 Population monitoring

Limited monitoring of this species takes place, and none provides sufficiently good information to enable population trends to be determined with any reliability, although current United Kingdom research, including public sightings schemes and a government-funded research project may address this. Public sightings schemes only record sharks on the surface and are affected by weather conditions and observer effort. Variation between years in numbers recorded cannot, therefore, reliably be attributed to changes in population

size. Catches of basking sharks are recorded by some fisheries departments, including Norway (whose records by fin weight are hard to interpret) and New Zealand (incidental catches), but there is no monitoring underway to support sustainable fisheries management. Most countries reporting elasmobranch landings do not differentiate between species of shark (only providing figures for total tonnage landed); weights of products rather than numbers of fish are reported; and little or no effort data are available. Even where catches are reported accurately, there are no catch per unit effort data available to enable fisheries yields to be extrapolated to provide overall population trends. There is an urgent need for improved catch, utilisation and trade data to support sustainable management efforts for this species.

4.2.2 Habitat conservation

4.2.3 Management measures

European Quota

Following the establishment of 200 miles fishery limits around European Community countries (including the United Kingdom and Ireland) in the 1970s, an annual quota for the Norwegian catch of basking sharks in EC waters was agreed in 1978 (as part of a quota exchange for white fish in Norwegian waters). The quota was 800 tonnes liver weight in 1982, since reduced to 400 t liver weight (approximately 800-1000 fish) in 1985, then to 200 t, and 100 t (or about 200-300 sharks per year at an average weight of 0.4-0.5 t liver per shark) since 1994. No part of this quota had been taken for several years. The total allowable catch was reduced to zero (0) in 2001 (EC Regulation 2848/2000).

FAO International Plan of Action for the Conservation and Management of Sharks

Management and monitoring of species of sharks taken in bycatch and directed fisheries is required under the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks), adopted by the UN Food and Agriculture Organization (FAO) in 1999. The IPOA aims to ensure the conservation and management of sharks and their long-term sustainable use, requiring States that voluntarily adopt the Plan to identify and pay special attention, in particular, to vulnerable or threatened species, and facilitate the identification and reporting of species-specific biological and trade data. Progress with the implementation of the IPOA-Sharks has been very limited since its agreement (see Doc. 19.2 from the 18th Animals Committee), with no significant new shark management measures being delivered as a result. It seems most unlikely to deliver sustainable shark fisheries management or conservation in the foreseeable future. CITES continues to offer the only effective means of monitoring international trade data at species level. The Animals Committee concluded in April 2002 that the 12th Conference of Parties should discuss the potential role for CITES in assisting FAO Parties in the implementation of the IPOA-Sharks, especially in respect of international trade in sharks and their parts and derivatives.

4.3 Control measures

4.3.1 International trade
and
4.3.2 Domestic measures

The United Kingdom listed the basking shark on Appendix III of CITES in 2000 (with subsequent reservations entered by Japan and Norway). Trade is controlled within the European Union under the provisions of EC Regulations Nos. 338/97 and 1808/2001.

5. Information on Similar Species

The basking shark is the only species of the family Cetorhinidae. It has a very distinctive appearance, and unlikely to be confused with any other species (except possibly for large specimens of the great white shark (*Carcharodon carcharias*) if it is not clearly seen in areas where their range overlaps - e.g. in southern Australia). The fins of the adults are extremely large and, for this reason alone, are very unlikely to be confused with those of any other species when detached from the body. The whale shark also has very large fins, but the skin of the whale shark (*Rhincodon typus*) is spotted and the fins are concave and rounded at the tips, while the basking shark has triangular fins with pointed tips. A CITES identification manual sheet has been prepared to assist in the identification of basking shark fins in trade. This was distributed to the Parties in 2001 (Identification Sheet number A-500g.005.001.001). Meat, cartilage and oil are more difficult to distinguish, but now only enter international trade on rare occasions. The United Kingdom has funded the development of a DNA test to enable the critical identification and distinction of these products from those of other sharks. Results to date have identified two loci that amplify with good specificity from basking shark DNA but not from other sharks tested. This amplified DNA includes sufficient variation to discriminate basking sharks from other Lamniforme shark species, and is short enough to be amplified from very degraded material (Hoelzel, 2001). A full report on the method and results is available (http://www.ukcites.gov.uk/pdf_files/dnf.pdf). It is also possible to identify species origin of shark liver oil using oil profiling procedures - e.g. oil class, fatty acid, glyceryl ethers. A proportion of the oil hydrocarbon content in basking shark livers is derived from the zooplanktonic prey of this species and can therefore be readily distinguished from liver oil from other species (Blumer 1967, Blumer and Thomas 1965, Blumer *et al*. 1963).

6. Other Comments

6.1 Comments from other Parties.

A draft version of this proposal was distributed on 3 May 2002 to the large number of range states listed in Annex 2. Expressions of support were received from Australia, Monaco and the European Union and its Member States, the majority of which are range states. A number of other range states indicated during informal consultations that they were in favour of the proposal, but not all have responded in time to enable their comments to be included in this section. Norway said that they cannot support the proposal because it is more appropriate for the international fisheries organisations to deal with the conservation and management of marine fish species at the present time. They question whether the data in the proposal supports the case for the basking shark being "threatened with extinction or liable to become so due to trade". They also believe that it is incorrect to interpret a steady decline in the number of specimens caught as a decline in the population.

The world's marine fisheries bodies listed on the FAO website (www.fao.org/fi/boy/rfb/index.htm) were also consulted on 3 May 2002. They were asked to provide information on catch data, including by-catch, stock assessments, or any other management measurements for the basking shark. Of the six bodies which had responded by 30 May, most confirmed that they had no catch data nor management measures for basking sharks. Only the International Council for the Exploration of the Sea (ICES) was able to provide catch data (for the North Atlantic). These data have been incorporated in the proposal.

7. Additional Remarks

7.1 Assessment of the basking shark under the CITES biological criteria

This proposal for the listing of the basking shark on Appendix II of CITES is based on the following assessment of the species' biological status, using CITES Appendix II listing criterion B(i) (namely '*It is known, inferred or projected that the harvesting of specimens from the wild for international*

trade has, or may have, a detrimental impact on the species by: exceeding, over an extended period, the level that can be continued in perpetuity).

1. The species has been subjected to unsustainable fisheries in several parts of the world, including the Northeast Atlantic, Northeast Pacific, and Northwest Pacific (see summary in Annex 4). All these fisheries appear to have exceeded sustainable levels and most caused population collapse in 10-20 years (the generation period for this species is given as 22 years on www.fishbase.org).

2. At least some of the products of these fisheries have entered international trade.

3. In recent years Northeast Atlantic basking shark fisheries have largely been supported economically by the high value of shark fin in international trade.

Criterion A of Annex 2a is also met by this assessment, using Appendix I criteria C (i) & (ii), namely a '*decline in the number of individuals in the wild, which has been either: i) observed as ongoing or as having occurred in the past (but with a potential to resume); or ii) inferred or projected on the basis of any one of the following: ..... levels or patterns of exploitation'*. Indeed, most of the trends in directed fisheries catches summarised in Annex 4 have demonstrated declines of between 50 and 95%, often within the estimated generation period for this species.

7.2 Assessment of the basking shark under FAO's recommended criteria for CITES listing

The UN Food and Agriculture Organization (FAO), through a series of technical consultations, has carefully considered the application of the CITES listing criteria to commercially exploited aquatic species. FAO (2000) notes that large, long-lived, late-maturing species, with both high and low fecundity, but more so the latter, are at a relatively high risk of extinction from exploitation.

Productivity, as a surrogate for resilience to exploitation, was considered to be the single most important consideration when assessing population status and vulnerability to fisheries. The most vulnerable species are those with an intrinsic rate of population increase of < 0.14 and a generation time of > 10 years (FAO 2001). Life history data presented in section 2.4 indicate that the basking shark falls into FAO's lowest productivity category and, as such, could qualify for consideration for Appendix I listing if their population declined to 20% or less of the historic baseline (FAO, 2001). FAO (2001) further recommend that even if a species is no longer declining, if populations have been reduced to near (defined as from 5-10% above the Appendix I extent of decline) to the guideline above on extent of decline, they could be considered for Appendix II listing. As demonstrated above and in Annex 4, catch data clearly indicate that some basking shark fisheries have shown population declines (as expressed by numbers landed) of 87-95% within the generation period for this species, with some catches possibly reduced to 5% of historic baseline. These declines are considered to be an indicator of declining population size, as described in fisheries for other species of large shark with a high market value.

In summary, as well as meeting the criteria for listing in Resolution Conf. 9.24, the species meets the guidelines recommended by FAO for listing commercially exploited aquatic species.

8. References

See Annex 3.

Annexes (English only)

Annex 1 Scientific synonyms of *Cetorhinus maximus*.

Annex 2 Countries where *Cetorhinus maximus* has been recorded.

Annex 3 References

Annex 4 Trends in fisheries yields or sightings for the basking shark.

Annex 5 North East Atlantic basking shark landings data.

- **5a** Targeted Northeast Atlantic basking shark landings (numbers of sharks caught), 1946-1996.
- **5b** Norwegian basking shark landings, recorded by ICES Fishing Area from 1973.

Annex 6 Detailed review of additional fisheries for basking shark.

Annex 7 Executive summary.

Scientific synonyms of *Cetorhinus maximus*

Halsydrus pontoppidani (Neill, 1809);

Tetroras angiova Rafinesque, 1809;

Squalus gunnerianus Blainville, 1810;

Squalus homianus Blainville 1810;

Squalus pelegrinus Blainville, 1810;

Squalus peregrinus Blainville, 1811;

Squalus (Cetorhinus) gunneri Blainville, 1816;

Squalus (Cetorhinus) shavianus Blainville, 1816;

? *Scoliophis atlanticus* Anon., 1817;

Squalus isodus Macri, 1819;

Squalus rostratus Macri, 1819;

Squalus elephas LeSueur, 1822;

Squalus rashleighanus Couch, 1838;

Squalus rhinoceros Mitchell, *in* DeKey, 1842;

Squalus cetaceus Gronow, 1854;

Polyprosopus macer Couch, 1962;

Cetorhinus blainvillei Brito Capello, 1870;

Selachus pennantii Cornish, 1885;

Cetorhinus maccoyi Barrett, 1933;

Cetorhinus maximus forma infanuncula Deinse & Adriani, 1953;

Cetorhinus maximus normani Siccardi, 1960.

Countries where *Cetorhinus maximus* is found

Alaska (USA)
Albania
Algeria
Argentina
Australia
Belgium
Brazil
Canada
Cape Verde
Chile
China
Croatia
Cuba
Denmark
Ecuador
Faeroe Islands
Falkland Islands (UK)
France
Germany
Gibraltar (UK)
Greece
Greenland
Iceland
Ireland
Isle of Man (UK)
Italy
Japan
Korea D P Republic
Korea, Republic of
Libyan Arab Jamhiriya
Malta
Mexico
Monaco
Morocco
Namibia
Netherlands
New Zealand
Norway
Peru
Portugal
Russian Federation
Senegal
Slovenia
South Africa
Spain
Sweden
Taiwan
Tunisia
Turkey
United Kingdom
United States of America
Uruguay
Western Sahara
Yugoslavia

(source: www.fishbase.org FAO Catalogue of Sharks of the World; Checklist of fish and invertebrates listed in the CITES appendices and in EC Regulation 338/97, 5th edition. JNCC report No. 292).

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Trends in fisheries yields or sightings for the basking shark

Geographical area and description of records.	Time scale	Average catches or sightings per year	Overall (decline) or increase in catches	Average (decline) or increase per decade
Achill Island, Ireland. A targeted coastal basking shark fishery	1947-1975	360/year in 1947-1950, 1,475/year in 1951-1955, 489/year in 1956-1960, 107/year in 1961-1965, 64/year in 1966-1970, 50/year in 1971-1975. Rarely seen in 1990s	(>95% decline in 25 years)	1940s: increase as fishery develops (1950s: 65% decline) (1960s: 30% decline) (1970s: 20% decline and closure)
West coast of Scotland	1946-1953	121/year throughout fishery. 142/year in 1946-1949, 100/year in 1950-1953.	(~30% in 7 years, but trend unclear)	(~30%, but trend unclear)
Firth of Clyde, Scotland	1982-1994	58.6/yr in first 5 years, 4.8/yr in last 5 years.	(>90% in 12 years)	(~90%)
Norwegian catches	1946-1996	837/year in 1946-1950 554/year in 1951-1955, 1,541/year in 1956-1960, 1,792/year in 1961-1965, 3,213/year in 1966-1970, 2,236/year in 1971-1975. 1,706/year in 1976-1980 797/year in 1981-1985 343/year in 1986-1990 491/year in 1991-1995 132/year in 1996 – 2000	(90% decline from peak landings in late 1960s to levels in the early 1990s)	~200% increase, 1950s ~100% increase, 1960s (1970s: 47% decrease) (1980s: 80% decrease) (1990s: 60% overall)
Northeast Atlantic (all catches combined)	1946-1996	1,254/year in 1946-1950 2,094/year in 1951-1955, 2,030/year in 1956-1960, 1,899/year in 1961-1965, 3,277/year in 1966-1970, 2,385/year in 1971-1975. 1,706/year in 1976-1980 848/year in 1981-1985 355/year in 1986-1990 494/year in 1991-1995 132/year in 1996 – 2000	(>90% decline from the main period of peak landings in the late 1960s to landings in the 1990s). This followed 20 years of fluctuating but rising catches.	~40% increase, 1950s ~20% increase, 1960s (1970s: 40% decrease) (1980s: 65% decrease) (1990s: 80% overall)
Canadian Pacific	1956-1990s	50-60/year killed in 1950s <25/year sighted in 1990s	(50% decline)	Data unclear, but a few years of catches resulted in an approximately 50% decline in sightings over 40 years.
California	1946-1950s	300/yr in 1946 200/yr in late 1940s Fishery closed, early 1950s	(30% decline in first few years, then fishery closed)	Data unclear, but a few years of high catches was followed by closure of the fishery.

Japan	1967-1990s	127/yr average, 1967-1974 150 sharks in 1975 20 sharks in 1976 9 sharks in 1977 6 sharks in 1978 Fishery closed, early 1980s 0-2/year sighted in 1990s	(> 95% decline in 10 years)	Data summarised for first 8 years of the fishery, so early trends unclear, but decline rapid in the 2nd half of the fishery and has persisted to present.
China	1960-1990	No quantitative data. Reported to be common in the 1960s, occasionally caught in the 1970s, and rare in 1980s and 1990s.	(No quantitative data, but decline to very low levels reported.)	(No quantitative data, but significant decline indicated in the 1960s and 1970s.)
Isle of Man sightings	1985-1998	Data available suggest a decrease in sightings/effort.	(Average sightings declined by ~ 90%)	(Average sightings declined by ~ 90%)

North East Atlantic basking shark landings data

Targeted NE Atlantic basking shark landings (no. of sharks caught), 1946-1996

Year	Achill Island	Other Irish catches	Scotland	Norway*	Norway 5-yr mean	Total	Total 5-yr mean
1946	0		66	426		492	
1947	6		245	250		501	
1948	80		222	964	837	1,266	1,254
1949	450		35	782	913	1,267	1,673
1950	905		77	1,764	942	2,746	2,026
1951	1,630		147	806	868	2,583	2,128
1952	1,808		68	392	848	2,268	2,243
1953	1,068		110	596	554	1,774	2,094
1954	1,162		0	682	498	1,844	1,879
1955	1,708			294	472	2,002	1,570
1956	977			528	377	1,505	1,340
1957	468			258	747	726	1,533
1958	500			122	1,541	622	2,030
1959	280			2,532	1,844	2,812	2,189
1960	219			4,266	2,046	4,485	2,320
1961	258			2,042	2,463	2,300	2,653
1962	116			1,266	2,384	1,382	2,526
1963	75			2,210	1,792	2,285	1,899
1964	39			2,138	1,748	2,177	1,813
1965	47			1,304	2,331	1,351	2,380
1966	46			1,822	2,521	1,868	2,570
1967	41			4,180	2,719	4,221	2,784
1968	75			3,160	3,213	3,235	3,277
1969	113			3,130	3,190	3,243	3,250
1970	42			3,774	2,642	3,816	2,706
1971	29			1,708	2,446	1,737	2,512
1972	62			1,438	2,250	1,500	2,330
1973	85	0		2,214	2,229	2,299	2,378
1974	33	150		2,148	2,188	2,331	2,331
1975	38	350		3,670	2,217	4,058	2,348
1976	0	?		1,502	2,095	1,502	2,209
1977				1,586	2,119	1,586	2,197
1978				1,570	1,706	1,570	1,706
1979				2,268	1,561	2,268	1,561
1980				1,606	1,430	1,606	1,430

* Numbers of sharks caught by Norway are mainly calculated from landings data in metric tonnes, converted through an estimated mean weight of 5t per shark. This calculation may under-estimate numbers of sharks taken by up to 30%. From 1992 onwards Norwegian landings were recorded as weight of fins (kg) only, scaled up to total weight in ICES data. Estimates of numbers of sharks landed in 2001 are based on an estimated average weight of 55 kg of fins per individual shark. Data for 2001 are preliminary only.

1981	0	776	1,268	776	1,292
1982	1	930	995	931	1,038
1983	122	758	800	880	851
1984	92	888	744	980	802
1985	40	631	572	671	630
1986	38	493	429	531	466
1987	1	70	299	71	319
1988	15	46	250	61	262
1989	3	256	217	259	221
1990	2	387	349	389	355
1991	1	325	456	326	459
1992	9	732	476	741	480
1993	0	582	403	582	406
1994	9	352	417	361	420
1995	0	22	317	22	319
1996		396	206	396	208
1997		232	138	232	138
1998		27	146	27	146
1999		15	74	15	74
2000		59		59	
2001		36		36	

North East Atlantic basking shark landings data (cont.)

Norwegian basking shark landings[*3], recorded by ICES Fishing Area from 1973

	Area I Barents Sea	**Area IIa** N. Norway	**Area IVa** S. Norway/ Shetland	**Area Vb(1)** Faeroes	**Area VIa** W. Scotland	**Area VIIb-c** W. Ireland	Total
1973	20	1,850	150			160	2,180
1974		1,598		200		350	2,148
1975		2,776	444		450		3,670
1976	14	1,488					1,502
1977	5	1,581					1,586
1978		1,443		6		120	1,570
1979	1	2,206				60	2,268
1980		1,570		36			1,606
1981		764		12			776
1982		849				80	930
1983		416	316			26	758
1984	1	375	512				888
1985	1	630					631
1986		493					493
1987		70					70
1988		3	43				46
1989			256				256
1990		337	50				387
1991		230	95				325
1992		695					731
1993		582					582
1994		301	51				352
1995		21	1				22
1996		396					396
1997		211	21				232
1998		27					27
1999		15					15
2000		59					59

Source: ICES, Denmark (May 23rd 2002).

[*] Numbers are derived by converting published landings (tonnes) to number of 5t fish. This may result in an under-estimate of the numbers of sharks taken by up to 30%.

Detailed review of additional fisheries for basking shark

California, USA

Basking sharks were only taken occasionally during the winter in Californian waters before a directed fishery commenced. Harpooning was initially only for sport, with carcasses incidentally being processed for oil and fish meal. However, the value of these products increased until the fishery became profitable and was operated from two centres: Monterey Bay and the San Luis Obispo Bay to Morro Bay area, 100 miles to the south. These two small areas are the two most important locations for winter concentrations of basking sharks along the central and northwestern southern Californian coast (Squire 1990). An average of 25 sharks *per annum* was landed during each season (September to May) from 1924 and 1938, with a maximum of about 100 in a single year. The fishery was inactive for several years then was revived in autumn 1946 to develop new uses for the valuable liver oil. It was also intended to process the carcasses for their very thick leather and for animal feed meal, and dry the fins for export to China. Three hundred basking sharks were taken in the first season, with 12 vessels operating in Monterey Bay and about six in the San Luis Obispo Bay area. Some vessels were directed to basking sharks on or near the surface by a spotter plane (Phillips 1947). This fishery continued until the early 1950s with about 200 sharks taken annually (Roedel and Ripley 1950, Annex 3). Squire (1967) reports that the fishery was suspended in California in 1950, because of the low prices paid for the oil and the low availability of basking sharks. Lea (pers. comm.) reports that basking shark sightings off central California over the past 20 years are not as numerous in the past. It has been suggested that the early 1940s and 1950s fisheries reduced the populations substantially, and that the species has never fully recovered.

Canadian Pacific

Basking sharks are common in the traditional knowledge of the Hesquiat and Ahousat people along the central west coast of Vancouver Island. In the 1940s, salmon fishermen complained about the problems with these fish being caught in their nets in Barkley Sound, Vancouver Island. The Department of Fisheries and Oceans therefore ran a shark eradication programme in the 1950s. A large blade was placed on the bow of Fisheries vessels and the sharks were rammed and killed. Information on the numbers of fish killed in this manner varies. Newspaper articles report a maximum of 31 being killed in one day and 50 in the first month of operation in 1956, and a total of 59 sharks killed in 1955 and 51-56 in 1956. Clemens and Wilby (1961) state that 'several hundred' were killed in Barkley Sound up to 1959. Presumably the programme ceased when numbers had been depleted to the extent where basking sharks were no longer posing a significant problem to the salmon fishermen. Darling and Keogh (1994) state 'Basking sharks are rarely sighted in Barkley Sound today, suggesting that the majority of the population in that area were killed.' It seems that a single vessel managed to deplete significantly the Barkley Sound stock of basking sharks over a period of just a few years. This occurred between 35 and 40 years ago, but the population has not recovered (Annex 3).

China

Parry-Jones (1996a in Phipps 1996) reports that basking sharks used to be landed by a harpoon fishery in Fujian Province and Guangxi Zhuang Autonomous Region up to the 1970s. The species was commonly caught in the 1960s, but is seldom landed now. The report concludes that catches and landings of this species had decreased over the last 40 years, and recommended prohibition of catches of this species (and whale sharks *Rhincodon typus*) in near-shore waters as a precautionary measure until their status is ascertained.

Scotland

Fairfax (1998) summarises the limited information available on the earlier 18th and 19th century fisheries in Scotland. These appear, like the Irish fishery, to have ceased by the mid 1830s, with large numbers of

sharks not being reported again until the 1930s. Fairfax (1998) and Kunzlik (1984) present data on landings from the 20th century Scottish basking shark fisheries, which concentrated on the Firth of Clyde and West coast (see Annex I). Several such fisheries started up in the 1940s, some targeted full time at the basking shark during the summer season, while others were more opportunistic. Regardless, all appear to have ceased after only a few years of good catches (Figure 3, Annex 3 & 4a). It is unclear whether this fishery was short-lived because of stock depletion (by the Scottish fishermen themselves, or Norwegian shark catchers operating close to the west coast of Scotland), or because of falling oil prices in the 1950s.

Oil prices rose again in the mid 1970s, Norwegian catchers took several hundred sharks in 1975, some Clyde basking shark by-catch was processed in the late 1970s, and a small target harpoon fishery started again in the Clyde in 1982. Initial yields from this fishery were good, but these were extremely short-lived and the fishery ceased at the end of 1994 after several poor years of catches (Fairfax 1998, Annex 4a).

New Zealand

Between 1986 and 1999 about 203 basking sharks were reported caught by observers on commercial trawlers off the coast of New Zealand. Catches were obtained in midwater and on or near the seabed, and multiple catches were common, including 14 in one tow (Francis and Duffy 2002). These authors also reported that, in the 1980s, Japanese bottom trawlers frequently caught and sometimes targeted basking sharks on the seabed. Catch data are also available from returns made by fishermen (provided by S Black, Ministry of Fisheries, NZ) and Licensed Fish Receivers (fish wholesalers, provided by M Francis, National Institute of Water and Atmospheric Research, NZ). The latter do not include discards and the former may only report processed weights (e.g. fins), not whole weights, resulting in obvious discrepancies. Both sets of data (see below) indicate a marked increase in landings in recent years, most likely due to an increased awareness of the value of fins for export to international markets (Malcolm Francis, NIWA, pers. comm.).

Fishing Year (Oct-Sept)	Greenweight reported by fishers (t)	Licensed Fish Receiver records (t)
1988/89	N/a	10.00
1989/90	N/a	3.81
1990/91	90.67	1.05
1991/92	21.22	0.00
1992/93	0.02	0.80
1993/94	42.67	32.93
1994/95	22.65	90.92
1995/96	20.09	11.50
1996/97	21.94	20.60
1997/98	72.82	49.33
1998/99	64.44	33.36
1999/00	172.80	142.80
2000/01	228.18	121.97

Incidental fisheries

There are reports of finned basking sharks being washed up dead in areas where no directed fisheries are known to exist (e.g. Monterey Bay, van Sommeran pers. comm.). Berrow (1994) extrapolated from very limited observer data to suggest that 77-120 sharks may be taken annually in the bottom set gill net fishery in the Celtic Sea (south of Ireland), though the reliability of this estimate has been questioned (P. Kunzlik in litt.). Berrow and Heardman (1994) received 28 records from fishermen of sharks entangled in fishing gear

(mostly surface gill-nets) around the Irish coast during 1993, representing nearly 20% of all records of the species that year. At least 22% of basking shark by-catch in fishing nets died. By-catch in Isle of Man herring fishery has amounted to 10-15 sharks annually, and a further by-catch source here is entanglement in pot fishermens' ropes, amounting to some 4-5 fish annually (Watterson in litt.). Lien and Fawcett (1986) record that at least 410 basking sharks were caught between 1980 and 1983 in salmon gill nets and cod-traps in the coastal waters of Newfoundland. Some basking sharks were also taken in deepwater trawls nearby during the winter months. Fairfax (1998) also reports that basking sharks are sometimes brought up from deep water trawls near the Scottish coast during winter. In contrast to these relatively large coastal by-catches, extrapolation of observer data from oceanic gill net fleets suggests that only about 50 basking sharks were among the several million sharks taken annually offshore in the Pacific Ocean (Bonfil 1994).

Executive summary

- An Appendix II listing is proposed for the basking shark (*Cetorhinus maximus)*; the species meets the criteria in Resolution Conf. 9.24, as outlined below and meets the guidelines suggested by FAO for the listing of commercially exploited aquatic species. Such a listing would help ensure that exploitation of this globally threatened species is regulated and monitored and that international trade is not detrimental to the survival of the species. The species is only protected within a limited part of its range and evidence suggests that fisheries are not being effectively managed by national or regional Fishery Management Organisations. Listing on Appendix II would also contribute to the implementation of the FAO International Plan of Action for the Conservation and Management of Sharks.

- *C. maximus* is widely distributed in coastal waters and on continental shelves of temperate zones in the northern and southern hemispheres. The species is planktivorous, bears a small number of live young (ovoviviparous) and is the second largest fish in the world (up to 10m in length and 47t in weight), exceeded only by the whale shark *Rhincodon typus*.

- *C. maximus* is considered to be **Vulnerable** in the 2000 IUCN Red List based on past records of declining catch rates, attributed to over-exploitation by fisheries, slow recovery rates and the potential for similar declines to occur in future due to targeted and by-catch fisheries.

- The biology of the species makes it especially vulnerable to exploitation: it has a slow growth rate, a long time to sexual maturity (c. 12-20 years), a long gestation period (1-3 years) and possibly a similar interval between pregnancies, low fecundity, and probable small populations. Estimates of natural mortality (M) and productivity (r) are very low.

- Catches in well-documented fisheries for *C. maximus* (especially from the NE Atlantic) have declined by 50-90% over short periods (typically a few decades or less). These declines have persisted into the long-term with no apparent recovery several decades after exploitation has ceased. Other data, based on sightings and less well-recorded fisheries, suggest similar declines.

- Demand for the fins of *C. maximus* has increased. Fins are known to enter international trade, particularly from the NE Atlantic to eastern Asia, where they command a high value, either fresh or dried, as a food item. This demand currently maintains the viability of targeted fisheries for this species and encourages incidental take in non-target fisheries. A single *C. maximus* can yield over 90kg of fins and reported prices range from USD 100-300/kg (dried) and USD 26/kg (fresh). Unprocessed or partly processed fins are identifiable in trade; a CITES identification sheet has been distributed to the Parties. There is only limited demand for the flesh and cartilage of this shark. A DNA test is available to identify parts and derivatives in trade.

- This species meets the criteria listed in Conference Resolution Conf. 9.24, Annex 2a, Bi, namely that '*it is known, inferred and projected that harvesting of specimens from the wild for international trade has, or may have, a detrimental impact on the species by exceeding, over an extended period, the level that can be continued in perpetuity*'. The species also meets criterion in Annex 1, Ci & ii, namely that '*a decline has been either observed as ongoing or as having occurred in the past, and is inferred and projected on the basis of levels or patterns of exploitation*'. FAO's recommended quantitative guidelines for considering listing commercially exploited marine species on CITES are also satisfied for this species (in view of its low productivity and declining population status).