

7 Basking Shark in the Northeast Atlantic (ICES areas 1–14)

7.1 Stock distribution

In the Northeast Atlantic, the basking shark *Cetorhinus maximus* is present from Iceland, and the White Sea (southern Barents Sea) southwards to the Mediterranean Sea and north-west Africa (Compagno, 1984; Konstantinov and Nizovtsev, 1980). WGEF considers that the basking shark in the ICES area exists as a single stock and management unit. However, the WGEF is aware of recent tagging studies showing both transatlantic and transequatorial migrations, as well as migrations into tropical areas and mesopelagic depths (Braun *et al.*, 2018; Gore *et al.*, 2008; Skomal *et al.*, 2009).

Marked interannual and intra-annual variability of basking shark sightings have been reported, with significant correlation between the duration of the sightings season in each year and environmental/climatic factors like the North Atlantic Oscillation (Couto *et al.*, 2017; Witt *et al.*, 2012). A genetic study by Hoelzel *et al.* (2006) indicates no differentiation between ocean basins, whereas Noble *et al.* (2006) suggested little gene flow between the northern and southern hemisphere. A rough estimate of the population size was given by Hoelzel *et al.* (2006). A recent study west of the UK, using photo identification (Gore *et al.*, 2017), showed very few re-sightings after one year (0.5%), and satellite tracking showed that basking shark show behavioural plasticity and that most individuals use only a small fraction of the time feeding in the surface (Gore *et al.*, 2017; Doherty *et al.*, 2017). These results point to a relatively large stock, and/or that the stock size may not be adequately traced by surface sightings.

7.2 The fishery

7.2.1 History of the fishery

The fishery for basking shark goes back as far as the middle or end of the 1700s, in Norwegian, Irish and Scottish waters (Strøm, 1762; Moltu, 1932; Parker and Stott, 1965; Myklevoll, 1968; McNally, 1976; Fairfax, 1998; See also the Stock Annex). Up to 1000 individuals may have been taken in Irish waters each year at the height of the fishery. Such intensive fisheries stopped during the mid-1800s when the species became very scarce.

The Norwegian fleet resumed the fishery in 1920. The landings increased during the 1930s as the fishery gradually expanded to offshore waters across the North Sea and south and west of Ireland, Iceland and Faroes. During 1959–1980, landings ranged between 1266 and 4266 individuals per year, but subsequently declined (Kunzlik, 1988). The geographical and temporal distribution of the Norwegian domestic basking shark fishery changed markedly from year to year, possibly as a consequence of the unpredictable nature of the shark's inshore migration (Stott, 1982).

In Irish waters, the basking shark fishery started again in 1947. Between 1000 and 1800 individuals were taken each year from 1951 to 1955 (an average of 1475 per year), but there was a decline in recorded landings from 1956. Average annual landings were 489 individuals from 1956–1960, 107 individuals from 1961–1965, then about 50–60 individuals per year for the remaining years of the fishery (Parker and Stott, 1965; McNally, 1976).

The Scottish fishery started in the 1940s. In all, around 970 sharks were taken between 1946 and 1953 (during a period when Norwegian vessels were also catching basking sharks in these waters).

From 1977–2007, an estimated total of 12 347 basking sharks were landed by Norway and Scotland, and of these Norway landed 12 014 individuals with an annual maximum of 1748 individuals landed in 1979.

There is no longer any directed fishery for basking shark within the ICES area. Since 2007, the species has been listed as a prohibited species on EU fisheries regulations and EU vessels should release/discard any individuals caught. Norwegian vessels may land dead specimens but should release live specimens. Since 2013, reported landings have been <500 kg.

7.2.2 The fishery in 2017

No new information.

7.2.3 ICES advice applicable

ICES advice has been for a zero TAC since 2006. In 2012, ICES advised on the basis of the precautionary approach that there should be no landings of basking shark and that it should remain on the Prohibited Species List. In 2015, ICES advised that *“when the precautionary approach is applied for basking shark in the Northeast Atlantic, no targeted fisheries should be permitted and bycatch should be minimized. This advice is valid for 2016 to 2019”*.

7.2.4 Management applicable

Article 13 of Council Regulation (EU) 2016/72 prohibits Union fishing vessels from fishing for, retaining on board, transhipping or landing basking shark in all waters. Article 46 of Council Regulation (EU) 2016/72 prohibits third-country vessels fishing for, retaining on board, transhipping or landing basking shark from EU waters.

Based on ICES advice, Norway banned all directed fisheries and landing of basking shark in 2006 in the Norwegian Economical Zone and in ICES subareas 1–14. The ban has continued since. During this period, live specimens caught as bycatch had to be released immediately, although dead or dying specimens could be landed. Since 2012, bycatch that is not landed should also be reported, and landings of basking sharks are not remunerated. Bycatch should be reported both in number of individuals and weight (since 2009).

Basking shark has been protected from killing, taking, disturbance, possession and sale in UK territorial (twelve nautical miles) waters since 1998. They are also protected in two UK Crown Dependencies: Isle of Man and Guernsey (Anon., 2002).

Sweden has forbidden fishing for or landing basking shark since 2004.

7.3 Catch data

7.3.1 Landings

Landings data within ICES subareas 1–14 from 1977–2014 are presented in Table 7.1, and Figure 7.1–7.2, since 2014: <0.1 t landed. Landings of basking shark peaked in 1979 at a total of 5266 t, and declined rapidly towards 1988. Another peak in landings (1697 t) occurred in 1992. After the ban on directed fisheries in 2006–2007, annual landings declined to <30 t and are currently <1 t.

Reported landings data come from UK (Guernsey) in 1984 and 2009, Portugal (1991–2007, 2010–2013, 2016), France (1990–2010 and 2014) and Norway (1977–2008, 2011–2012). Most landings are from Subarea 2 and are taken by Norway. For Portugal and

France, the reported landings were between 0.1 and 1.5 t. Landings for France in 2005 were higher, with 3.5 t.

Landings in numbers from Scotland and Norway (1977–2014) are presented in Figure 7.3. The trends are very similar to those of landings in biomass, with a first maximum of 1748 individuals in 1979, a second maximum of 573 individuals in 1992, and less than ten individuals after 2006.

The conversion factors used for Norwegian landings (liver and fin weight to live weight) were revised during WGEF 2008. Data from the Norwegian Directorate of Fisheries revealed that the nominal value of fins increased dramatically from 1979 to 1992, was variable during 1993–2005, and decreased after 2005. Table 7.2 shows old and revised numbers.

Table 7.3 shows the proportions (%) of landed basking sharks caught by various gears as reported to the Norwegian Directorate of Fisheries (1990–2011). During most of the 1990s, harpoon was the main gear, but remained at a relatively low level from 2000, except for 2005 which was the last year with a directed fishery. After the ban on directed fisheries in 2006, bycatch has been taken primarily in gillnets.

Further information on Norwegian landings of liver and fins, and corresponding official and revised landings in live weight and numbers are given in the Stock Annex.

7.3.2 Discards

Limited quantitative information exists on basking shark discarded bycatch. However, anecdotal information indicates that this species is an incidental bycatch in gillnet and trawl fisheries and may be entangled in potting ropes. Most bycatch events occur in the summer as the species moves inshore. Total bycatch has not been estimated.

Normal discard observer programmes, such as DCMAP may not record bycatch of large animals such as basking sharks, if they fall or are removed from gear before the catch is brought on board the vessel. Fisheries observer programmes are not designed to account for rare species. (ICES, 2018).

Berrow and Heardman (1994) estimated 77–120 sharks were caught annually in the gillnet fishery in the Celtic Sea. These authors received 28 reports of specimens being entangled in fishing gear around the Irish coast in 1993. In the Isle of Man, bycatch in herring and pot fishery (entanglement in ropes) is estimated at 14–20 sharks annually. Bonfil (1994) estimated that 50 specimens were taken annually by the oceanic gillnet fleet in the Pacific Ocean. Fairfax (1998) reported that basking sharks are sometimes brought up from deep-water trawls near the Scottish coast during winter, and Valeiras *et al.* (2001) reported that of twelve basking sharks being incidentally caught in fixed entanglement nets in Spanish waters between 1988 and 1998, three sharks were sold at landing markets, three live sharks were released, and three dead sharks were discarded at sea. More detailed information can be found in the Stock Annex.

The French NGO APECS reported on 15 accidental catches from the Irish Sea, Atlantic Ocean and Mediterranean Sea (Jung *et al.*, 2012). More detailed information (catch location, gear, and biological data) are given in Table 7.4. This table also includes data on eleven bycatch events from the Norwegian coast, published in the Norwegian media (prior to 2013).

Accidental bycatch of three basking shark were reported from The Smalls, Ireland (Division 7.g) in 2005. These sharks were released alive (Johnston, pers. comm. 2015). There are no other records of basking sharks in the Irish discard observer programme.

In 2009, observers from French national observer programmes reported three accidentally caught, but released, basking sharks (*ca.* 4 m long). Two basking shark were recorded in Division 6.a and one in Division 4.a. One individual (*ca.* 8 m long) was recorded in 2010 from Division 6.a.

In April 2014, two basking sharks were stranded on south Brittany beaches: one male (5 m L_T , 650 kg) and one female (4 m L_T , 250 kg estimated). The female had a third of its dorsal body lacerated with a propeller.

Five basking sharks were caught and discarded by the Norwegian Coastal Reference Fleet in 2007–2009 (Vollen, 2010 WD). All specimens were caught in gillnets by vessels <15 m in ICES Subarea 2.

The requirement for EU fleets to discard all basking sharks accidentally caught results in a lack of information on these catches. Similarly for Norway, although reporting of released basking sharks is mandatory, there is currently no operative mechanism to facilitate such reporting. A protocol for the standardised recording of bycatch and biological information from bycatch would benefit any future assessments of the stock.

7.3.3 Quality of the catch data

The official Norwegian conversion factor used to convert from liver weight and fin weight to live fish was revised in 2008 (Table 7.2). The official Norwegian landing statistics were unchanged from 1977 to 1999, but from 2000–2008 the revised landings figures are applied. Further information on the revision of the conversion factor is included in the Stock Annex.

7.3.4 Discard survival

Limited information available, and national observer programmes could usefully collect data on fate (released alive/released dead) of basking shark specimens caught.

7.4 Commercial catch composition

There is some information on minimum, maximum and median weight of livers and fins, and corresponding live weights of individual basking sharks landed in Norway during 1992–1997. This information is included in the Stock Annex.

7.5 Commercial catch-effort data

There are no effort or CPUE data available for recent years. Historical CPUE data from the Norwegian fishery (1965–1985) are given in the Stock Annex.

7.6 Fishery-independent surveys

Several countries, e.g. Norway, Denmark, Ireland, conduct scientific whale-counting surveys. Observations of basking sharks are normally recorded in these surveys.

The Norwegian whale-counting survey observed a total of 87 basking shark in the Norwegian Sea during the period 1995–2014. Sightings seem to be heavily dependent on weather conditions, and 82 of the 87 sightings were made within nine short time periods (hours or 1–2 d). No apparent trends could therefore be identified. A number of Norwegian commercial vessels regularly report observations of whales, and a request to report basking shark sightings might yield useful effort-related data. The Norwegian Shark Alliance (HAI Norge) have collected online public sightings of basking sharks since 2011.

A national sightings program also exists along French coastlines, including all scientific survey reports (managed by APECS). Between 40 and 270 sightings are recorded each year, mostly reported by sailors and fishers. Sightings occur mainly from April to June, and the major area is the southern and western coasts of Brittany. Early sightings are reported off the island of Corsica in February–March; in 2011 one basking shark was reported in Saint Pierre et Miquelon.

There are sightings programmes in the UK (Marine Conservation Society, 2003; Southall *et al.*, 2005), and in Ireland through the Irish Basking Shark Study Group and the Irish Whale and Dolphin Group.

In Scotland, Whale and Dolphin Trust for Hebrides and North West Scotland, runs a sighting programme; Sea Watch Foundation is doing so for the Northern islands and north-east Scotland coasts. Basking Shark Scotland collates public sightings data.

7.7 Life-history information

A summary of the knowledge of basking shark habitat, reproduction, growth and maturity, food and feeding, and behaviour can be found in the Stock Annex.

Habitat

In a study from 2008, the Irish Basking Shark Study Group tagged two basking sharks with archival satellite tags (Berrow and Johnston, 2010 WD). Both sharks remained on the continental shelf for most of the tagging period; ‘Shark A’ spent most time in the Irish and Celtic Seas with evidence of a southerly movement in winter to the west coast of France, whilst the movements of ‘Shark B’ were more constrained, remaining off the southwest coast for the whole period with locations off-the-shelf edge and in the Porcupine Bight (Figure 7.4). The greatest depths recorded were 144 m and 136 m, respectively, demonstrating that although ‘Shark B’ was located over deep water off-the-shelf edge, it was not diving to large depths. The sharks were within 8 m of the surface for 10% and 6% of the time. The study demonstrated that basking sharks were present and active in Irish waters throughout the winter period.

Skomal *et al.* (2009) shed further light on apparent winter ‘disappearance’ of basking shark. Through satellite archival tags and a novel geolocation technique they demonstrated that sharks tagged in temperate feeding areas off the coast of southern New England moved to the Bahamas, the Caribbean Sea, and onward to the coast of South America and into the southern hemisphere. When in these areas, basking sharks descended to mesopelagic depths (200–1000 m) and in some cases remained there for weeks to months at a time. The authors concluded that basking sharks in the western Atlantic Ocean, which is characterized by dramatic seasonal fluctuations in oceanographic conditions, migrate well beyond their established range into tropical mesopelagic waters. In the eastern Atlantic Ocean, however, only occasional dives to mesopelagic depths have been reported in equivalent tagging studies (Sims *et al.*, 2005). It is hypothesized that in this area, the relatively stable environmental conditions mediated by the Gulf Stream may limit the extent to which basking sharks need to move during winter to find sufficient food.

The NGO APECS and the Manx Basking Shark Watch tagged ten basking sharks in 2009 (Stéphan *et al.*, 2011). The sharks were tagged with pop-up archival tags (MK10PAT, Wildlife Computers). Eight tags were deployed around the Isle of Man in the Irish Sea and two in the Iroise Sea (West Brittany, France). All the sharks tagged in the Irish Sea moved south, within the Irish Sea or Celtic Sea, and one to the southern Bay of Biscay (Figure 7.5). One of the tags set in the Irish Sea in 2009 popped off after

five days but the second after 38 days. During this short period, the shark moved quickly northwards past the west coast of Ireland to western Scotland. This study confirmed that at least some sharks are present in coastal waters during the cold season (October to March). They are then found in deeper waters, while continuing to perform daily vertical migrations. However, one particularly significant sector of winter distribution does emerge: the northwestern part of the Celtic Sea where basking sharks are especially distributed at depths of 50–100 m during the cold season (Figure 7.5). The track of one shark tagged in Brittany confirms that some sharks sighted at the entrance to the Channel can swiftly reach the waters of the Hebrides via the west of Ireland (Figure 7.5).

Since 2011, APECS have tagged two further sharks off south Brittany, a 7.5 m male in April 2011 and a 6.5 m female in June 2013. These tags popped off after 35 and 76 days, respectively. The first one moved about 150 nm west of the tagging location to the northern Bay of Biscay, and the second one in the Celtic Sea, about 40 nm south of Ireland. In May 2016 two SPOT tag were deployed on adults animal south of Brittany ; the 6.5 m female showed up in May 2017 in the southern of Bay of Biscay after spending the winter off the Moroccan coast.

The Manx Basking Shark Watch also deployed tags in 2008 and 2011–2013 and have four basking sharks equipped with SPOT5 tags that can be tracked on the WildlifeTracking website. The Irish Basking Shark Study Group also performed tagging in 2012 and 2013.

SPOT Tagging technology has been successfully applied in the Inner Hebrides (West Scotland) on basking shark since 2012: nine SPOTs were deployed in July 2012 (Witt *et al.*, 2013). Recent analyses (Witt *et al.*, 2016), revealed various spatio-temporal patterns in habitat use, from coastal movements to movements of thousands of kilometers (Figure 7.6). Long-distance movements of three adult basking shark from the Hebridean Sea to Madeira, Canary Islands and North African coasts were observed from SPOT and SPLASH-F tags. These represented movements of >3300 km (straight-line distance) over periods of 132–322 days. In contrast, other sharks demonstrated a degree of site fidelity to the Inner Hebrides (at various spatial scales) during the summer months (Figure 7.7). This study also lighted the importance of the Irish and Celtic Seas and important migration corridors for sharks moving from NW Scotland to the Isle of Man and southwest England.

7.8 Exploratory assessment models

No exploratory assessments have been undertaken.

7.9 Stock assessment

No stock assessment has been undertaken.

7.10 Quality of assessments

No assessments have been undertaken.

7.11 Reference points

No reference points have been proposed for this stock.

7.12 Conservation considerations

Basking shark is listed as “Endangered” on the Red List of European marine fish (Nieto *et al.*, 2015) and on the Norwegian Red List (Sjøtun *et al.*, 2010).

Basking shark was listed on Appendix II of the Convention on International Trade in Endangered Species (CITES) in 2002.

Basking shark was listed on Appendices I and II of the Convention on the Conservation of Migratory Species (CMS) in 2005.

Basking shark is listed on Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea (UNCLOS).

Basking shark was listed on the OSPAR (Convention on the protection of the marine environment of the Northeast Atlantic) list of threatened and/or declining species in 2004.

7.13 Management considerations

The current status of the stock is unknown. At present there is no directed fishery for this species. WGEF considers that no directed fishery should be permitted unless a reliable estimate of a sustainable exploitation rate is available.

Proper quantification of bycatch, fate and discarding, in numbers and estimated weight, is required.

Where national legislation prohibits landing of bycaught basking sharks, measures should be put in place to ensure that incidental catches are recorded by (estimated) weight and number, and carcasses or biological material made available for research.

7.14 References

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Table 7.1. Basking shark in the Northeast Atlantic. Total landings (t) of basking sharks in ICES subareas 1–14 (1977–2017). “.”=zero catch, “+” = <0.5 t. Data for 2017 updated following Data Call.

| | 1 & 2 | 3 & 4 | 5A | 5B | 6 | 7 | 8 | 9 | 10 | 12 | 14 | TOTAL |
|------|-------|-------|----|-----|-----|-----|-----|-----|-----|-----|----|-------|
| 1977 | 3680 | . | . | . | . | . | . | . | . | . | . | 3680 |
| 1978 | 3349 | . | . | 14 | . | 278 | . | . | . | . | . | 3641 |
| 1979 | 5120 | . | . | . | . | 139 | 7 | . | . | . | . | 5266 |
| 1980 | 3642 | . | . | 83 | . | . | . | . | . | . | . | 3725 |
| 1981 | 1772 | . | . | 28 | . | . | . | . | . | . | . | 1800 |
| 1982 | 1970 | . | . | . | . | 186 | . | . | . | . | . | 2156 |
| 1983 | 967 | 734 | . | . | . | 60 | . | . | . | . | . | 1761 |
| 1984 | 873 | 1188 | . | . | . | 1 | . | . | . | . | . | 2062 |
| 1985 | 1465 | . | . | . | . | . | . | . | . | . | . | 1465 |
| 1986 | 1144 | . | . | . | . | . | . | . | . | . | . | 1144 |
| 1987 | 164 | . | . | . | . | . | . | 1 | . | . | . | 165 |
| 1988 | 96 | 10 | . | . | . | . | . | . | . | . | . | 106 |
| 1989 | 593 | . | . | . | . | . | . | + | . | . | . | 593 |
| 1990 | 781 | 116 | . | . | . | . | 1 | . | . | . | . | 897 |
| 1991 | 533 | 220 | . | . | . | . | + | + | . | . | . | 753 |
| 1992 | 1613 | 84 | . | . | . | . | + | + | . | . | . | 1697 |
| 1993 | 1374 | . | . | . | . | . | . | + | . | . | . | 1374 |
| 1994 | 920 | 157 | . | . | . | . | + | 1 | . | . | . | 1078 |
| 1995 | 604 | 23 | . | . | . | . | 1 | 1 | . | . | . | 629 |
| 1996 | 792 | . | . | . | . | . | + | 1 | . | . | . | 793 |
| 1997 | 425 | 43 | . | . | . | . | 2 | 1 | . | . | . | 471 |
| 1998 | 55 | . | . | . | . | . | 1 | . | . | . | . | 56 |
| 1999 | 31 | . | . | . | . | . | 1 | 1 | . | . | . | 33 |
| 2000 | 117 | . | . | . | . | . | 1 | 1 | . | . | . | 119 |
| 2001 | 80 | . | . | . | . | . | . | 2 | 1 | . | . | 83 |
| 2002 | 54 | + | . | . | . | . | . | 1 | . | . | . | 55 |
| 2003 | 128 | . | . | . | . | . | . | 1 | . | . | . | 129 |
| 2004 | 72 | . | . | . | . | . | . | 1 | 26 | . | . | 99 |
| 2005 | 218 | + | . | . | . | 1.9 | 1.5 | 1.5 | 0.1 | 0.6 | . | 224 |
| 2006 | 16 | . | . | . | . | + | + | + | . | + | . | 17 |
| 2007 | 26 | . | . | . | . | . | . | + | . | + | . | 26 |
| 2008 | 4 | . | . | . | . | . | 1.1 | . | 0.1 | . | . | 5 |
| 2009 | . | . | . | 1.3 | + | . | + | . | 0.1 | 1.4 | . | 2.9 |
| 2010 | . | . | . | + | 1.2 | . | . | + | + | 0.7 | . | 2.1 |
| 2011 | 2 | . | . | . | . | . | . | + | 0.1 | 0.8 | . | 3 |
| 2012 | 22 | . | . | . | . | . | . | 1.1 | + | 0.2 | . | 23 |
| 2013 | . | . | . | . | . | . | . | + | . | . | + | + |
| 2014 | . | . | . | . | . | + | . | . | + | . | . | + |
| 2015 | . | . | . | . | . | . | . | . | . | + | . | + |
| 2016 | . | . | . | . | . | . | . | + | . | . | . | + |
| 2017 | . | . | . | . | . | 0.6 | . | . | . | . | . | 0.6. |

Table 7.2. Basking shark in the Northeast Atlantic. Norwegian landings of liver (kg) and fins (kg) of basking shark (*Cetorhinus maximus*) during 1977–2008, estimated landings in live weight (conversion factors of 4.64 for liver and 40.0 for fins), estimated numbers of landed individuals (from landings of both liver and fins using an average weight per individual of 648.5 kg for liver and 71.5 kg for fins), ICES and Norwegian official landings (applying conversion factors of 10.0 for liver (1977–1995), 100.0 fins (1996–1999), 100.0 for fins (ICES 2000–2008), and 40.0 for fins (Norway 2000–2008)), and landings recommended used by ICES WGEF 2008. In 1995 and 1997, landings of whole individuals measuring 3760 kg (one individual) and 7132 kg (two individuals), respectively, were reported. These weights are included in the official and revised landings and in the estimation of landed numbers.

| Year | Liver (kg) | Fins (kg) | Catch from liver (tonnes) | Catch from fins (tonnes) | Landed numbers (livers – fins) | ICES official landings (tonnes) | Norway official landings (tonnes) | Recommended by ICESWGEF 2008 |
|------|------------|-----------|---------------------------|--------------------------|--------------------------------|---------------------------------|-----------------------------------|------------------------------|
| 1977 | 793 153 | 0 | 3680.2 | 0.0 | 1223 | 7931.5 | 7931.5 | 3680.2 |
| 1978 | 784 687 | 0 | 3640.9 | 0.0 | 1210 | 7846.9 | 7846.9 | 3640.9 |
| 1979 | 1 133 477 | 95 070 | 5259.3 | 3802.8 | 1748–1330 | 11 334.8 | 11 334.8 | 5259.3 |
| 1980 | 802 756 | 60 851 | 3724.8 | 2434.0 | 1238–851 | 8027.6 | 8027.6 | 3724.8 |
| 1981 | 387 997 | 27 191 | 1800.3 | 1087.6 | 598–380 | 3880.0 | 3880.0 | 1800.3 |
| 1982 | 464 606 | 31 987 | 2155.8 | 1279.5 | 716–447 | 4646.1 | 4646.1 | 2155.8 |
| 1983 | 379 428 | 24 847 | 1760.5 | 993.5 | 585–348 | 3794.3 | 3794.3 | 1760.5 |
| 1984 | 444 171 | 23 505 | 2061.0 | 940.2 | 685–329 | 4441.7 | 4441.7 | 2061.0 |
| 1985 | 315 629 | 16 699 | 1464.5 | 668.0 | 487–234 | 3156.3 | 3156.3 | 1464.5 |
| 1986 | 246 474 | 12 138 | 1143.6 | 485.5 | 380–170 | 2464.7 | 2464.7 | 1143.6 |
| 1987 | 35 244 | 3148 | 163.5 | 125.9 | 54–44 | 352.4 | 352.4 | 163.5 |
| 1988 | 22 761 | 1927 | 105.6 | 77.1 | 35–27 | 227.6 | 227.6 | 105.6 |
| 1989 | 127 775 | 10 367 | 592.9 | 414.7 | 197–145 | 1277.8 | 1277.8 | 592.9 |
| 1990 | 193 179 | 18 110 | 896.4 | 724.4 | 298–253 | 1931.8 | 1931.8 | 896.4 |
| 1991 | 162 323 | 18 337 | 753.2 | 733.5 | 250–256 | 1623.2 | 1623.2 | 753.2 |
| 1992 | 365 761 | 37 145 | 1697.1 | 1485.8 | 564–520 | 3657.6 | 3657.6 | 1697.1 |
| 1993 | 291 042 | 34 360 | 1350.4 | 1374.4 | 449–481 | 2910.4 | 2910.4 | 1374.4 |
| 1994 | 176 220 | 26 922 | 817.7 | 1076.9 | 272–377 | 1762.2 | 1762.2 | 1076.9 |
| 1995 | 10 450 | 15 571 | 52.2 | 626.6 | 17–219 | 108.3 | 108.3 | 626.6 |
| 1996 | 41 283 | 19 789 | 191.6 | 791.6 | 64–277 | 1978.9 | 1978.9 | 791.6 |
| 1997 | 57 184 | 11 520 | 272.5 | 467.9 | 90–163 | 1159.1 | 1159.1 | 467.9 |
| 1998 | 3 | 1366 | 0.0 | 54.6 | 19 | 136.6 | 136.6 | 54.6 |
| 1999 | 20 | 770 | 0.1 | 30.8 | 11 | 77.0 | 77.0 | 30.8 |
| 2000 | 51 | 2926 | 0.2 | 117.0 | 41 | 292.6 | 117.0 | 117.0 |
| 2001 | 0 | 1997.5 | 0.0 | 79.9 | 28 | 199.7 | 79.9 | 79.9 |
| 2002 | 0 | 1351.5 | 0.0 | 54.1 | 19 | 135.2 | 54.1 | 54.1 |
| 2003 | 0 | 3191.5 | 0.0 | 127.7 | 45 | 319.2 | 127.7 | 127.7 |
| 2004 | 0 | 1808.3 | 0.0 | 72.3 | 25 | 180.8 | 72.3 | 72.3 |
| 2005 | 0 | 2180.5 | 0.0 | 87.2 | 30 | 218.1 | 87.2 | 87.2 |
| 2006 | 0 | 160 | 0.0 | 6.4 | 2 | 16.0 | 6.4 | 6.4 |
| 2007 | 0 | 653 | 0.0 | 26.1 | 9 | 65.3 | 26.1 | 26.1 |
| 2008 | 0 | 98 | 0.0 | 3.9 | 1 | 9.8 | 3.9 | 3.9 |

Table 7.3. Basking shark in the Northeast Atlantic. Proportions (%) of landed basking sharks caught in different gears as reported to the Norwegian Directorate of Fisheries from 1990–2011.

| YEAR | DIVISION 2.A | | | | | | DIVISION 4.A | | |
|------|--------------|---------|-----------|----------------|--------------|--------------|----------------|---------|---------|
| | Harpoon | Gillnet | Driftnet* | Undefined nets | Bottom trawl | Danish seine | Hook and lines | Harpoon | Gillnet |
| 1990 | 84.0 | | 3.1 | | | | | 12.9 | |
| 1991 | 69.7 | | 1.0 | | | | | 29.3 | |
| 1992 | 83.1 | | 6.0 | | 5.6 | | 0.4 | 4.9 | |
| 1993 | 99.1 | 0.8 | | | 0.1 | | | | |
| 1994 | 85.4 | | | | | | | 14.6 | |
| 1995 | 89.8 | 6.5 | | | | | | | 3.7 |
| 1996 | 89.1 | 10.3 | | 0.2 | | 0.4 | 0.1 | | |
| 1997 | 66.7 | 23.7 | | | | | 0.5 | 9.1 | |
| 1998 | 67.2 | 28.5 | | | | | 4.4 | | |
| 1999 | 9.1 | 81.8 | | 7.8 | 1.3 | | | | |
| 2000 | 33.4 | 58.7 | | | 7.8 | | | | |
| 2001 | | 96.0 | | | 4.0 | | | | |
| 2002 | 16.3 | 78.5 | | | 5.2 | | | | |
| 2003 | 3.4 | 89.7 | | | 7.2 | | | | |
| 2004 | | 100.0 | | | | | | | |
| 2005 | 54.1 | 44.5 | | 0.5 | 1.4 | | | | |
| 2006 | | 100.0 | | | | | | | |
| 2007 | | 100.0 | | | | | | | |
| 2008 | | 100.0 | | | | | | | |
| 2009 | | | | | | | | | |
| 2010 | | | | | | | | | |
| 2011 | | 50.0 | | | | | 50.0 | | |

* These driftnets for salmon were banned after 1992.

Table 7.4. Basking shark in the Northeast Atlantic. Summary details of bycatch reported from France and Norway.

| NATION | DAY | MONTH | YEAR | GEOG. AREA | LAT | LON | GEAR | DEPTH | LENGTH | WEIGHT (KG) | COMMENT | SOURCE |
|--------|-----|-------|------|---------------|--------|--------|---------------|-------|---------|-------------|---------------------------------------|--------------------------|
| France | 25 | Jan | 2010 | Iroise Sea | 48.549 | 5.124 | Gillnet | | 4–5 m | | Released alive | Unpublished data - APECS |
| France | 8 | May | 2010 | Atlantic | 46.236 | 1.592 | Gillnet | | 4.6 m | | Discarded | Unpublished data - APECS |
| France | 27 | May | 2010 | Atlantic | 47.247 | 2.964 | Gillnet | | 3.4 m | | Discarded, samples, museum collection | Unpublished data - APECS |
| France | | May | 2009 | Mediterranean | 42.935 | 3.063 | Gillnet | | 6–7 m | | | Unpublished data - APECS |
| France | | May | 2009 | Mediterranean | 42.935 | 3.063 | Gillnet | | 6–7 m | | | Unpublished data - APECS |
| France | | May | 2009 | Mediterranean | 42.935 | 3.063 | Gillnet | | 6–7 m | | | Unpublished data - APECS |
| France | 31 | May | 2009 | Atlantic | 47.768 | 4.211 | | | 2.5–3 m | | Released alive | Unpublished data - APECS |
| France | 18 | Nov | 2009 | Atlantic | 43.427 | 1.695 | | | 3.5–4 m | | Discarded | Unpublished data - APECS |
| France | 27 | Apr | 2009 | Mediterranean | 45.841 | 1.531 | Bottom trawl | 20 m | | | Discarded | Unpublished data - APECS |
| France | 20 | May | 2009 | Mediterranean | 43.051 | -3.391 | Pelagic trawl | 45 m | 5 m | | Discarded | Unpublished data - APECS |
| France | 30 | May | 2011 | Mediterranean | 43.328 | -5.203 | Gillnet | | 3–6 m | | Released alive | Unpublished data - APECS |
| France | 3 | Aug | 2011 | Iroise Sea | 48.233 | 4.483 | Gillnet | | 3–6 m | | Discarded, samples | Unpublished data - APECS |
| France | 19 | Apr | 2011 | Atlantic | 47.760 | 4.205 | Gillnet | 30 m | 3–6 m | | Discarded, samples, immature | Unpublished data - APECS |
| France | 6 | May | 2011 | Atlantic | 47.745 | 4.218 | Gillnet | | 3–6 m | | Released alive, genetic sample | Unpublished data - APECS |
| France | 4 | Nov. | 2011 | Celtic Sea | | | | | 4 m | | Genetic sample | Obsmer data |
| France | 17 | May | 2013 | Atlantic | 47.780 | 4.210 | Gillnet | | 3.3 m | | Discarded, samples, immature male | Unpublished data - APECS |
| France | 15 | April | 2014 | Atlantic | 47.78 | 3.77 | | | 5 m | 650 | Discarded | Media |
| Norway | | Dec | 2006 | Atlantic | 59.03 | 9.80 | Gillnet | 50 m | 3.5 m | 350 | Approx. position | Media |
| Norway | | Sep | 2006 | Atlantic | 58.81 | 9.90 | Gillnet | | ~4 m | 500 | Discarded, approx. position | Media |
| Norway | | Aug | 2007 | Atlantic | 61.97 | 5.02 | Gillnet | | 4.5 m | 250 | Discarded, approx. position | Media |
| Norway | | | 2007 | Atlantic | 64.13 | 8.20 | Gillnet | | 4 m | 500 | Approx. position | Media |

| NATION | DAY | MONTH | YEAR | GEOG. AREA | LAT | LON | GEAR | DEPTH | LENGTH | WEIGHT (KG) | COMMENT | SOURCE |
|--------|-----|-------|------|------------|-------|-------|---------|-------|--------|-------------|----------------------------------|--------|
| Norway | | Sep | 2007 | Atlantic | 58.45 | 8.86 | Gillnet | | 4-5 m | | Approx. position | Media |
| Norway | | July | 2008 | Atlantic | 68.11 | 14.18 | | | | | Approx. position | Media |
| Norway | | July | 2008 | Atlantic | 62.36 | 47.00 | Gillnet | | | | Released alive, approx. position | Media |
| Norway | | July | 2011 | Atlantic | 70.29 | 27.28 | Gillnet | | ~10 m | | Discarded, approximate position | Media |
| Norway | | July | 2011 | Atlantic | 71.11 | 23.96 | Gillnet | | | | Released alive, approx. position | Media |
| Norway | | May | 2012 | Atlantic | 68.78 | 11.86 | Gillnet | | ~10 m | ~1 t | Landed, approx. position | Media |
| Norway | | May | 2012 | Atlantic | 62.48 | 5.86 | Gillnet | | | | Landed, approx. position | Media |
| Norway | 13 | Sept | 2014 | Atlantic | 65.60 | 12.10 | Gillnet | | 12 m | | Approx. position | Media |

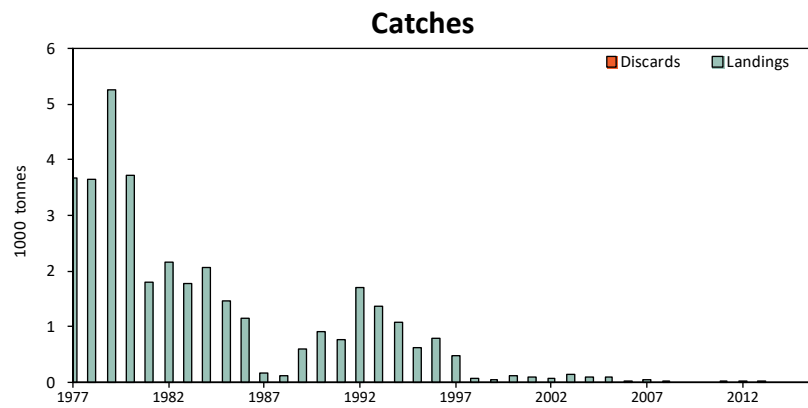


Figure 7.1. Basking shark in the Northeast Atlantic. Total landings (1000 t) of basking sharks in ICES subareas 1–14 from 1977–2014, , since 2014: <0.1 t landed (not shown).

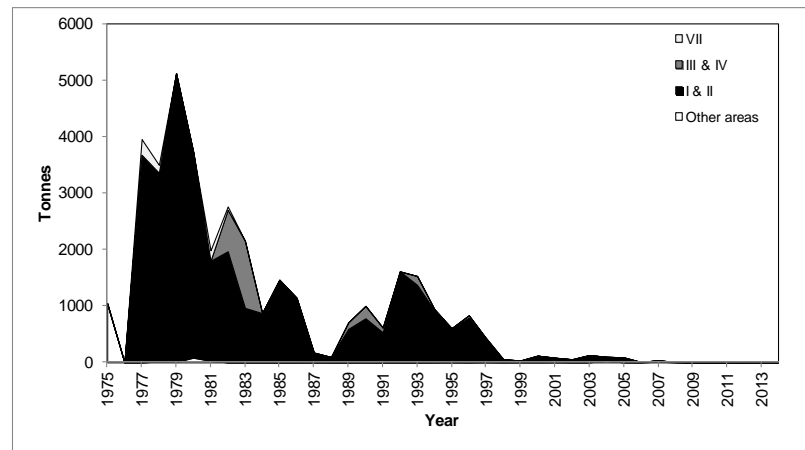


Figure 7.2. Basking shark in the Northeast Atlantic. Total landings (t) of basking sharks in ICES subareas 1–14 from 1975–2014, since 2014: <0.1 t landed in “Other areas” (not shown).

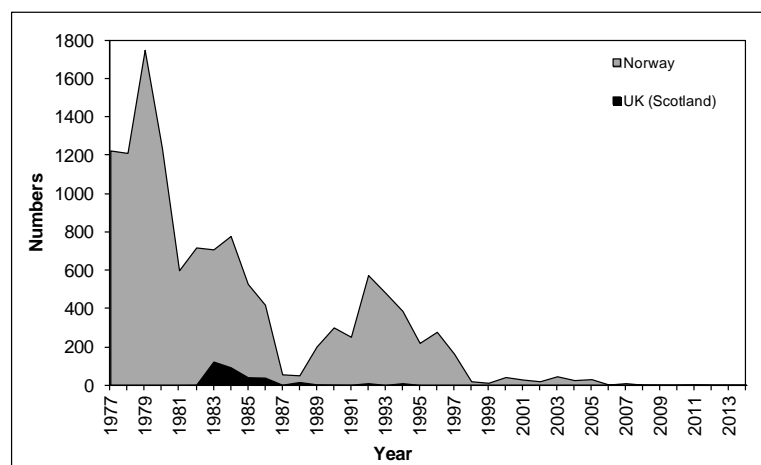


Figure 7.3. Basking shark in the Northeast Atlantic. Numbers of basking sharks landed by Norway and Scotland in ICES subareas 1–14 from 1977–2014.

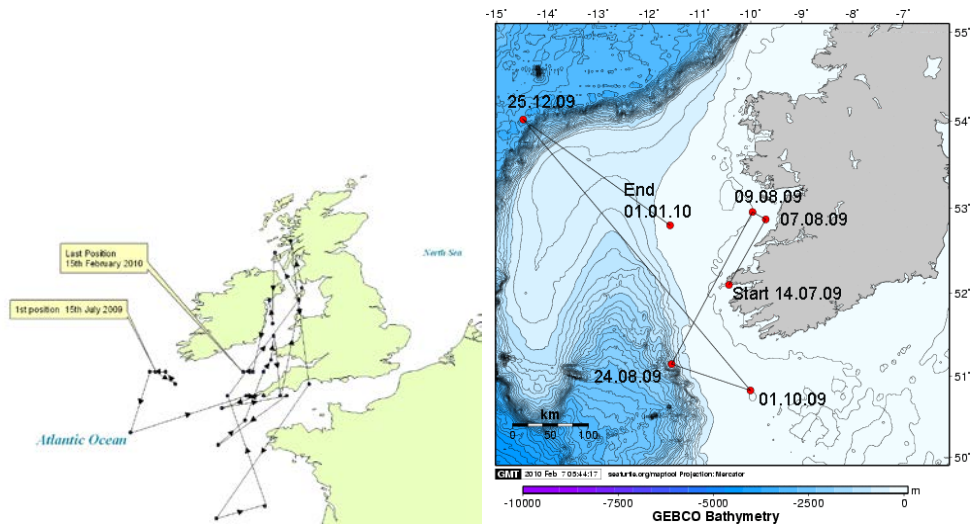


Figure 7.4. Basking shark in the Northeast Atlantic. Geolocations from basking shark A (left, sex=male) and B (right, sex=unknown). Source: Berrow and Jackson (2010 WD).

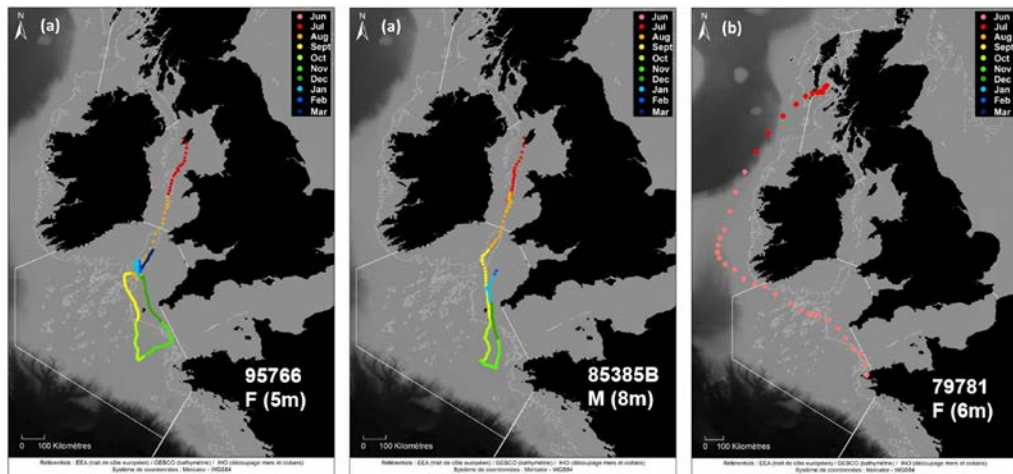


Figure 7.5. Basking shark in the Northeast Atlantic. Most probable tracks for (left) shark 95766 (5 m female) and (centre) shark 85385 (8 m male), tracked for more than 200 days and which stayed in the Irish Sea and Celtic Seas, and (right) most probable track for shark 79781 (6 m female) tracked for 38 days. Source: Stéphan *et al.* (2011).

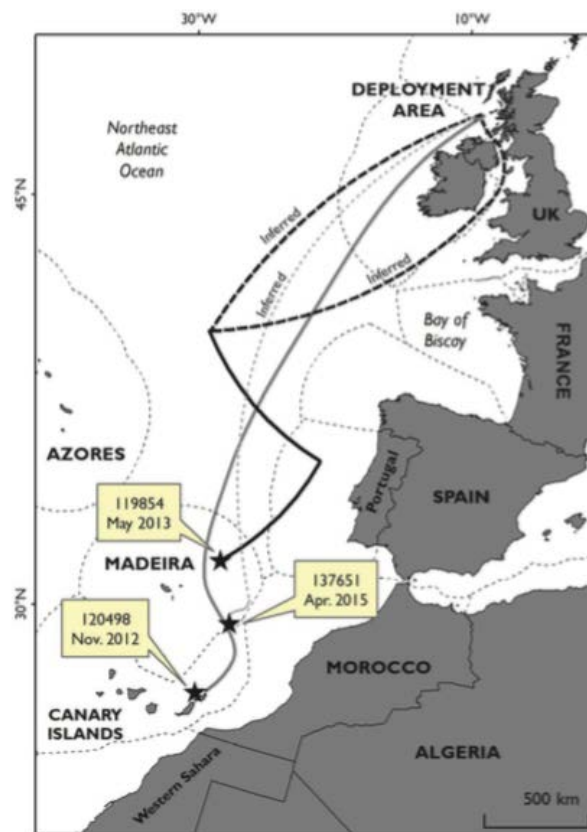


Figure 7.6. Basking shark in the Northeast Atlantic. Long-range movements of basking sharks from Scotland revealed by Argos satellite tracking. Two SPOT-tagged basking sharks in 2012 (119854, 120498) and one SPLASH-F tagged shark in 2014 (137651). Source: Witt *et al.* (2016).

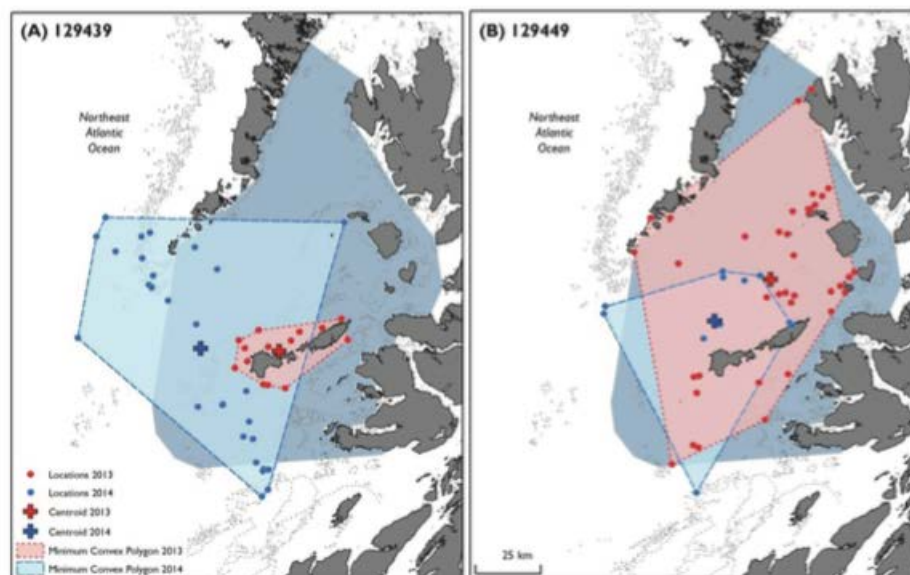


Figure 7.7. Basking shark in the Northeast Atlantic. Example distribution of two sharks showing inter-annual fidelity to the Hebridean Sea. Single highest quality Argos locations per day (red and blue circles for 2013 and 2014 respectively). Minimum convex polygons for data gathered in 2013 and 2014 (red and blue polygons respectively), geographic mean centroid of Argos locations for 2013 and 2014 (red and blue crosses respectively). Source: Witt *et al.* (2016).