

Nomination

Cetorhinus maximus, Basking Shark

There are morphological differences between some populations of basking sharks and it has been suggested that there may be several species, including two in the North Atlantic (Siccardi, 1960, 1971). Others consider there to be insufficient evidence to separate these species at the present time and genetic research is underway that may help to clarify the situation (eg. Hoelzel, 2001).

Geographical extent

OSPAR Region; All

Biogeographic zones: 1,2,5,6,10

Region & Biogeographic zones specified for decline and/or threat: as above

C. maximus occurs in temperate waters of the north and south Pacific and Atlantic, the Indian Ocean and the Mediterranean. In the OSPAR Maritime Area it is probably least often reported from the North Sea. It is a migratory species, moving into coastal waters where it is known to congregate in a few favoured areas at certain times of the year (e.g. Compagno, 1984). In UK waters and the Irish Sea, hotspots have been identified off the coast of Cornwall and Devon, the Isle of Man and the Isle of Arran (MCS, *in press*). Satellite tagging work has shown that the sharks remain in continental shelf edges during winter spending more of their time at greater depths than near the surface (Sims *et al.*, *in prep*).

Application of the Texel-Faial criteria

C. maximus was nominated for inclusion by several Contracting Parties and Observers. The criteria common to all nominations were decline and sensitivity with information also provided on threat.

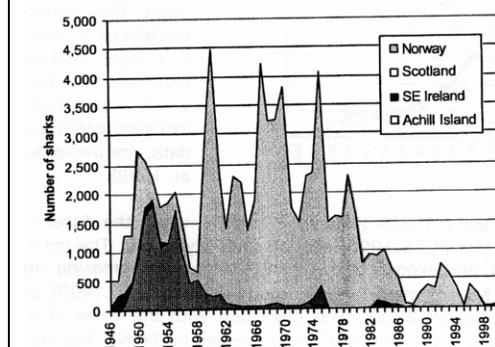
Decline

There are no firm estimates for the total global population or regional populations of basking shark. Where observations have been made, the total annual number of records is usually in tens, hundreds or, at most, low thousands, including repeat sightings. The total number removed from the whole of the NE Atlantic during the past 50 years is probably between 80-106,000 animals (Sims & Reid, 2002).

Most basking shark fisheries appear to have collapsed after initial high yields, and this species is considered by Compagno (1984) to be extremely vulnerable to over-fishing - perhaps more so than most other sharks.

There are some well-documented declines in catches by basking shark fisheries, usually over a very short period. These have resulted in long-term (lasting several decades) reductions in local populations. In the NE Atlantic, for example, catches between 1946-1990s declined by 90% from peak catches in the 1960s (Figure A).

FIGURE A. Targeted Northeast Atlantic basking shark catches (1946-2000) (Anon, 2002)



There remains a debate on whether the decline in catches also reflects a decline in the population (see section on threat linked to human activities).

Sensitivity

The basking shark is a very large, long-lived species with a reproductive capacity that is considered to be relatively low even for an elasmobranch.

Compagno (1984) considers it to be extremely vulnerable to overfishing and ascribes this to a slow growth rate, lengthy maturation time, long gestation period, probably low fecundity and probable small size of existing populations.

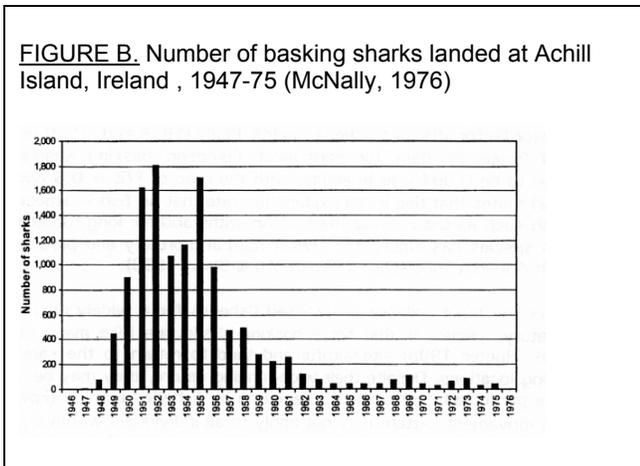
The fact that large numbers are found concentrated in a few favoured coastal areas also makes them particularly vulnerable to exploitation by fisheries (Camhi *et al.*, 1998). There is a possibility that there are local stocks (Fowler, 1996 & *in press*), if that is the case, they would particularly vulnerable to depletion by fisheries activity.

Threat

The basking shark is targeted by fishing operations in several parts of its range including a small number in ICES area IIa in the OSPAR Maritime Area. This was originally driven by demand for the high-grade oil in the liver of the shark, but today it is

the market for fins that are the most valuable (Fowler, *in press*).

Fisheries statistics reveal a boom and bust fishery for this species (McNally, 1976) (Figure B).



Incidental catches of basking shark have also been recorded. These are most common in coastal waters and mainly recorded in set nets and trawls (e.g. Berrow, 1994; Fairfax 1998). Take from incidental catch may be significant and either contribute to declines from targeted catch or prevent the recovery of over-fished populations. They do however appear to be resilient to being released, apparently unharmed although subsequent survival rates are not known. Because basking sharks congregate in bays and shallow water they are also at risk from collisions with vessels and may be harassed by shark watchers (Fowler, *in press*).

Relevant additional considerations

Sufficiency of data

Most of the historic data on basking sharks comes from fisheries landing records. Observation schemes are a more recent source of information although it is difficult to determine population size from these data as the animals are widely distributed and therefore infrequently recorded except in a few favoured coastal areas, where they are usually seen in relatively large numbers for only part of the year. Tagging studies are providing further fisheries-independent data on basking shark behaviour and distribution.

Changes in relation to natural variability

Cyclical variations in patterns of sighting or catches of this species have been reported. These may be linked to alterations in ocean currents, water temperature and zooplankton aggregations. This

may have affected patterns of basking shark catches, but it is proposed that these have been superimposed upon a general downward trend caused by fishing (Anon, 2002).

Expert judgement

Calculations of natural mortality and fishery mortality derived from north-west European landings (Pauly, 1978 & 2000) 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. This species has among the lowest natural mortality and productivity yet calculated for a commercially fished marine species (Smith *et al.*, 1998).

Where similar patterns of exploitation and declining catches are recorded during fisheries for other large sharks, 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).

ICES evaluation

The ICES review of this nomination by the Study Group on Elasmobranch Fishes (SGEF) raised the question of whether there were sufficient fishery-independent data sets providing evidence of a decline in basking shark numbers over the OSPAR area and pointed to the fact that observed declines in basking shark fisheries could be due to other factors such as local depletion of the fishable population, a change in basking shark distribution or economic factors. This is discussed further in the section linking threats to human activities.

SGEF report that there are no targeted fisheries for basking sharks in the OSPAR region at the present time. Latest figures from ICES, which were made available in 2002 and cover landings up to the year 2000, show a small number of basking sharks continue to be landed in Area IIa (Anon, 2002).

In relation to the sensitivity of basking sharks, SGEF noted that biological data area limited, although all lamniform sharks have a very low fecundity and late age at maturity, and they are likely to be sensitive to additional mortality.

Threat and link to human activities

Cross-reference to checklist of human activities in OSPAR MPA Guidelines

Relevant human activity: Fishing, hunting, harvesting; shipping & navigation. *Category of effect*

of human activity: Biological – removal of target species, removal of non-target species, physical damage to species.

The decline in catches of many of the basking shark fisheries, including the NE Atlantic fishery is believed to be an indication of a decline in the population and therefore a threat that is linked to human activity.

Although no catch per unit effort data are available, the declining catches in the NE Atlantic from 1970-1980 are believed to represent falling yields from declining stocks rather than declining fishing effort (Anon, 2002). This is because declining catches coincided with a period of peak demand along with high value for basking shark oil, encouraging the establishment of new fisheries in southern Ireland and the Firth of Clyde.

In the early 1990s, landings increased slightly, coinciding with the onset of a North Sea regime shift, and increased abundance and landings of other species in the NE Atlantic. Despite the combination of high values and demand in international markets, an increase in the number of vessels fishing for basking sharks, and an apparent increased availability of sharks (ICES, 1995), the highest catches in the early 1990's still represented only 10-20% of peak catches in the 1960s and increased landings were short-lived.

This pattern of steeply declining catches is familiar in other fisheries for large sharks where there are better records including catch per unit effort, and has been shown to reflect a decline in the population (Camhi *et al.*, 1998).

Management considerations

The basking shark is already protected in some parts of the OSPAR Maritime Area e.g. UK waters and around the Isle of Man. An annual quota for Norwegian catch of basking shark in EC waters has existed since 1978 however no part of this quota has been taken for several years and the Total Allowable Catch was reduced to zero in 2001. Outside EC waters, there are some landings of basking sharks in ICES area IIa.

Useful management measures to consider within the OSPAR Maritime Area should focus on the remaining fishery, preventing incidental capture (including subsequent removal of fins), collisions, and harassment of sharks. This could include seasonal gear restrictions, prohibition in trade of shark products, such as fins, even if the capture of animals is not deliberate, recommended routing

measures and Codes of Conduct in areas known to be favoured by the sharks. The issue of whether any basking shark fishery should continue in the OSPAR area is primarily a consideration for fisheries organisations rather than OSPAR, although OSPAR can communicate an opinion on this to the relevant bodies. As basking sharks are highly migratory it is also important that OSPAR supports conservation measures for this species when it occurs outside the Maritime Area.

IUCN assess the global status of the basking shark as Vulnerable in the 2000 IUCN Red List.

Further information

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