OSPAR COMMISSION

Protecting and conserving the North-East Atlantic and its resources

Background Document on Basking shark, *Cetorhinus maximus* – Update

2015

Biodiversity and Ecosystems Series

OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. The Contracting Parties are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998.
Les Parties contractantes sont l'Allemagne, la Belgique, le Danemark, l'Espagne, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède, la Suisse et l'Union européenne.

Acknowledgement

This report has been prepared in 2009 by the Association pour l'Etude et la Conservation des Sélaciens (APECS - Ms Claire Laspougeas) and by the Agence des aires marines protégées (Ms Amelia Curd) (France), and updated by APECS in 2013 and 2014 (Ms Hélène Gadenne, Ms Alexandra Rohr and Mr Eric Stephan). Thanks are also due for contributions provided by Colin Speedie, Sarah Fowler, David Sims, Jean-Luc Solandt, Ole Thomas Albert, Chiaria Bertulli, Marc Dando, Megan Wittaker, Russel Wynn.

Photo acknowledgement:

Cover page: Basking shark, Greg Skomal

Contents

Executive Summary 3
Récapitulatif 3
1. Background Information 4
Name of species (feature) *4*
Definition of habitat *4*
2. Original Evaluation against the Texel-Faial selection criteria 4
List of OSPAR Regions and Dinter biogeographic zones where the species occurs *4*
List of OSPAR Regions and Dinter biogeographic zones where the species is under threat and/or in decline *5*
Original evaluation against the Texel-Faial criteria for which the species was included on the OSPAR List *5*
3. Current status of the species 6
Distribution in OSPAR maritime area *6*
Population (current/trends/future prospects) *6*
Condition (current/trends/future prospects) *7*
Limitations in knowledge *7*
4. Evaluation of threats and impacts 8
Major threats *8*
Fishing *8*
Marine ecotourism *9*
Marine tourism *10*
Additional potential threats 10
Marine pollution *10*
Offshore renewable energy *10*
Climate change and ocean acidification *11*
5. Existing Management measures 11
6. Conclusion on overall status 14
7. Action to be taken by OSPAR 15
Action/measures that OSPAR could take, subject to OSPAR agreement *15*
Brief summary of the proposed monitoring system (see annex 2) 18

Annex 1: Overview of data and information provided by Contracting Parties **19**

Annex 2: Detailed description of the proposed monitoring and assessment strategy **22**

Annex 3: References **26**

Annex 4: Additional Information **32**

Annex 5: Basking shark codes of conduct - Shark Trust / APECS **53**

Update of the Background Document on Basking shark – *Cetorhinus maximus*

Executive Summary

This Background Document for Basking Shark – *Cetorhinus maximus* – has been developed by OSPAR following the inclusion of this species on the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008-6). The document provides a compilation of the reviews and assessments that have been prepared concerning this species since the agreement to include it in the OSPAR List in 2003. The original evaluation used to justify the inclusion of *Cetorhinus maximus* in the OSPAR List is followed by an assessment of the most recent information on its status (distribution, population, condition) and key threats prepared during 2009-2010 and updated in 2013 and in 2014. Chapter 7 provides proposals for the actions and measures that could be taken to improve the conservation status of the species. In agreeing to the publication of this document, Contracting Parties have indicated the need to further review these proposals. Publication of this background document does not, therefore, imply any formal endorsement of these proposals by the OSPAR Commission. On the basis of the further review of these proposals, OSPAR will continue its work to ensure the protection of *Cetorhinus maximus*, where necessary in cooperation with other competent organisations. This background document may be updated again to reflect further developments or further information on the status of the species which becomes available.

Récapitulatif

Le présent document de fond sur le requin pèlerin a été élaboré par OSPAR à la suite de l'inclusion de cette espèce dans la liste OSPAR des espèces et habitats menacés et/ou en déclin (Accord OSPAR 2008-6). Ce document comporte une compilation des revues et des évaluations concernant cette espèce qui ont été préparées depuis qu'il a été convenu de l'inclure dans la Liste OSPAR en 2003. L'évaluation d'origine permettant de justifier l'inclusion du requin pèlerin dans la Liste OSPAR est suivie d'une évaluation des informations les plus récentes sur son statut (distribution, population, condition) et des menaces clés, préparée en 2009-2010 et actualisée en 2013 puis 2014. Le chapitre 7 fournit des propositions d'actions et de mesures qui pourraient être prises afin d'améliorer l'état de conservation de l'espèce. En se mettant d'accord sur la publication de ce document, les Parties contractantes ont indiqué la nécessité de réviser de nouveau ces propositions. La publication de ce document ne signifie pas, par conséquent que la Commission OSPAR entérine ces propositions de manière formelle. À partir de la nouvelle révision de ces propositions, OSPAR poursuivra ses travaux afin de s'assurer de la protection du requin pèlerin (*Cetorhinus maximus*), le cas échéant avec la coopération d'autres organisations compétentes. Ce document de fond pourra encore être actualisé pour tenir compte de nouvelles avancées ou de nouvelles informations qui deviendront disponibles sur l'état de l'espèce.

1. Background Information

Name of species (feature)

Cetorhinus maximus (Gunnerus 1765)**,** basking shark.

The Basking shark is the world's second largest fish and the largest fish in the North-East Atlantic. It is a plankton-feeding (zooplankton) pelagic shark and can reach 12 metres in length and weigh up to 4 tonnes.

Definition of habitat

The basking shark is widely distributed in coastal waters on the continental shelves of boreal and warm temperate regions in both the northern and southern hemispheres (Figure 1). Thanks to the use of satellite tags, the presence of this species in tropical and equatorial regions is now attested (Skomal *et al*., 2009).

Figure 1: *Global basking shark distribution (Ebert et al., 2013).*
Map reproduced with the permission of the author, Marc Dando

2. Original Evaluation against the Texel-Faial selection criteria

List of OSPAR Regions and Dinter biogeographic zones where the species occurs

OSPAR Regions: All

Dinter Biogeographic Provinces:

- Two biogeographic zones for the pelagic environment (the water column less than 1000 m depth): the warm-temperate waters and the cool-temperate waters;
- One biogeographic zone for the deep-sea environments (> 1 000 m): the Atlantic zone.

List of OSPAR Regions and Dinter biogeographic zones where the species is under threat and/or in decline

All where it occurs

Original evaluation against the Texel-Faial criteria for which the species was included on the OSPAR List

Global importance: This species occurs throughout temperate seas in all oceans. Although sightings of surface feeding sharks are frequent in the OSPAR area, there is no evidence to suggest that populations in the OSPAR region are of particular global importance.

Regional importance: In the OSPAR maritime area, basking sharks are observed most frequently in the waters around the British Isles and the Republic of Ireland and along the coast of northern France. The coast of Norway is presumably also important, since there has been such a large fishery there. Our current state of knowledge has not allowed us to identify this species' reproductive zones. Only one report of a birthing event was recorded in the coastal waters of the Isle of Man in 2006 (www.manxbaskingsharkwatch.com).

Decline: There are no firm estimates for the global population or regional populations of basking sharks. The total 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. Landings throughout the North-East Atlantic have also fluctuated, but a continued downwards trend is evident over the past few decades. A few well-documented declines in catches by directed fisheries for the basking shark suggest that reduction 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, 2005a). These apparent declines have persisted into the long-term with no apparent recovery several decades after exploitation has ceased.

Rarity: Basking sharks are a highly mobile species for which the global population size and structure remains unknown. It is therefore very difficult to define its degree of rarity. Nevertheless, the collapse of landings in the North-East Atlantic could indicate this species is increasingly rare.

Sensitivity: Compagno (1984) considers basking sharks to be extremely vulnerable to overfishing, because they spend long periods surface feeding (Sims & Quayle, 1998) and ascribes this to a slow growth rate, lengthy maturation time, probable low fecundity and probable small size of existing populations. The population productivity estimated at 0.013 – 0.023 (Musik *et al*., 2000) is very low for a marine fish species, making basking sharks very sensitive.

Threats:

- The main threat to basking sharks is accidental by-catch. Currently in the OSPAR maritime area, targeted fisheries are forbidden, but by-catches sometimes occur in set nets, trawls and through entanglement in pot lines. The magnitude of this threat is unknown due to lack of reporting;
- Accidental boat collisions are being increasingly reported and evident from scars on sharks;

- The increase of recreational boat traffic and wildlife watching may constitute indirect threats for basking sharks which may affect their behaviour in traditional feeding, pupping and breeding grounds;
- Anthropogenic pollution from land/riverine runoff and changing seawater temperature may induce a degradation in the basking shark's habitat by altering the composition and distribution of its primary food source, copepod zooplankton. Clearly there has been a shift in the timing and distribution of *Calanus* copepod community in the North Atlantic which may be affecting basking shark populations or distribution (Beaugrand *et al*., 2002).

3. Current status of the species

Distribution in OSPAR maritime area

In the OSPAR area, the basking shark occurs from Iceland, Norway and as far north as the Russian White Sea (southern inlet of the Barents Sea) to Portugal (Konstantinov & Nizovtsev, 1980; Ebert *et al.*, 2013).

The western European shelf provides a key habitat for basking sharks, with persistent seasonal aggregations or 'hotspots' in areas of higher zooplankton abundance, most observations occurring during the spring and summer months (data from sighting recording schemes). These areas are around the south-west peninsula of England (Cornwall and Devon), northwest (Hebrides) and south (Isle of Arran) of Scotland, west and north of Ireland, the Isle of Man in the Irish Sea and Brittany in France (Glénan archipelago and Iroise Sea) (Bloomfield & Solandt, 2008; Speedie *et al.*, 2009; Witt *et al.*, 2012; APECS unpublished data). There have also been occasional recent sightings in the North Sea (Geelhoed *et al*., 2014; BfN 2014).

There is also evidence from satellite tagging of the presence of the species along the continental shelf break in the Gulf of Biscay (Sims *et al.*, 2003, Witt - Wildlife Tracking, 2013-2014; Stephan *et al.*, 2011).

Satellite tag deployments have also revealed that basking sharks move further south than what we believed in the past. Two individuals tagged with SPOT satellite tags in 2012 in Inner Hebrides were tracked migrating southwards to Madeira and the Canary Islands (Witt *et al.*, 2013 & 2014).

The North of the Celtic Sea and western Approaches of the English Channel are also used by the species during autumn and winter months with few incursions into the surface water layer (Sims *et al*., 2003; Stephan *et al*., 2011).

Population (current/trends/future prospects)

No firm estimates are available for the total global population or regional populations of this species due to the difficulties in counting basking sharks. There is only very limited information available on wider population trends.

Catches in well-documented fisheries for basking sharks (especially from the North-East 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 (Annex 4).

If some monitoring data for this species are available nowadays, most knowledge is based on sightings of sharks feeding on plankton near the sea surface during spring and summer and the variation in numbers of sightings is only available on a local or regional scale. There are also large inter-annual variations in the sightings numbers, positively correlated with environment parameters: fluctuations in sea surface temperature (SST) and the North Atlantic Oscillation (NAO) index, the abundance of zooplankton (copepods). (Sims and Quayle, 1998; Sims *et al*., 2000; Cotton *et al*., 2005).

In UK waters, numbers of sightings reports and sharks have varied considerably over the 27 years span of the Marine Conservation Society recording scheme (1997-2013) but with a pattern of clear peaks and troughs. The long-term trend has been towards higher numbers of both reports and sharks (Bloomfield & Solandt, 2008; Solandt & Chassin, 2014). In Brittany, the annual distribution of reported observations between 1997 and 2013 does not reveal any clear tendencies even if there are also a pattern of peaks and troughs between years (unpublished data, APECS) (Annex 4, Table 5).

Whilst sightings recording schemes do not allow for in-depth ecological studies of a species, they provide the means to note the long-term presence or absence of a species and hence the identification of its greater trends and exceptional events. The information collected also allows for the identification of important sectors and/or periods where basking sharks will spend time near the surface where they are particularly exposed to a number of threats (fishing by-catch, boat collisions, pollution, *etc.).*

In 2006, two studies have shown the first results on genetic analysis (Hoel*zel et* al., 2006; No*ble et* al., 2006). Hoel*zel e*t al., (2006) estimate roughly an effective population size (Ne = 8200) that is low for a globally distributed species. A recent publication reports the first successful attempt to collect elasmobranch mucus in the field and its efficacy for genetic analyses (Lie*ber et* al., 2013). Thanks to this new method, it is now possible to obtain more easily a lot of samples, and new estimations of the population size should be obtained in a near future.

Condition (current/trends/future prospects)

In their reports, Witt *et al.,* (2012) and Solandt & Chassin (2014) show that there is a small but significant change in the relative sizes of observed sharks between 1987 and 2013. The number of sightings of larger sharks (longer than 6 metres) increased since 2005 whilst there has been a decrease in the proportion of smaller sharks (less than 4 metres) over the whole 28 year period; this may be an indication of population recovery from historical over-exploitation.

Limitations in knowledge

The basking shark is a little-known species for which maximum research effort within the OSPAR area has been focused around the British Isles. The current approach to conservation of basking sharks relies heavily on the precautionary principle, which states that insufficient scientific knowledge about biology and stock status is no defence for a lack of action.

It is not known whether there are discrete local populations of basking sharks or whether there is a relationship between regional population abundance and global trends. The degree to which mixing or interchange occurs between populations remains unknown. The results of new genetic studies will probably give more information on the population structure in a near future.

If it has been demonstrated on a small spatial and temporal scale, that basking sharks feed in a selective manner in zones where zooplankton concentrations are high (thermal fronts in particular), the factors which influence basking shark distribution and abundance in the long-term and at a larger scale are not well-known. A better understanding of population dynamics and movements and migrations is essential for the long-term management of this species, by allowing the implementation of efficient and lasting conservation measures.

Whilst data on the broad-scale trends in surface sightings of this species in UK and northern French waters are available thanks to sighting schemes collated by APECS and the Marine Conservation Society, absolute population abundance has not been determined. In fact, sightings do not provide information when sharks are not at the surface and there are several biases in the pressure of observations (weather conditions, public awareness, attractiveness of this area for people, *etc*.) which varies a lot between years and areas.

Even if it is known that basking shark is an aplacental viviparous (producing eggs which hatch within the uterus and giving birth to fully developed young) and a K strategist species (low fecundity, long gestation period and attaining maturity at a late age and size), very few things are known on mating and birth areas.

The capture of a pregnant female (690 cm total length) in April 2012 on the northern coast of Syria could indicate that the Mediterranean Sea is an important area for the reproduction (Ali *et al.,* 2012). This incidental capture was the opportunity to describe for the first time the basking shark egg cases and to confirm that it's an aplacental viviparous species.

4. Evaluation of threats and impacts

Major threats

Fishing

- ✓ Directed fisheries

Basking shark numbers declined in parts of the OSPAR area as a result of historic fisheries but fishing for this species is now banned in the EEZs of Norway (since 2013,

Table 2), in the EU waters (since 2007, Council Regulation (EC) n°41/2007, article 5.6[1]) and in international waters managed by the North East Atlantic Fisheries Commission (since 2012,

1

[?] It is prohibited for community –and third country vessels to fish for, retain on board, transfer or disembark the basking shark (*Cetorhinus maximus*) in all EU waters. When accidently caught the species shall not be harmed and specimens promptly released (Council Regulation (EU) No 43/2014)

Recommendation 4.2012, 6.2015). It can be noted that in Norway, it is allowed to land basking sharks caught accidentally but only individuals that are dead or dying at the time of capture.

- ✓ By-catch

Levels of accidental by-catch in fisheries are unknown due to low levels of reporting. However, some data of by-catches of basking shark have been recorded opportunistically in several countries.

In Irish waters, Berrow & Heardman (1994) indicate that twenty-eight basking sharks were by-caught in fishing gear during the year 1993, mainly off the south and west coasts. Most of these (21) were caught in surface gill-nets and four were caught in bottom-set gill-nets in depth ranging from 25 to 300 meters. One shark was caught in lobster buoys and another in a trawl net. At least 22% of the sharks caught in nets died.

Valeiras et al., (2001) present data on by-catch from the Galicia coastal waters (north-west Iberian Peninsula), between the estuary of the River Mino and the ria of Ribadeo between 1988 and 1998. Twelve by-catches were reported (one in 1992, 1993, 1995 and 1996; two in 1997; 6 in 1998) due to entanglement in gill nets (called “trasmallo” or “mino”) used by an artisanal coastal fleet. 17% of the sharks were released alive, 50% died, and data are not available for the other animals. The increase in records in 1997 and 1998 could be the result of a better collaboration with fishermen among other things. 73.7% of records occurred during the end of winter and the beginning of spring (February, March and April) and were more frequent in the western coastal waters of the studied area.

Some opportunistic data on by-catches are also available for the Norwegian waters between 2006 and 2012 (published in Norwegian media) (ICES 2014). Eleven basking sharks were caught and the fishing gear mentioned for ten catches is gillnet. Two sharks were released alive, five were dead and data are not available for the other animals.

Finally, data have also been collected by France (unpublished data). The reports of by-catches, for the waters in OSPAR area, collected by the APECS (1997-2013) come for a part from fishermen and depend on relations maintained with them and, for another part, from the French observations at sea program OBSMER. Data come from four areas: the Atlantic coast, the English Channel, the north-east of the Celtic Sea and the north/north-west Scotland. A total of 64 sharks were reported, of which 15 sharks were released alive, 40 were dead and data are not available for the nine other animals. Fishing gears are gillnet (38), bottom trawl (18), pelagic trawl (4) and 1 shark was caught in the wetting line of a longline. On the Atlantic coast, 31 by-catches were in spring (April to June), 4 in winter (January to March) and 4 in autumn (November to December) and 3 in summer (July to September). In the north-east of the Celtic sea, 8 by-catches were in spring, 4 in winter and 1 in autumn. In English Channel, 2 by-catches were in winter and 2 in autumn and 1 in summer. In the north/north-west Scotland, 2 by-catches were in summer and 1 in spring and 1 in autumn.

Marine ecotourism

In addition, because these fish congregate in bays and shallow water, ecotourism activities (wildlife watching) have been developed in certain areas.

Speedie *et al.,* (2009) have found that slow-speed boat handling, when undertaken in a careful and responsible manner, has no visible effect on shark behaviour. However, that does not mean that no

risk exists, simply that whilst sharks are distracted by feeding or courtship, the risk changes to one of collision rather than simple disturbance. Therefore reductions in speed in areas of high likelihood of surface sighted sharks may prove to be the most efficient measure at hotspot sites.

To ensure a safe, positive interaction between human and shark, the Shark Trust has developed a Basking Shark Code of Conducts for swimmers and divers, kayakers and boat operators. The APECS also distributes a code of conducts for basking sharks (Annex 5). By following these codes, the risk of injuring or harassing basking sharks is greatly reduced.

Marine tourism

Recreational boat traffic (*e.g.* jet-ski use) has resulted in collisions, and some confirmed basking shark mortalities (Doyle *et al.*, 2005). Collisions seem to be relatively frequent: large areas of scarring are often observed on the head, dorsal fins and dorsal surfaces of UK sharks (CITES, 2002; www.manxbaskingsharkwatch.com; www.mcsuk.org). Kelly *et al.*, in 2004, show that there is a low level of reported incidents and a lack of awareness of marine protection legislation amongst all sectors. In order to establish appropriate management regimes, it is essential that the extent of these impacts are understood.

Additional potential threats

Other existing or future threats may include marine pollution, offshore renewable energy devices, climate change and ocean acidification, even if their characteristics and implications are less understood.

Marine pollution

The impact of microplastics (plastic fragments smaller than 5 mm) on large filter feeding marine organisms such as basking sharks are largely unknown. A recent study (Fossi *et al.*, 2014) represents the first evidence of plastic additives (phthalates) in Mediterranean basking sharks and it underlines the importance of future research both on detecting the presence of and looking for toxicological impacts of microplastics in filter-feeders species. The document discuses the possibility of using the basking shark as an indicator species for microplastics in the pelagic environment.

Plastic fragments have also been observed in the stomachs of some individuals necropsied by APECS team (Unpublished data).

Offshore renewable energy

It has long been recognized that elasmobranch species may be affected by Offshore Renewable Energy Devices through disturbance during construction and installation, and through electrical current bleed that might affect navigation and electro-reception (Gill 2005, Gill & Kimber, 2005). Speedie *et al.,* (2009) indicate that in the case of the basking shark, there is clear potential for collision with underwater turbine devices, as well as disruption of surface feeding and courtship behaviour due to the aforementioned installation and servicing of offshore sites. Tidal turbines are recognized to pose an obvious risk to sharks feeding around such installations, especially at hotspot sites that support regular aggregations of sharks, not all of which will be at the surface~~,~~ all of the time. He also indicates that the potential effects on tidal flows and frontal development that might

affect surface feeding and courting basking sharks are as yet unknown. This knowledge can be obtained through the deployment of animal-borne sound recording tags with associated motion recording tags and satellite telemetry. It would be prudent to deploy such an approach at a renewable energy site before, during, and following construction (Drewery, 2012)

Climate change and ocean acidification

Climate has important effects on migratory species through effects on physical and biotic environments including predator-prey interactions (Robinson *et al.*, 2008). There is potential for global warming to affect the timing and species assemblages of phytoplankton and zooplankton blooms (Sims & Reid, 2002), and there is evidence that plankton blooms/fish recruitment coupling events that occur in the North Sea may have already been permanently disrupted by warming of this relatively enclosed water body (Beaugrand *et al.*, 2002 & 2003). This is likely to have consequences for many species that rely on highly productive waters, including the basking shark, which lies at the end of a very short food chain, *i.e.* phytoplankton – zooplankton – basking shark.

Ocean acidification may have severe consequences for the marine environment, not least for carbonate shelled-organisms but also on copepods (in particular egg production rate and early development) and so, on the basking shark. However, as ocean acidification is only a recently observed phenomenon, there are few outcomes we can predict accurately (Speedie *et al.*, 2009).

5. Existing Management measures

Despite this vulnerability, the protection for basking sharks in Europe is limited and varies spatially.

Concern over the strong possibility that populations are depleted as a result of exploitation by fisheries and the lack of scientific knowledge of the species, has led to the basking shark being listed as Vulnerable worldwide since 1996 (last update, evaluation of 2005: A2ad+3d ver 3.1) (Fowler, 2005b) and Endangered (A2ad) in the North Pacific (Fowler, 2009a) and the North-East Atlantic (Fowler, 2009b) in the IUCN Red List since 2000 (IUCN: http://www.iucnredlist.org).

The basking shark is listed on several international conventions. In 2000, the species was listed in Appendix III of the Convention on International Trade in Endangered Species (CITES). In 2002, on the basis of a UK proposal, the CITES listing was upgraded to Appendix II, which requires that international trade in these species is monitored through a licensing system to ensure that trade can be sustained without detriment to wild populations.

In addition to OSPAR, basking sharks are also listed on UNCLOS, the Barcelona Convention, the Bern Convention, and the Bonn Convention on Migratory Species (CMS) and its Memorandum of Understanding on the Conservation of Migratory Species (CMS Sharks MoU) (Table 1). These international conventions do not protect a species *per se* but encourage contracting countries to take the necessary steps towards protecting the species within their own territory, and/or to establish partnerships whose aim is to improve the species conservation status. Parties to CMS are required to protect Endangered Appendix I species. The UNEP/CMS recommendation n°8.16 adopted in 2005 calls upon range states listed in Appendix I or II to develop a global migratory sharks conservation instrument (CMS, 2005). Since 2007 CMS Contracting Parties have negotiated an instrument and agreed on a Memorandum of Understanding (MoU), a legally non-binding instrument. It is intended

to achieve and maintain a favourable conservation status for migratory sharks based on the best available scientific information and taking into account the socio-economic value of these species for the people in various countries. The MoU was finalised and opened for signatures at the third negotiation meeting in Manila in 2010. Currently, 37 countries and the European Union are signatories to the Sharks MoU. At the first meeting of the signatories in Bonn in 2012, a conservation plan (Annex III of the MoU) was adopted for species included in Annex I of the MoU.

To act according to the precautionary principle and as an interim measure, pursuant to Article 5 and 6 of the Convention on Future Multilateral Cooperation in the North East Atlantic Fisheries, the North East Atlantic Fisheries Commission (NEAFC) Contracting Parties have agreed at the end of 2011 that no directed fishery for basking shark shall be undertaken in the Convention Area from 2012 to 2014. Contracting Parties are urged to make all available data on basking shark, including fisheries data, available to ICES for further evaluation of the state of the resource. The Recommendation was renewed by Recommendation 6:2015.

Table 1: International Conventions of relevance to basking sharks in the OSPAR Regions

Convention		Listing
United Nations Convention on the Law of the Sea (UNCLOS)		Annex I (Highly Migratory Species) since December 1982
Convention of Barcelona for the Protection of the Marine Environment and the Coastal Region of the Mediterranean		Annex II (Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean) since June 1995
Bern Convention on the Conservation of European Wildlife and Natural Habitats	BERN CONVENTION 1979 - 2004	Appendix II Strictly Protected Fauna Species (Mediterranean only) since December 1997
Convention on International Trade in Endangered Species of Flora and Fauna (CITES)	CITES	Appendix II since 2002
OSPAR Convention for the protection of the marine environment of the North-East Atlantic	OSPAR COMMISSION Protecting and conserving the North-East Atlantic and its resources	OSPAR List of Threatened and/or Declining Species and Habitats since 2003
Convention on the Conservation of Migratory Species (Bonn Convention)	CMS	Appendix I- Endangered Migratory Species Appendix II- Migratory species conserved through Agreements since November 2005

At a European scale, some implementing measures were taken by the Common Fisheries Policy:

- A Total Allowable Catch (TAC) of zero was adopted in 2001 in the ICES regions IV, VI & VII, which forbids commercialisation of this shark in these areas from 2002 (Annex 1D, Council Regulation (EC) No 2555/2001).

This TAC was applied until 2006 and was subsequently replaced in 2007 by a ban on EC vessels to fish, keep on board, embark or disembark basking sharks inside and outside European waters (Article II-5.6, Council Regulation (EC) n°41/2007). This ban is also applicable to all third party vessels fishing in European waters (article 13.2 of the regulation) and is still applicable (Article I-12.1, Council

Regulation (EC) 43/2014). Basking sharks are also concerned by the Council Regulation (EC) No 1185/2003 relative to the removal of shark fins on board fishing vessels (a process known as finning), which was adopted by the EC at the end of 2003 and amended in 2013 (Regulation (EU) No 605/2013).

On a national scale, basking sharks are currently fully protected within the territorial waters of the United Kingdom, Guernsey and Isle of Man, Malta and continental United States and partially protected in New Zealand where directed fishing is prohibited (

Table 2). The target fishery was closed in Norway, following the listing on Appendix I of CMS, but by-catch was still allowed until 2012. Since 2013, incidental catches should be released unharmed to the extent possible and only those individuals that are dead or dying at the time of capture might be landed in Norway (Table 2).

In the United Kingdom, basking sharks have been studied in depth and listed as a priority species under the UK Biodiversity Action Plan since 1999 (English Nature, 1999). In the UK, some national initiatives can be shown like the wise scheme (www.wisescheme.org), to limit impact from ecotourism. Within the framework of this scheme, nearly 800 individuals have been trained so far in safe observation techniques for the basking shark and other species.

Table 2: **National conservation measures in the OSPAR area**

	Text	**Year**	**Extent**	**Regulation**
Isle of Man	Schedule 5 of the Manx Wildlife Act	1990	12 nm	It is forbidden: - to capture, kill, injure or catch basking sharks; - to disturb basking sharks and to damage or obstruct access to an area used by basking sharks for shelter or protection; - to have in possession, to transport or to sell basking sharks or any products derived from the latter.
Guernesey, Alderney & Sark (Channel Islands)	Fishing Ordnance, Part I, Section II	Aug. 1997	3 nm	It is forbidden: - to capture, kill or injure basking sharks; - to ship, have in one's possession, sell, buy, import or export basking sharks; - Animals captured accidentally must be released at sea.
UK	Schedule 5 of the Wildlife and Countryside Act	Apr. 1998	12 nm	It is forbidden : - to capture, kill or catch basking sharks; - to have in one's possession or to sell basking sharks or any products derived from basking sharks.
Jersey (Channel Islands)	Conservation of wildlife	2000	12 nm	It is forbidden to kill or capture basking sharks

UK / England & Wales	Countryside and Rights of Way Act	2000	12 nm	It is forbidden to kill or capture basking sharks
UK / Scotland	Nature Conservation Act (Scotland)	2004	12 nm	It is forbidden to kill or capture basking sharks
Sweden	National regulations, FIFS 2004:36	2004	12 nm and EEZ	It is forbidden to fish for, retain on board, land, import or market basking sharks
UK / Northern Ireland	Wildlife (Northern Ireland) Order (1985) Amended by the wildlife and natural environment (Northern Ireland act 2011)	2011	12 nm	It is forbidden: - to kill or capture basking sharks; - to disturb basking sharks.
Spain	Spanish List of Wild Species under Special Protection	2011	12 nm	It is forbidden: - to capture, kill or injure basking sharks; - to sell, buy, import or export basking sharks.
Norway	Fishing regulation/injunction	2013	12 nm and Norwegian vessels in ICES area I-XIV	It is forbidden : - to capture and land *C. maximus;* - to cut the fins off *C. maximus* (finning) before landing of any by-catch; - if *C. maximus* is captured when fishing for other species, it should be released unharmed to the extent possible. Only dead or dying individuals at the time of capture might be landed; - all capture of *C. maximus* must be reported both in number of individual and weight.

6. Conclusion on overall status

There is no known change in the status of this species since it was proposed to be listed by OSPAR in 2004. Future trends are currently very unclear. The pronounced migratory character and vulnerability of this species underlines the need to strengthen our knowledge of basking sharks by pooling the efforts of research teams within different countries.

The collapse of landings thirty years ago was a turning point in the interest in the conservation of this species. However it has not proved possible to assess the effects of past fishing mortality on basking shark populations in the North-East Atlantic because no reliable estimates of population size have been made. The development of the genetic studies should lead soon to further results being obtained.

Nowadays, the targeted fishing of basking sharks is entirely banned (ICES, 2006), but by-catch persists, notably in driftnets, entanglement in lobster/crab and prawn pot ropes and trawlers, for which very few data are available. New potential threats also exist, with the development of the marine renewable energies and the pollution of the oceans due to microplastic which is expanding,

and other threat like climate change and ocean acidification that continue to evolve over time and to impact the composition of the zooplankton.

The low productivity of this marine fish species makes basking sharks very sensitive to population collapse from anthropogenic sources (*e.g.* the Californian / west coast Canadian populations have not recovered since a fisheries programme and an eradication programme were introduced along that coast between the 1930s and 1970s. The eradication programme (which killed sharks by ramming them with boats with large spikes attached to their hulls) between the 1950s and the 1970s in Canada was introduced to eliminate basking sharks in order to protect salmon nets. The shark population has yet to recover (Solandt, *comm.pers*.).

Various research programmes have been implemented in order to understand the population size and distribution of basking sharks. The sightings recording schemes developed for the most part in British and French waters only provide information on the relative surface abundance of basking sharks. Most observations occur in the spring and summer, in shallow coastal areas. The presence of basking sharks depends on the sea surface temperature at large scale and several studies have also demonstrated that basking shark tracks seasonal zooplankton aggregations closely. If recording schemes allowed localising hotspots at the surface, other areas of aggregation should exist in areas where sharks spend most of their time deeper. The current knowledge does not allow specifying the role of these zones of aggregation.

Tracking studies have brought valuable information on this species. There are more and more evidences that *C. maximus* is highly migratory. These tags deployments have demonstrated that basking sharks move between different economic zones and as a result are not afforded statutory protection for the majority of the time. Therefore conservation measures for this species need to be framed on an international level, as has been attempted through listing on several international agreements.

Current management measures, while ostensibly helpful, do not appear to be sufficient to allow for the recovery of this species. Very few countries that are Party to CMS have implemented protection for this Appendix I species.

7. Action to be taken by OSPAR

Action/measures that OSPAR could take, subject to OSPAR agreement

As set out in Article 4 of Annex V of the Convention, OSPAR has agreed that no programme or measure concerning a question relating to the management of fisheries shall be adopted under this Annex.

Table 3: Summary of key priority actions and measures which could be taken for Basking shark. Where relevant, the OSPAR Commission should draw the need for action in relation to questions of fisheries management to the attention of the competent authorities. Where action within the competence of the Commission is desirable to complement or support action by those authorities or bodies, the Commission shall endeavour to cooperate with them.

Key threats	- Incidental captures;

	- Increase of recreational boat traffic and wildlife watching; - Climate change and ocean acidification through alterations in zooplankton composition; - Pollution, habitat degradation, offshore renewable energy.	
Other responsible authorities	EC, FAO, RFMOs [OSPAR Contracting Parties: Iceland, Norway, Denmark, Sweden, Netherlands, Belgium, Germany,UK, Ireland, France, Portugal, Spain]	
Already protected? **Measures adequate?**	- Council Regulation (EC) n°41/2007 of the 21/12/2006 (article 5.6) banning basking shark fishing in the EC; - Council Regulation (EC) n°1185/2003 of the 26/06/03 banning finning in the EC; - Norwegian fishing regulations; - NEAFC recommendation 6:2015 banning directed basking shark fishing in the convention area since 2012; - IUCN Red List vulnerable globally (2005), endangered in the NE-Atlantic (2009); - CITES Appendix II; - CMS Appendix I, II (Bonn convention); - Bern convention; - Barcelona convention; - Fully protected within the territorial waters of the United Kingdom, Guernsey, Isle of Man, Sweden, Spain and Norway as well as in the Exclusive Economic Zone of Sweden (see table 2); - UK Biodiversity Action Plan.	European and NEAFC regulations limit global targeted fishing impact on this vulnerable species in a significant way. Nevertheless, as basking sharks carry out ocean-wide migrations, protection measures need to extend beyond territorial and community waters.
Recommended A+M	**OSPAR Commission**	OSPAR should emphasise to relevant scientific bodies the following research needs: - Pooling research efforts between different countries and strengthening transnational communication between research teams; - Improving our knowledge of this species by furthering or initiating research programs: o to quantify and monitor population size; o to elucidate migration and over-wintering areas which may identify locations where basking sharks mate and the pregnant females reside (satellite tagging);

		• to grasp the relationship between zooplankton availability and basking shark presence; ○ to continue surveillance of basking shark sightings (casual users and observers embarked on fishing vessels and using effort-based observation from fixed points on land) distribution trends over time in order to fully understand the impacts of climate change on this species. These studies should be run concurrently between all range states in the OSPAR region using the same methodology over a number of years; • to continue research programs on basking shark population genetics in order to determine the population structure.
	Contracting Parties	- Encourage OSPAR Members that are Party to CMS to implement the Appendix I listing by protecting the species within their waters; - Statutory protection; - Extend protection under the UK Wildlife and Countryside Act to all UK waters (including the EEZ) and to apply similar measures in Northern Ireland and France, where basking sharks are usually sighted; - Develop the use of the codes of conduct; - Develop local management measures, including provision of guidelines and codes of conducts to sea-users and establish surveys of sea-users to determine whether boat strike and disturbance is a regular occurrence.
	OSPAR should communicate to relevant authorities the need for:	- Improved accidental by-catch data collection (obligatory declarations in the log books, embarking scientific observers on board fishing vessels); - Extending the Bern Convention listing to OSPAR waters; - Listing basking sharks on the Habitats Directive.

In the 2014 advice, ICES indicates that proper quantification of by-catch and discarding both in weight and numbers of this species in the entire ICES area is required. It also recommends that where national legislation prohibits landing of by-catches basking sharks, measures should be put in

place to ensure that incidental catches are recorded in weight and numbers, and carcasses or biological material made available for research (ICES, 2014).

Brief summary of the proposed monitoring system (see annex 2)

Given the highly mobile nature of this species, a large-scale international conservation effort must be envisaged. As basking sharks undergo transatlantic migrations and migrate southward in the North-East Atlantic Ocean, it would be interesting to pursue partnerships with countries outside the OSPAR maritime area, namely Canadian, American, Canary Island and Azores research teams. This might be achieved through the proposed CMS Instrument for migratory sharks.
Relevant Contracting Parties should be encouraged to report to OSPAR on:

- Sighting schemes;
- Satellite tagging;
- Genetic research to determine whether there are one or several basking shark populations;
- Research on population size estimate;
- Research relating to food availability;
- Accidental by-catch;
- Implementation of codes of conduct in basking shark hotspots with high boat traffic.

Annex 1: Overview of data and information provided by Contracting Parties

Table 4: Overview of data and information provided by Contracting Parties

Contracting Party	Feature occurs in CP's Maritime Area	Contribution made to the assessment (*e.g.* data/information provided)	National reports References or weblinks
Belgium	Y	N	
Denmark	Y	N	
European Commission		N	
France	Y	Data on sightings along French coast, trends in Brittany (NW France) over last years (1997-2013) Data on satellite tracking in the North-East Atlantic Ocean (2009-2013)	Stephan *et al.,* (2011) http://asso-apecs.org/
Germany	Y	N	Fricke (2008)
Iceland	Y	Data on sightings from whale watching boats essentially	Jónbjörn Pálsson, Pers. comm. (2009) Chiaria Bertulli, Pers. comm. (2014) Megan Wittaker, Pers. comm. (2014)
Ireland	Y	Data on sightings	Doyle *et al.,* (2005)
Netherlands	Y-rare	N	Muus & Nielsen. (1999) Camphuysen *et al.,* (2001)
Norway	Y	Information on the level of sightings during whale surveys, public sightings and strandings	Ole Thomas Albert, Pers. comm. (2014)
Portugal	Y-rare	Information on the level of sightings, incidental catches and landings (1987-2006)	Joao Correia & Filipe Pereira, Pers. comm. (2008)
Azores	Y-rare		Santos *et al.* (1997) Backus (1966) http://www.photonunosa.com/news.html
Spain	Y	N	Valeiras *et al.,* (2001)
Sweden	Y	N	Gärdenfors, (ed.) (2005)

UK	Y	Data on sightings Data on genetic studies Data on satellite tracking	Bloomfield & Solandt (2008) Cotton *et al.,* (2005) Doyle *et al.,* (2005) Drewery (2012) Hoelzel *et al.,* (2006) Jones (2012) Noble *et al.,* (2006) Norris Green (2008) Sims *et al.,* (2005), Sims (2008) Solandt & Chassin (2014) Speedie & Johnson (2008), Speedie *et al.,* (2009) Witt *et al.,* (2012 -2014) www.mcsuk.org http://noc.ac.uk/

C. maximus was nominated in 2001 for inclusion in the OSPAR List by Germany, Iceland, Portugal, UK, WWF.

Contact persons: Fátima Brito, Direcção Geral do Ambiente, Portugal / Sabine Christiansen, WWF International, Hamburg, Germany / Ronald Fricke, Staatliches Museum fuer Naturkunde, Stuttgart, Germany / Mathew Carden, DEFRA, London UK

Summaries of country-specific information provided (Table 4)

France: In France, an annual sightings scheme has been running in Brittany since 1997 and along the whole of the French coast since 1998 by the NGO Association Pour l'Etude et la Conservation des Sélaciens (APECS) (http://asso-apecs.org/; Annex 4, Table 5).

Since 2003, APECS has initiated a study program for the basking sharks (sex ratio, size, photo-identification, ADN sampling) in order to grasp a better knowledge of the individuals present in the waters around Brittany, and to learn whether the basking sharks make up a small local population or belong to a much vaster one, and to better understand their movements. Every spring, monitoring is carried out in the waters surrounding the Glénan Isles and the north of the Iroise Sea. In 2009, in order to improve knowledge of vertical and horizontal movements patterns, an international program called "Sur les traces du requin pèlerin: Satellite tracking of basking sharks in the North-East Atlantic Ocean" saw the day and initiated cooperation between the various European teams which is one of the OSPAR Commission recommendations (Annex 4, Table 5).

Iceland: Baskings sharks are particularly present in the warmer waters off the southern and western coast. It is occasionally seen, but only single animals (Jónbjörn Pálsson, Pers. comm, 2009). Opportunistic data are also available from a whale watching tour operator from Reykjavik with some fins photos (Chiara Bertulli and Megan Wittaker, Pers. comm.).

Ireland: In Ireland, since 1992, the Irish Whale and Dolphin Group (www.iwdg.ie) log, in parallel to their cetacean records, basking sharks strandings and sightings. Most observations take place during the spring. Irish Basking Shark Project (http://www.baskingshark.ie/) was created in 2009 to focus on basking shark.

Norway: The Norwegian Institute of Marine Research (IMR) has not conducted research on basking sharks. However, basking shark have been recorded on whale sighting surveys in the Norwegian Sea since 1988 and more sporadic observations of both live and stranded individuals have also been recorded. The data include less than 50 sightings, 30 sporadic public observations at sea, and 8 stranded animals (Ole Thomas Albert, Pers. comm.).

Portugal: A few observations and accidental by-catches occur very infrequently, and concern mostly single basking sharks (Joao Correia, Filipe Pereira, Pers. comm,). From 1987 to 2006, fish landings in Portugal indicate a total basking shark capture of 13.5 tonnes (Joao Correia, Pers.comm). In 1956 (Santos et al., 1997) and 1964 (Backus, 1966) in Azores, a basking shark was found in the stomach of a sperm whale.

Spain: A report of basking sharks in Galician waters presents morphometric, biological, geographic and temporal data on 19 basking sharks from sightings, strandings and incidental catches between (1988-1998). 74% of sharks were recorded during February, March and April, which may suggest that the species occurs seasonally in this area (Valeiras *et al.*, 2001)

The Netherlands: In summer young individuals are sometimes observed foraging off the Dutch Coast.

United Kingdom: Since 1987, the Marine Conservation Society (MCS) (http://www.mcsuk.org/) has successfully raised public and media awareness of basking sharks in UK waters and regularly reports basking shark watch results to the general public via annual summary reports (Annex 4, Table 5). MCS is joint lead partner of the basking shark species action plan (http://jncc.defra.gov.uk/page-5167) along with the Shark Trust and the Wildlife Trust.
A major UK Defra research programme was carried out between 2003 and 2006 by Cefas and the University of Plymouth. Research teams researched satellite tagging in UK waters before taking an interest in basking shark food availability and determining the relationship between basking shark distribution and thermal fronts, zones which are prolific for zooplankton. Genetic studies aiming to show whether there are one or several populations have been put into place. Research teams have worked specifically in Cornish and Hebridean waters.

Annex 2: Detailed description of the proposed monitoring and assessment strategy

Rationale for the proposed monitoring

Basking sharks have life-history traits that make them especially vulnerable. The main threats to this species are fishing by-catches and collisions because of increased boat traffic (marine tourism) and ecotourism. Furthermore a lot remains to be learnt about their biology and population dynamics.

Given its vulnerability and the threats facing this species, it is important to coordinate research activities for this species on an OSPAR area scale, and to further research in zones that have had little prospecting to date (particularly Norway, the Iberian Peninsula and Iceland)

Use of existing monitoring programmes

The feeding habits of basking sharks lead them to spend long hours at the sea surface filtering zooplankton, a characteristic which allows relatively easy sightings of this species and subsequent relative abundance estimates. Thus, different sightings schemes have been implemented across the OSPAR maritime area, essentially in French and British waters.

Awareness-raising campaigns are led every spring along the British and French coastline. Users of leisure vessels are invited to report sightings by means of a public sightings recording scheme. In parallel, research teams using line transect methods around the southern Hebrides, Isle of Man, Cornish coast and Brittany with a very precise protocol (effort-corrected counts from ship surveys) collect data on different biotic and abiotic parameters. Some programmes are dedicated to tagging of basking sharks with satellite pop-up tags.

Any OSPAR monitoring strategy for basking sharks will therefore essentially be to bring together the outputs of the different ongoing monitoring, assessment and research efforts across the OSPAR area, ensuring at the same time that any significant gaps are filled. At the same time, it would be expedient to further research efforts in non-prospected zones (*i.e*. the Iberian peninsula and Scandinavia).

Results from the basking sharks monitoring and other research programmes are not formally coordinated or reported on across the OSPAR area at present.

The focus should be on ensuring that the resulting available information is collated for this species at the OSPAR level. Therefore, the relevant Contracting Parties (UK, France) should report monitoring data to OSPAR. It may be necessary for OSPAR to consider how best to ensure consistency of monitoring and data reporting.

OSPAR could encourage the implementation of research programmes in non-prospected zones. Every year the European Elasmobranch Association organises a meeting to allow European researchers to exchange research ideas on sharks, skates and rays. This NGO based in Plymouth was created in 1996 (http://www.eulasmo.org/) and gathers together the majority of research teams working on basking sharks. The EEA could be the organisation with which data collected via the OSPAR network is exchanged and analysed.

Synergies with monitoring of other species or habitats

As basking sharks come to feed on the surface, it is natural to link their observations with cetacean monitoring programmes, as is already the case with several organisations (*e.g.* the Irish Whale and Dolphin Group, the Hebridean Whale and Dolphin Trust). Surveys on board cetacean research vessels can also record basking shark sightings data. Raising awareness among the fishing and merchant community would increase sightings recording at no extra cost.

The Council Regulation (EC) n°812/2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending Regulation (EC) No 88/98 stipulates that Member States should have observers monitor incidental catches of cetaceans and to collect the data necessary to extrapolate the by-catch observed to the whole fishery concerned. It is suggested that these observers, who by definition must be competent biologists, log all by-catches, including shark species. In France, although basking shark is not included in the Data Collection Framework (DCF), since 2009, observers working in the frame of the French observations at sea program OBSMER have been trained and given permission by the fishing authorities to collect data, in addition to cetaceans, on 11 sharks, 6 rays and 3 angel sharks, including the basking shark, the porbeagle (Lamna nasus), the common skate (Dipturus batis) and the angel shark (Squatina squatina), all four of which are on the OSPAR list. Since 2010, on the APECS' proposition, mucus sampling is realized on basking sharks. The OSPAR Commission could encourage all Contracting Parties to increase their observation effort in terms of numbers and detail recorded.

Assessment criteria

Data is insufficient to determine a critical level below which conservation efforts must be multiplied. The current approach to conservation of basking sharks relies heavily on the precautionary principle, which states that insufficient scientific knowledge about biology and stock status is no defence for a lack of action.

With our current level of knowledge, there is a need for further research effort in the UK and France as well as other Contracting Parties, where basking sharks are often seen.

Techniques/approaches

- Continue sightings recording schemes in British and French waters, further research in Scandinavia and the south of the OSPAR region. Expand further fixed-point and mobile effort-corrected basking shark (and other marine megafauna) watches across the OSPAR region with coordinated methodology;
- Further satellite tagging programmes, covering different sexes and age classes;
- Further research on food availability and distribution;
- Further genetic research on basking shark populations in order to determine whether there are one or several;
- Increased reporting of by-catches: encourage fishermen to declare by-catches in their log books;
- Increased dissemination of the codes of conduct in basking shark hotspots.

Selection of monitoring locations

Basking sharks should be monitored in Great-Britain, Ireland, France, Norway, Spain and Portugal. Efforts should be concentrated in Norway, Spain and Portugal.

Timing and Frequency of monitoring

Monitoring should take place annually:

- In the north of the OSPAR maritime area, as is already the case, during the spring and summer months to coincide with plankton blooms;
- In the south of the OSPAR area, not enough data have been collected to identify a preferential monitoring period, or indeed whether there is a high enough abundance of basking sharks to merit a targeted research programme.

Data collection and reporting

The basic data categories to be recorded are:

 For a sighting at sea by a leisure vessel user/member of the public:

- GPS position;
- size estimation;
- animal behaviour (feeding yes or no);
- photo-identification of dorsal fin if possible.

 For a sighting carried out by a research team:

- GPS position;
- photo-identification of dorsal fin;
- size estimation;
- animal behaviour (feeding yes or no);
- sex determination, as well as the recording of any distinctive marks, by getting into the water with the basking shark if behaviour and weather conditions will allow it;
- abiotic factors: water temperature/air temperature/wind strength and direction/sea state/ cloud covercounting the time for which the dorsal fin is out of the water and comparing it to the total time the basking shark is observed;
- mucus sampling (and tagging if it's part of the program);
- plankton sampling once all other parameters have been recorded. If the sighting lasts a long time, regular plankton samples along its path should be carried out;
- Afterwards, if the shark is still within sight, carry out simple ethological surveying: behaviour, surrounding vessels, types of vessels, behaviour in response to surrounding activities *etc*.

Quality assurance

It is essential that awareness raising campaign efforts are equal along the whole coastline and that clear pointers are given in identifying basking sharks, so that their dorsal fins are not confused with those of porbeagles or cetaceans.

For sightings recording schemes, it is important that one is not afraid to discard data if reliability or accuracy is in doubt.

During ship-based surveys (and effort-corrected land-based surveys), prospecting efforts (time and distance surveyed) must be recorded in order to carry out effective comparisons between different sectors.

Annex 3: References

Ali M., Saad A., Reynaud C., Capape C. (2012). Occurrence of basking shark, *Cetorhinus maximus* (Elasmobranchii: Lamniformes: Cetorhinidae), off the Syrian coast (eastern Mediterranean) with first description of egg case. Acta Ichthyologica Et Piscatoria, 42 (4), 335-339

Backus R. H. (1966). A Large Shark in the Stomach of a Sperm Whale. Journal of Mammalogy, 47 (1), 142 p

Beaugrand G., Reid P. C., Ibanez F., Lindley J. A., Edwards M., (2002). Reorganization of North Atlantic Marine Copepod Biodiversity and Climate. Science 296, 1692-1694

Beaugrand G., Branger K. M., Lindley J. A., Souissi S., Reid P. C. (2003). Plankton effect on cod recruitment in the North Sea. Nature, 426, 661-664

Berrow S. D. & Heardman C. (1994). The basking shark *Cetorhinus maximus* (Gunnerus) in Irish water. Patterns of distribution and abundance. Proc. R. Acad. 94B (2), 101-107

Bloomfield A. & Solandt J-L. (2008). Marine Conservation Society Basking shark Watch: 20 year report (1987-2006). Marine Conservation Society, Ross on Wye, UK

Bonfil R. (1994). Overview of world elasmobranch fisheries. FAO fisheries Technical Paper 341. FAO, Rome, Italy

Camphuysen K., Couperus B., Weichler T. (2001). Foraging basking sharks *Cetorhinus maximus* in the North Sea, summer 2001 [Foeragerende reuzenhaaien (*Cetorhinus maximus*) in de Noordzee, zomer 2001]. Het Zeepaard, 61 (5), 127-132 (in Dutch)

Chenard M., Desbrosses P., Le Gall J. (1951). Squales Le pèlerin (*Cetorhinus maximus*, Gunnerus). Revue des travaux de l'Office des Pêches Maritimes, 16, 1-4

CITES (2002). Convention on International Trade in Endangered Species (CITES), 2002. Inclusion of Basking Shark *Cetorhinus maximus* in Appendix II. Proponent: United Kingdom (on behalf of the Member States of the European Community). 12th Meeting of the Conference of Parties Proposal 36

CITES (2006). Conservation and management of sharks. Implementation of CITES shark listings. Documente prepared by the intersessional shark working group of the CITES Animals Committee. ACC 22 Doc 17.2

Clarke S. (2004). Shark product trade in Mainland China and Hong-kong and implementation of the CITES shark listings. Hong-Kong, china : TRAFFIC East Asia

CMS (2005). Migratory sharks. UNEP/CMS/Recommendation 8.16, 2 p

Compagno L. V. J. (1984). FAO species catalogue Vol. 4. Part 1 and 2: Sharks of the world: An annotated and illustrated catalogue of shark species known to date. FAO Fisheries Synopsis 125. FAO, Rome, Italy

Compagno, L. V. J. (2001). Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Vol 2. Bullhead, mackerel and carpet sharks (Heterodontiformes, Lamniformes and Orectolobiformes). Rome : FAO Species Catalogue for fisheries Purposes, FAO

Cotton P. A., Sims P. W., Fanshame S., Chadwick M. (2005). The effects of climate variability on zooplankton and basking shark (Cetorhinus maximus) relative abundance off southwest Britain. Fisheries Oceanography, 14 (2), 151-155

Doyle J. I., Solandt J-L., Fanshawe S., Richardson P. (2005). Marine conservation Society Basking Shark Report 1987-2004. Marine Conservation Society, Ross on Wye, UK, 68 p

Drewery H. M. (2012). Marine Scotland Science Report 24/12: Basking shark (*Cetorhinus maximus*) literature review, current research and new research ideas, 26 p

Ebert D. A., Fowler S., Compagno L. J. V. (2013). Sharks of the world, a fully illustrated guide. Fluke Art, 528 p

English Nature (1999). UK Biodiversity Group Tranch 2, Action Plans, vol. 5. Maritime Species and Habitats. English Nature, Peterborough, UK

Fairfax D. (1998). The Basking Shark in Scotland: natural history, fishery and conservation. Tuckwell Press, East Linton, Scotland. 206 p

Federal Agency for Nature Conservation (BfN) (2014), Monitoring report for seabirds in the North Sea in 2014. http://www.bfn.de/0314_meeres-kuesten_naturschutz.html. Augen auf für den Habicht! Unser Vogel des Jahres 2015 wird illegal verfolgt. Helfen Sie ihm. Tipps unter http://www.vogel-des-jahres.de/habicht

Fossi M. C., Coppola D., Baini M., Giannetti M., GuerrantiC., Marsili L., Panti C., De Sabata E., Clò S. (2014). Large filter feeding marine organisms as indicators of microplastic in the pelagic environment: the case studies of the Mediterranean basking shark (*Cetorhinus maximus*) and fin whale (*Balaenoptera physalus*)

Fowler S. L. (1996). Status of the basking shark *Cetorhinus maximus* (Gunnerus). Shark news 6:4-5. Newsletter of the IUCN Shark Specialist Group

Fowler S. L. (2005a). Status of the basking shark: *Cetorhinus maximus* (Gunnerus). In Fowler S. L., Camhi M., Burgess G., Fordham G., Musik J., Sharks, rays and chimaeras. The status of the Chondrichtyan fishes. IUCN species survival commission shark specialist group. IUCN, Gland, Switzerland and Cambridge UK, 461p

Fowler S. L. (2005b). *Cetorhinus maximus*. The IUCN Red List of Threatened Species. Version 2014.2. <www.iucnredlist.org>. Downloaded on 21 October 2014

Fowler S. L. (2009a). *Cetorhinus maximus* (North Pacific subpopulation). The IUCN Red List of Threatened Species. Version 2014.2. <www.iucnredlist.org>. Downloaded on 20 October 2014

Fowler S. L. (2009b). *Cetorhinus maximus (Northeast Atlantic subpopulation)*. The IUCN Red List of Threatened Species. Version 2014.3. <www.iucnredlist.org>. Downloaded on 20 October 2014

Fricke R. (2008). Rote Liste der marinen Fische und Rundmäuler Deutschlands (Pisces: Gnathostomata, Petromyzontomorphi). Bonn (BfN).

Gärdenfors U. (ed) (2005). The 2005 red list of Swedish species. Uppsala (ArtDatabanken)

Gautier M. (1960). La pêche des squales en particulier dans les ports du Finistère. Penn ar Bed, 21, 178-183

Geelhoed, S.C.V.; Bemmelen, R.S.A. van; Verdaat, J.P. (2014). Marine mammal surveys in the wider Dogger Bank area summer 2013. Report / IMARES C016/14. 27pp http://www.wageningenur.nl/nl/Publicatie-details.htm?publicationId=publication-way-343531313331. Accessed 3 March 2014.

Gill A. B. (2005). Offshore renewable energy- ecological implications of generating electricity in the coastal zone. Journal of Applied Ecology, 42, 605-615

Gill A. B. & Kimber J. A. (2005). The potential for cooperative management of elasmobranches and offshore renewable energy development in UK waters. Journal of the Marine Biological Society of the UK , 85, 1075-1081

Gore M. A., Rowat D., Hall J., Gell F. R., Ormond R.F. (2008). Transatlantic migration and deep mid-ocean diving by basking shark. Biol. Lett doi :10.1098/rsbl 2008.0147, published online

Hareide N. R., 2006. History of Norwegian fishery for basking shark (*Cetorhinus maximus*). Working document. ICES Working Group on Elasmobranch Fishes. 6pp.

Hoelzel A. R., Shivji M. S., Magnussen J., Francis M. P. (2006). Low worldwide genetic diversity in the basking shark (*Cetorhinus maximus*). Biology Letters, 4 (2), 639-642

ICES (2006). Report of the working group on Elasmobranch Fishes (WGEF) 14-21 June 2006. ICES WGEF Report 2006. ICES advisory Committee on Fishery Management. 299 p

ICES (2007). Report of the working group on Elasmobranch Fishes (WGEF) 22-28 June 2007. ICES WGEF Report 2007. ICES advisory Committee on Fishery Management. 332 p

ICES (2013). Report of the Working Group on Elasmobranch Fishes (WGEF), 17–21 June 2013, Lisbon, Portugal. ICES CM 2013/ACOM:19. 649 p

ICES (2014). Draft - Report of the Working Group on Elasmobranch Fishes (WGEF), 17-26 June 2014, Lisbon, Portugal. ICES CM 2014/ACOM:19, 671 p

IUCN, 2005. IUCN Red List of Threatened Species. IUCN Gland, Switzerland and Cambridge, UK.

Jones A. R. (2012). The spatio-temporal distribution and habitat associations of marine megavertebrates off southwest UK. Thesis for the Degree of Doctor of Philosophy, University of Southampton, 331 p

Kelly C., Glegg G.A., Speedie C.D. (2004). Management of marine wildlife disturbance. Elsevier, Ocean and coastal Management, 47, 1-19

Konstantinov K. G. & Nizovtsev G. P. (1980). The basking shark *Cetorhinus maximus*, in Kan-dalaksha Bay of the White Sea. Journal of Ichthyology, 19: 155-156

Kunzlik P.A. (1988). The basking shark. Scottish Fisheries. Information Pamphlet no14. Department of Agriculture and Fisheries for Scotland. Aberdeen

Lieber L., Berrow S., Johnston E., Hall G., Hall J., Gubili C., Sims D. W., Jones C. S., Noble L. R. (2013).Mucus: aiding elasmobranch conservation through non-invasive genetic sampling. Endangered Species Research, 21, 215-222

McNally K. (1976). The Sun-Fish Hunt. Blackstaff Press: Belfast

Musik J. A., Harbin M. M., Berkeley S. A., Burgedd G. H., Eklund A. M., Findley L., Gilmore R. G., Golden J. T., Ha D. S., Huntsman G. R., McGovern J. C., Parker S. J., Poss S. G., Sala E., Schmidt T. W., Sedberry G. R., Weeks H., Wright S. G. (2000). Marine, estuarine and diadromous fish stocks at risk of extinction in North America (exclusive of Pacific salmonids). Fisheries 25 (11), 6-30

Muus B. J. & Nielsen J. G. (1999). Zeevissen van Noord- en West-Europa, Schuyt en Co. (ISBN 90 6097 510 3) (in Dutch)

Noble L. R., Jones C. S., Sarginson J., Metcalfe J. D., Sims D. W., Pawson M. G. (2006). Conservation genetics of basking sharks. Final project report. Department for Environment Food and rural affairs (DEFRA) Tender CR 0288, 85 p

Norris Green L. (2008). Photographic identification of basking sharks (Cetorhinus maximus) in coastal waters of the Isle of Man. Research dissertation: MSc Wildlife Biology and Conservation, 53 p

Pauly D. (2002). Growth and mortality of the basking shark Cetorhinus maximus and their implications for the management of whalesharks Rhincodon typus. In : Fowler S. L., Reed T. M., Dipper F. A. (eds) (2002). Elasmobranch Biodiversity, Conservation and Management. Proceedings of the International Seminar and Workshop, Sabah, Malaysia, July 1997. IUCN SCC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. XV + 258 p

Pawson M. & Vince M. (1999). Management of shark fisheries in the Northeast Atlantic. Case studies of the management of elasmobranch fisheries (Shotton, R., ed),1-46, FAO Fisheries Technical Paper 378/1. Food and Agriculture Organization of the United Nations: Rome

Robinson R. A., Crick H. Q. P., Learmonth J. A., Maclean I. M. D., Thomas C. D., Bairlein F., Forchhammer M. C., Francis C. M., Gill J. A., Godley B. J., Harwood J., Hays G. C., *et al*., (2008). Travelling through a warming world: Climate change and migratory species. Endangered Species Research, doi:10.3354/esr00095

Santos R. S., Porteiro F. M., Barreiros J. P. (1997). Marine fishes of the Azores: Annotated check-list and bibliography. Publishers university of the Azores. Arquipelago-life and Marine Sciences Supplement 1: XXVIII + 241 p

Shepard E. L., Ahmed M. Z., Southall E. J., Witt M. J., Metcalfe J. D., Sims D. W. (2006). Diel and tidal rhythms in diving behaviour of pelagic sharks identified by signal processing of archival tagging data. Marine Ecology Progress Series, 328, 205-213

Sims D. W. & Merrett D. A. (1997). Determination of zooplankton characteristics in the presence of surface feeding basking sharks *Cetorhinus maximus*. Mar. Ecol. Prog. Ser.,158, 297-302

Sims D. W., Fox A. M., Merrett D. A. (1997). Basking shark occurrence off southwest England in relation to zooplankton abundance. J. Fish Biol, 51, 436-440

Sims D. W. & Quayle V. A. (1998). Selective foraging behaviour of basking sharks on zooplankton in a small-scale front. Nature, London, 393, 460-464

Sims D. W. (1999). Threshold foraging behaviour of basking sharks on zooplankton: life on an energetic knife-edge? Proc. R. Soc. Lond. B, 266, 1437-1443

Sims D. W., Southall E. J., Quayle V. A., Fox A. M. (2000). Annual social behaviour of basking sharks associated with coastal front areas. Proc R Soc Lond B Biol Sci, 267, 1897-1904

Sims D. W. & Reid P. C. (2002). Congruent trends in long-term zooplankton decline in the Northeast Atlantic and basking shark (*Cetorhinus maximus*) fishery catches off west Ireland. Fisheries Oceanography, 11 (1) , 59-63

Sims D. W., Southall E. J., Richardson A. J., Reid P. C., Metcalfe J. D. (2003). Seasonal movements and behaviour of basking sharks from archival tagging: no evidence of winter hibernation. Marine Ecology Progress Series, 248, 187-196

Sims D. W., Southall E. J., Metcalfe J. D., Pawson M. G. (2005). Basking shark population assessment. Final report for Global Wildlife Division of Data. Tender CR 0247, 74 p.

Sims D. W. (2008). Sieving a living: a review of the biology, ecology and conservation status of the plankton-feeding basking shark *Cetorhinus maximus*. Adv Mar Biol, 54, 171-220

Skomal G. B., Zeeman S. I., Chisholm J. H., Summers E. L., Walsh H. J., McMahon K. W., Thorrold S. R. (2009). Transequatorial Migrations by Basking Sharks in the Western Atlantic Ocean. Current Biology,19, 1-4

Solandt J-L., Stephan E., Richardson P., Doyle J., Duncan C., Fanshawe S. (2006). Basking sharks in the Northeast Atlantic: distribution, conservation and collaboration. Poster presented EAA 2006

Solandt J-L. & Chassin E. (2014). Marine Conservation Society Basking Shark Watch. Overview of data from 2009 to 2013. Edited by Jay D. 6 p

Southall E. J., Sims D. W., Metcalfe J. D., Fanshawe S., Lacey C., Shrimpton J., Solandt J-L., Speedie C. D. (2005). Spatial distribution patterns of basking sharks on the European shelf: preliminary comparison of satellite-tag geolocation, survey and public sightings data. J. Mar. Biol. Ass. U.K., 85, 1083-1088

Southall E.J., Sims D.W., Witt M.J., Metcalfe J.D. (2006). Seasonal space-use estimates of basking sharks in relation to protection and political-economic zones in the Northeast Atlantic. Biol. Cons, 132 (1), 32-39

Speedie C. D., Johnson L. A. (2008). The basking shark (*Cetorhinus maximus*) in West Cornwall. Natural England Research Information. Report NERR018, 45 p. www.naturalengland.org.uk

Speedie C.D., Johnson L.A, Witt M. (2009). Basking Shark Hotspots on the West Coast of Scotland: Key sites, threats and implications for conservation of the species. Scottish Natural Heritage, Commissioned Report, 339, 59 p

Stephan E., Gadenne H., Jung A. (2011). Satellite tracking of basking sharks in the North-East Atlantic Ocean. APECS Report

Valeiras J., Lopez A., Garcia M. (2001). Geographical, seasonal occurrence and incidental fishing captures of basking shark, Cetorhinus maximus (Chondricthyes : Cetorhinidae). J. Mar. Biol. Ass. UK, 81, 183-184

Witt M. J., Hardy T., Johnson L., McClellan C. M., Pikesley S. K., Ranger S., Richardson P. B., Solandt J-L., Speedie C., Williams R., Godley B. J. (2012). Basking sharks in the Northeast Atlantic: spatio-temporal trends from sightings in UK waters. Mar Ecol Prog Ser, 459, 121-134

Witt M. J., Doherty P. D., Hawkes L. A., Godley B. J., Graham R. T., Henderson S. M. (2013). Basking shark satellite tagging project: post-fieldwork report Scottish Natural Heritage, Commissioned Report, 555, 30 p

Witt M. J., Doherty P. D., Godley B. J., Graham R. T., Hawkes L. A., Henderson S. M. (2014). Basking shark satellite tagging project: insights into basking shark (*Cetorhinus maximus*) movement, distribution and behaviour using satellite telemetry (Phase 1, July 2014). Scottish Natural Heritage Commissioned Report, 752, 69 p.

Witt M. J. - Wildlife Tracking (2013-2014). Scotland 2013-14: Basking shark SPOT tags. http://www.wildlifetracking.org/index.shtml?project_id=839&dyn=1417521651

Annex 4: Additional Information

1 Geographical distribution and movements of basking shark

Geographical distribution in the OSPAR area is derived from three types of data:

- sightings of sharks reported in the frame of public sightings recording schemes;
- effort-corrected counts from ship surveys;
- geolocations determined from satellite telemetry;

a. Surface Sightings

Public schemes and ship surveys are mostly carried out in the UK and France. The number of observations is highly variable from year-to-year (APECS, unpublished data). These inter-annual variations have also been observed in the United Kingdom (Sims & Reid, 2002, Cotton *et al*, 2005). Cotton *et al.,* (2005) demonstrated that a major component of the inter-annual variation in relative abundance of basking sharks off south-west Britain was positively correlated with fluctuations in sea surface temperature (SST) and the North Atlantic Oscillation (NAO) index. At a local scale (0.01–10 km), basking shark distribution and migration was determined by the abundance of adult *C. helgolandicus* (Sims & Merrett, 1997; Sims & Quayle, 1998; Sims, 1999). At larger scales (10–1 000 km), sea surface temperature correlated significantly with basking shark distribution and movement patterns (Sims & Quayle, 1998; Sims *et al*., 2000; Cotton *et al*., 2005). In addition some novel aspects of the relationship between basking sharks and their environment were described at finer temporal scales, notably the effect of time of day and tidal cycle on the number of sharks recorded at the surface; which has implications for future directed monitoring efforts (Jones, 2012). These results also suggest that further in depth investigation of the relationship between basking sharks and fronts is required.

There was some indication that juveniles and sharks < 3m (Total Length) appeared to feed later in the summer at the surface compared to larger individuals (Sims *et al.*, 1997), which may reflect habitat segregation by size.

The Figure 2 and Table 5 are a synthesis of information provided by both public sightings recording schemes in France and UK waters**.**

Limitations in the method

The data collected within these programs do not allow an in-depth study of the ecology of the basking shark. There is a number of biases inherent to the method which it is important to keep in mind during the data analysis:

- The effort of observation is not homogeneous, neither in space, nor in time. Certain coastal areas are more frequented than others and number of observers changes (periods of the year, weather conditions, *etc*.). The variations in the schemes' promotion of the public can also have consequences on the number of observers;

- The weather conditions make more or less easy the sharks' observation (state of the sea, the wind, the luminosity, *etc.);*

- The behaviour of the sharks: only the on-surface individuals are observed, so this method offers a partial image of the presence of the species. And among the on-surface individuals, their detection can vary (duration of emersion, size of the shark, *etc*.);

- The multiple observations: the same shark maybe observed several times by various people, at the different moments and/or at different locations. The method can thus tend to overestimate the number of on-surface individuals in a sector.

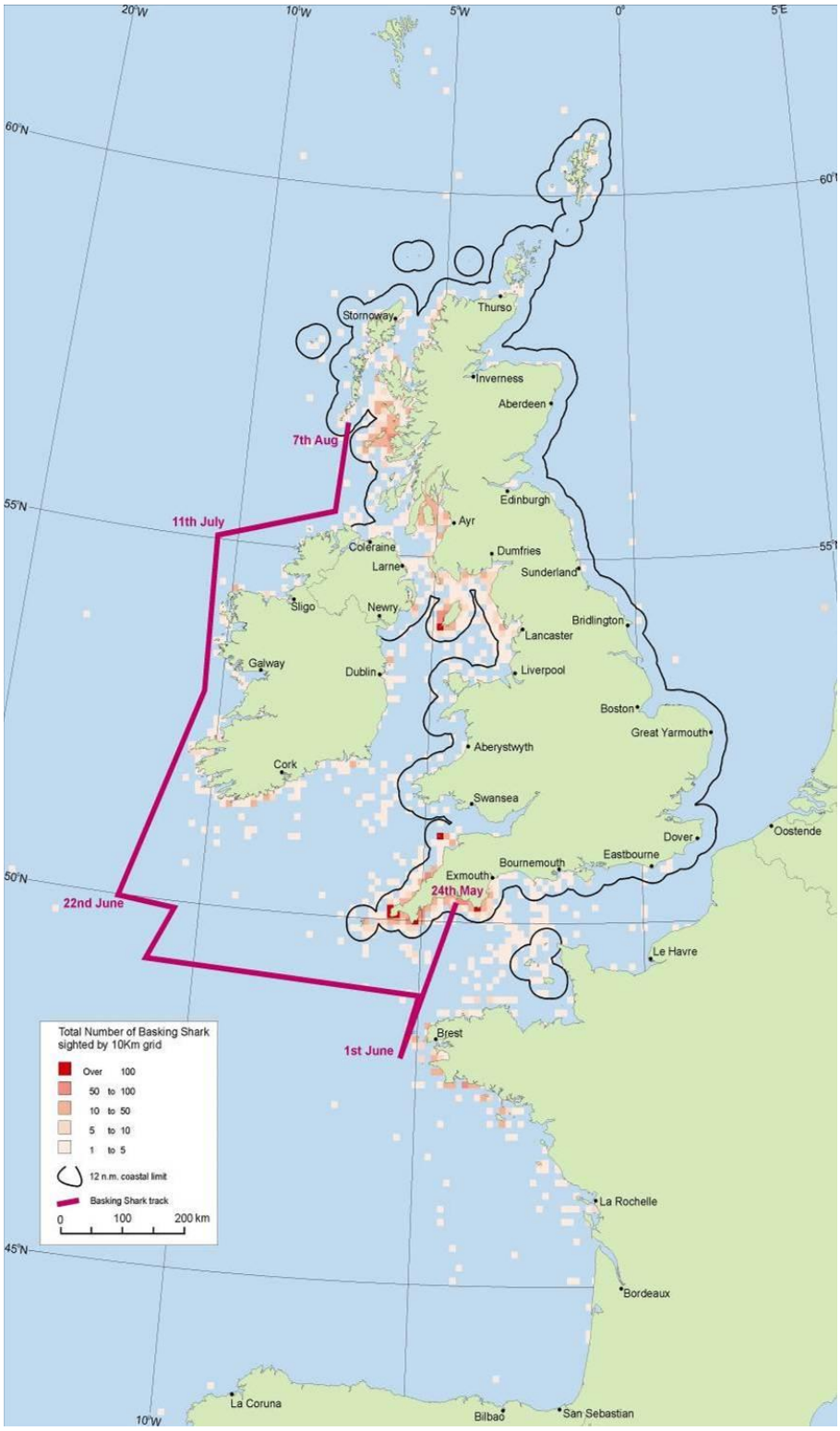
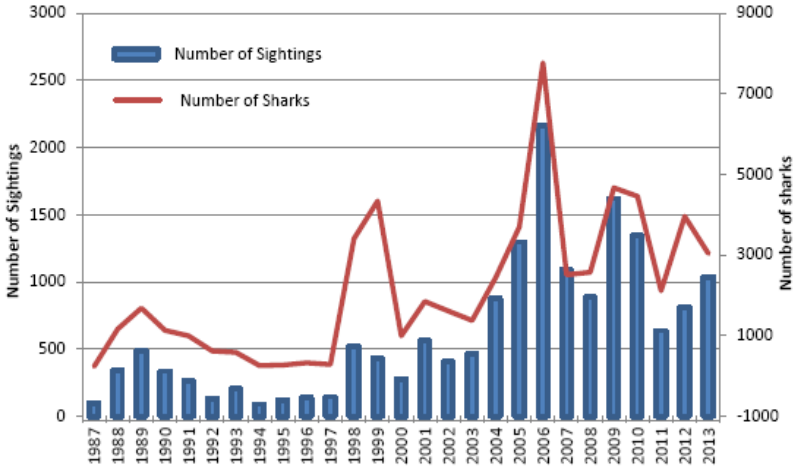
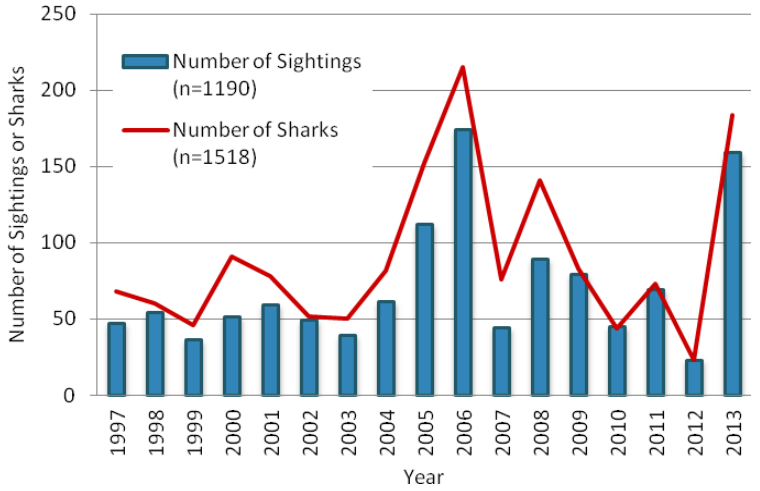


Figure 2: *Basking shark sighting densities (by 10 km grid cell) compiled by the Marine Conservation Society (MCS) between 1987 and 2004 and l'Association pour l'Etude et la Conservation des Sélaciens (APECS) between 1997 and 2005.*

The pink line indicates the movement of a satellite-tracked basking shark between Plymouth (May 2001) and the outer Hebrides in Scotland (August 2001). Basking sharks are regularly sighted within the 12 nm limit, but tracked sharks (pink line) spent the majority of their time (78%), outside the 12 nm limit of UK water (*i.e.* outside the protected area) (Solandt *et al.*, 2006; Sims *et al.*, 2005)

Table 5: Sightings recording schemes in Britain, Republic of Ireland and France

	British zone	**French zone**
References	Solandt J-L. & E. Chassin (2014). Marine Conservation Society basking Shark Watch Overview of data from 2009 to 2013. Edited by David Jay. Bloomfield A. & J-L. Solandt (2008). Marine Conservation Society Basking Shark Watch 20 year report (1987-2006). Marine Conservation Society, Ross on Wye, UK. Doyle J.I., J-L. Solandt, S. Fanshawe, P. Richardson (2005). Marine Conservation Society Basking Shark Report 1987-2004. Marine Conservation Society, Ross on Wye, UK. http://www.mcsuk.org/what_we_do/Wildlife+protection/Reports+and+downloads	Unpublished data, APECS
Background	The lack of ecological data led the Marine Conservation Society (MCS) to launch the Basking Shark Watch Project in 1987 as part of its campaign to protect basking sharks. The basking shark watch database is currently the most extensive database on basking shark surface sightings in the UK. Since 1987, the MCS has successfully raised public and media awareness of basking sharks in UK waters. MCS encourages the public to report basking shark sightings online on the MCS website and regularly reports basking shark watch results to the general public via their annual summary reports (www.mcsuk.org). Different zones were prospected: - South West of England - Scotland - Isle of Man - North Ireland - Ireland - Wales	In France, the basking shark sightings recording scheme is managed by the APECS (Association Pour l'Etude et la Conservation des Sélaciens) and is based on a collaboration with sea users who are invited to report all encounters. Data collection is achieved via sightings record cards, which are distributed every spring via different organisations along the coastline and are also available on the website: www.asso-apecs.org**.** Every two years, an awareness-raising campaign is led by means of posters placed in strategic coastal spots, *i.e.* port authorities. The analysis of data collected between 1997 and 2013 demonstrates that Brittany (NW France) is an area of high abundance for this species. The results for the sector (1° to 7° West / 47° & 49°30 N & 1° to 3°35 West / 49°30 & 50° N) are presented below.

Temporal distribution (1/2)	While the pattern over the 27 years study period was generally of increasing public records of basking sharks (Figure 3), some apparent peaks and troughs in the annual number of sightings occurred. In all 3 regions, comparatively smaller numbers of public-derived records were obtained during the late 1980s and early 1990s. Most noticeable was the generally greater number of public records since 2004 (especially in western Scotland and the Isle of Man, but more variable in southwest England – not on this figure). The highest annual number of Basking Shark Watch sightings received since 1987 was over 2200 reports submitted in 2006 (>7 500 sharks), the year which saw sightings schemes developed by the Wildlife Trusts, the launch of the Manx Basking Shark Watch project and the recruitment of a Basking Shark Watch officer at MCS. The smallest number of observations was observed in 1994. Following this there was an average of 1060 basking shark reports per year between 2007 and 2013, with the lowest number of reports being 637 in 2011 (dominated by Isle of Man sightings), and the highest 1621 reports in 2009.  ***Figure 3**: Number of reports, and total number of sharks, per year, 1987-2013 in the UK*	In Brittany, the annual distribution of reported observations between 1997 and 2013 does not reveal any clear tendencies (Figure *4*). The average number of sightings and sharks between 1997 and 2013 are respectively 70 and 90 per year. On the one hand, 4 years (2005, 2006, 2008 and 2013) have results above the average with the maximum number of sightings (174) and sharks (215) in 2006, like in UK waters. The year 2013 has similar results with 159 sightings and 184 sharks reported. On the other hand, 4 years have the lowest results (1999, 2003, 2007 and 2012). The minimum number of sightings and sharks occurs in 2012 (both 23). The number of individuals and number of sightings are similar, with the most pronounced differences occurring in 2000, 2005, 2006 and the maximum in 2008 as these were years where large groups of basking sharks were observed.  ***Figure 4:** Number of reports, and total number of sharks, per year 1997-*

		2013 in Brittany

Temporal distribution (2/2)

The timing of the basking shark season was similar in both Southwest England and the Isle of Man. This typically started in April (in Southwest England) or May (in the Isle of Man) and rose sharply to a peak in June, with sightings then gradually tailing off and usually ending in October or November (Figure 5). There was, however, a second smaller peak in shark sightings in Southwest England waters in August. Overall the season for the Isle of Man was shorter, running from May to September rather than April to October or November. Sightings in Scotland showed a distinctly different pattern, starting in May and rising more gradually to peak in August, then falling off rapidly to end in October or November.

During the period 1987-2006, over 90% of reported sharks were seen between May and August. The greatest number of basking shark sightings was reported in June. Historically, sightings have peaked earliest in the southwest (around May and June), followed by the Isle of Man (June and July) and lastly in Scotland (around August), but recent years have shown some deviations, particularly Isle of Man with a lot of sightings from the beginning of May. This change in this area is probably due to the integration of data from the Isle of Man since 2005, the date of the creation of the Manx Basking Shark Watch.

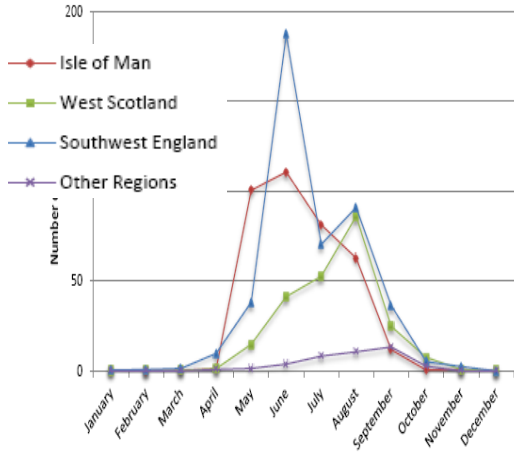


Figure 5: *Average number of sightings reports per month, 2009-2013 in the UK*

A marked seasonality can be noted both for the number of reports and for the number of sightings: 94% of observations occur between April and August (Figure 6).

Two peaks in observation are visible (as it is observed in SW England between 2009 and 2013):

- a first one at the end of April - beginning of June, with an important proportion observed in southern Brittany,
- a second one of weaker intensity between the middle of July and the middle of August, with the majority of observations recorded in northern Brittany.

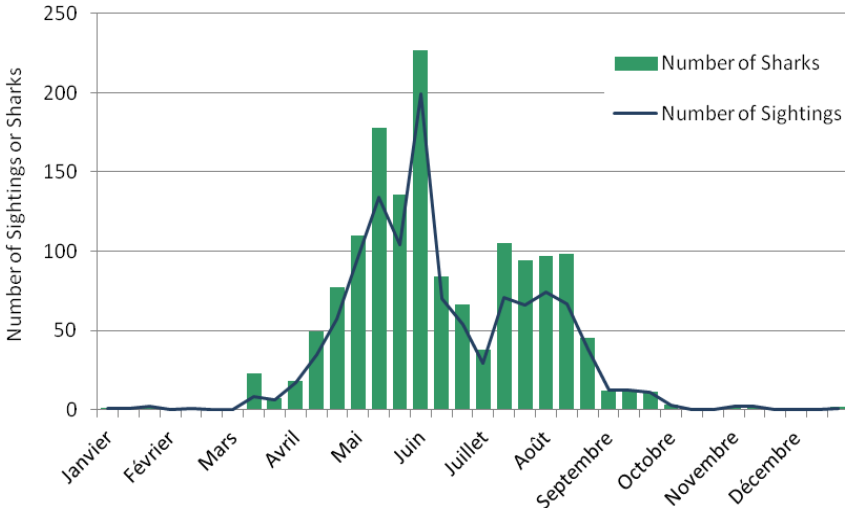


Figure 6*: Monthly variation in the number of basking sharks observed and recorded in Brittany from 1997 to 2013*

Spatial distribution	The most obvious trend in the basking shark reports coming in to MCS is that there is a 'channel' of sightings of sharks (Figure 7). The latest results reaffirm the localisation and persistence of hotspots for the: - Isle of Man; - Southwest England (principally Cornwall and Devon: the Lizard and Lands End peninsulas, and Dorset); - West Scotland (essentially between Skye and Mull: Tiree, Coll, Canna islands and other inner Hebridean Islands, and also more in the South around Arran island and in the Firth of Clyde in general). Since 1987, the data spread over time shows that there has been an increase in the number and geographic spread of sightings reported from Scottish waters.	Each observation having been located within a square of the 10'x10' latitude/longitude grid, the number of sharks observed per grid square was mapped (Figure 8). Thanks to this map two hotspots along the Atlantic face of Brittany were identified: - the surroundings of the Glénan archipelago; - the North of the Iroise Sea. The approach to the ile de Groix and Belle-Ile in the Morbihan, the waters around the Raz headland in the Finistère and the entrance to the Casquets traffic separation scheme in the English Channel are also sectors with high basking shark activity

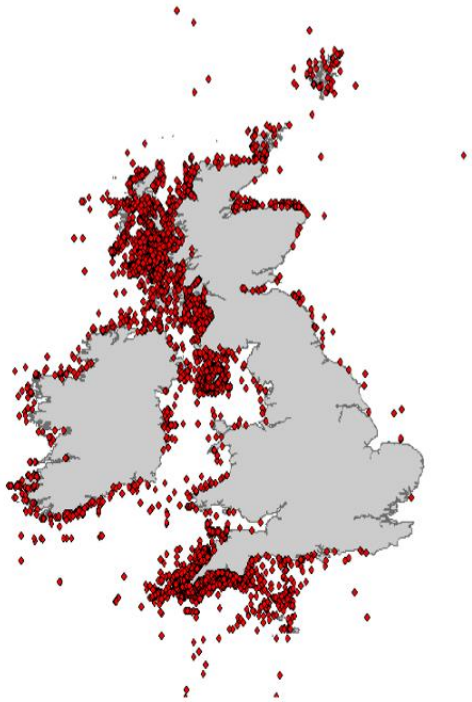


***Figure 7**: Distribution of basking shark sightings around the UK and Ireland (1987-2013)*

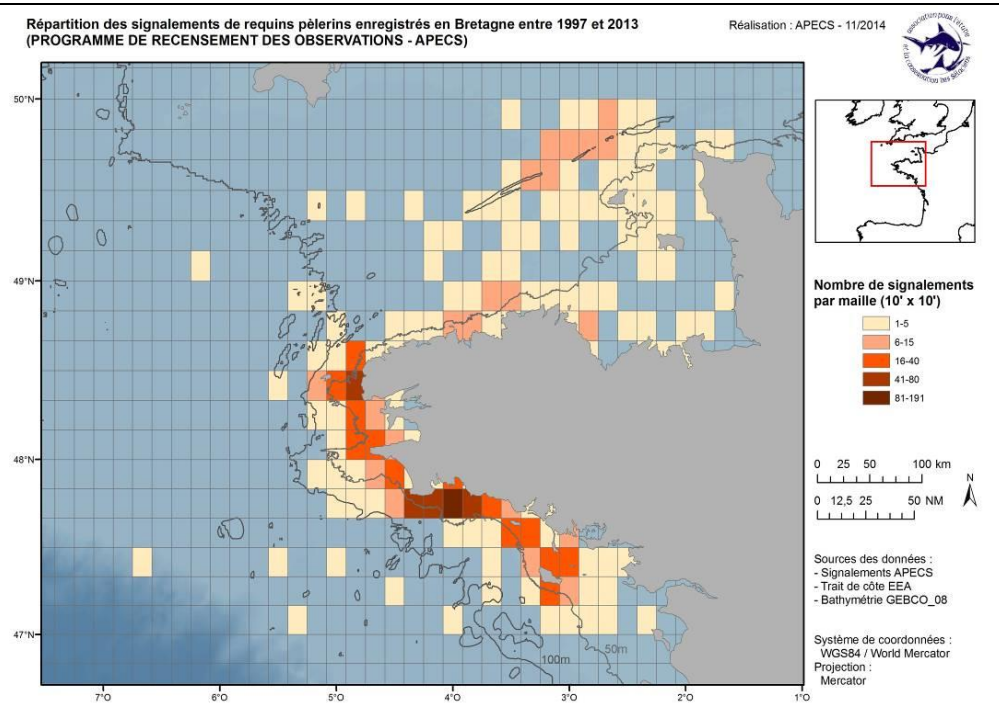
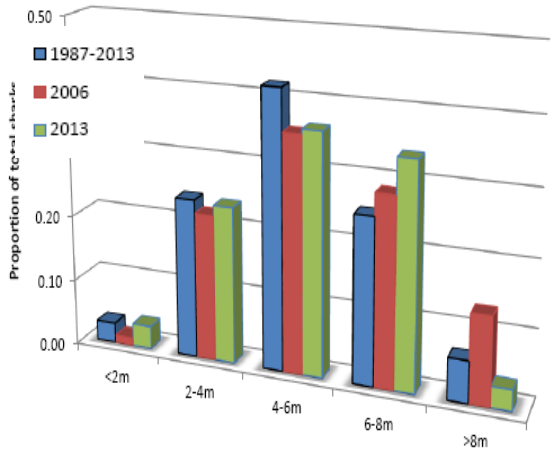
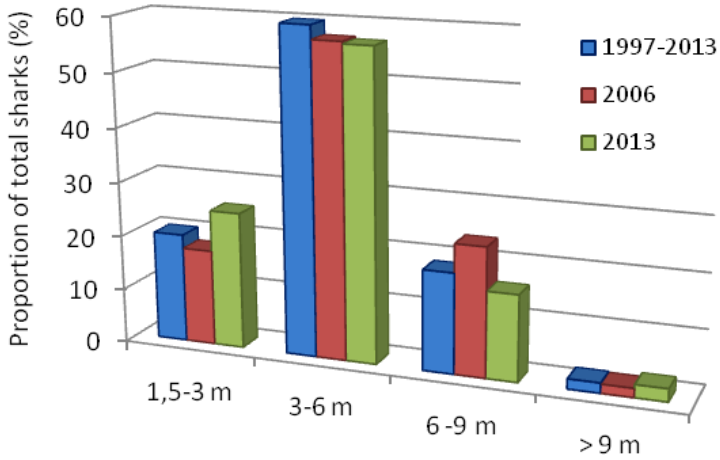


***Figure 8**: Geographic distribution of basking shark sightings reported in Brittany from 1997 to 2013*

Shoal size	Between 1987 and 2013, although recorded shoal sizes ranged from 1 to over 900, almost 90% of sightings were of five animals or fewer (58% solitary individual and 30% between 2-5 sharks). Congregations of between 100 and 300 individuals (16 reports) were reported in all the key hotspot locations, as well as southern Ireland and north Wales, but the only sightings of shoals of 300-499 were in Southwest England. Just one sighting of over 500 animals was recorded, with 918 individual sharks counted in the waters to the southwest of Tiree in August 2012.	The majority of basking shark reports (69%) concern solitary individuals and for sharks observed in a group (31%), 90% of groups have a number of sharks between 2 and 5 individuals. The majority of observed groups were made up of 2 individuals (60%), with the largest group size counting 15 individuals, observed twice in March 2000 and May 2008.
Size distribution	There is a small but significant change in the relative sizes of observed sharks since 1987. Sightings of larger sharks (longer than 6 metres) have been on the increase since 2005 whilst there has been a decrease in the proportion of smaller sharks (less than 4 metres) over the whole 28 year period. Witt et al, (2012) suggest that this is may be an indication of population recovery from historical over-exploitation. This hypothesis can be put in perspective compared to the increasing number of observers over this period that offers the possibility of having a better image of the structure in size of the population. (Figure 9).  ***Figure 9:*** *Basking shark size distribution in 2006, 2013 vs. 1987-2013*	Shark length estimation was available for 1 141 individuals (75% of individuals). Specimens measuring between 3 and 6m are the most commonly observed (45%) while individuals of a larger size (>9 m) are rare (1.4%). There is no significant difference observed between the size distribution of basking sharks during the study period. (Figure 10).  ***Figure 10****: Basking shark size distribution between 1997 and 2013*

b. Satellite tracking

Generality

Other methods are used to study the distribution and abundance of basking sharks. Tracking experiments have been developed to study individual large-scale movements. This method consists of equipping sharks with electronic tags which record its activity via a number of physical parameters (temperature, depth, light intensity), and an emitter to transmit the data via a satellite system. A lot of countries in OSPAR area have developed satellite tracking tags programs (

Table 6).

Most tracked sharks remain on continental shelf edges during winter, spending more time at greater depths and less near the surface (Sims *et al.*, 2005; Stephan *et al.*, 2011). Some individuals move into shallower shelf waters in higher latitudes as the summer season progresses, with a greater proportion of time spent at feeding at the surface, particularly after the thermocline has developed and zooplankton densities are at their height. However, one shark tagged on the Isle of Man recently was seen moving - via open ocean waters - to the coastal waters of Newfoundland in 2007 (Gore *et al.,* 2008).

Sims *et al.,* (2005) found that the largest migration of the sharks observed in the UK shark tagging project was from the Plymouth area, south into waters off north-west Brittany, west through the western approaches to southern Ireland, around the Atlantic coast of Ireland, and eventually into the sea of the Hebrides in less than three months of tracking (Figure 2). This single immature shark roamed through the inshore territorial waters and EEZ of several States.

Figure 11 illustrates those areas where sharks tagged in UK waters were most commonly recorded. In the summer, basking sharks tended to move north between centres of high zooplankton abundance associated with thermal fronts (Figure 11A). In winter, there was a tendency for the sharks to remain in deeper water, generally in the southern region of the shelf (Figure 11B). These results suggest it unlikely that there are separate populations of basking sharks inhabiting northern or southern UK waters, but rather that individuals move freely between these areas and the waters of adjacent states and probably form a single population in this part of the North-East Atlantic.

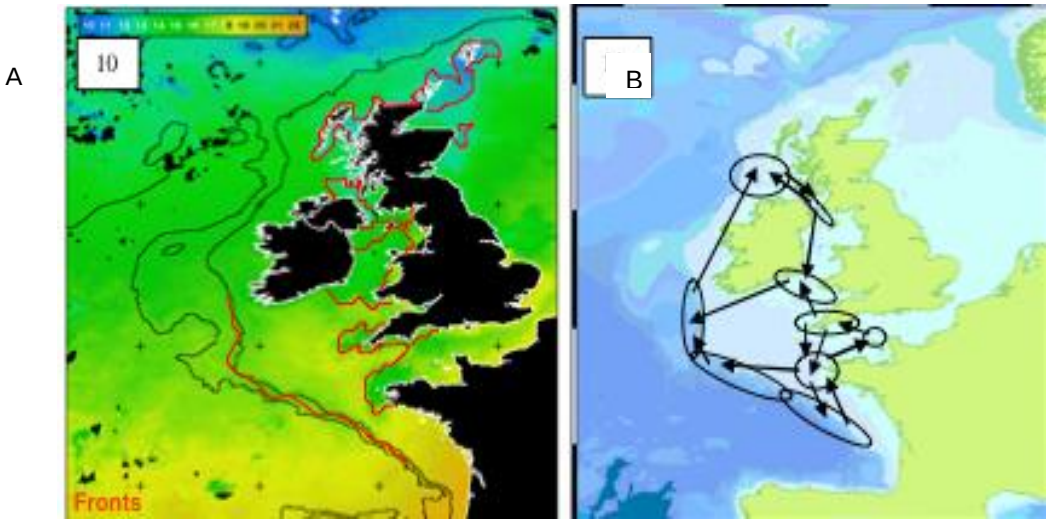


Figure 11*: Breakdown of location of tidal and shelf break fronts (red lines) on NE Atlantic continental shelf (A) and location of shark hotspots (B) where sharks were observed most frequently from the archival tracking experiment.* Remote sensing image is a monthly composite of sea surface temperature during August 2002 from AVHRR on NOAA satellites. (Data reproduced with permission, Sims *et al.*, 2005).

Table 6: Satellite tracking programs identified in OSPAR area

Country of OSPAR area (Team name)	Year	Number of tag	Program	Reference
SCOTLAND (Scottish Natural Heritage and University of Exeter) http://www.snh.gov.uk/	2013 2012	• 15 SPOT5 tags • 12 pop-up tags (MiniPAT) • 4 SPLASH-F • 12 pop-up tags (PAT-MK-10-F) • 8 SPOT5 tags	Basking shark tagging project	Witt *et al.,* (2014) http://www.wildlifetracking.org/index.shtml?project_id=839&dyn=1417555271 http://www.wildlifetracking.org/index.shtml?project_id=753
ISLE OF MAN (Manx Wildlife Trust) http://www.manxbaskingsharkwatch.com/	2013 2012 2011 2009 2008 2007	• 5 SPOT5 tags • 3 pop-up tag (PAT-MK-10) • 3 pop-up tag (PAT-MK-10) • 3 pop-up tags (PAT-MK-10) • 4 pop-up tags (PAT-MK-10) • 2 pop-up tags (PAT-MK-10)	Manx Basking Shark Watch (collaboration with APECS in 2009)	http://www.wildlifetracking.org/index.shtml?project_id=864 Gore *et al.* (2008) Stephan *et al.*, (2011)
FRANCE (Association Pour l'Etude et la Conservation des Sélaciens) http://www.asso-apecs.org/	2013 2011 2009	• 1 pop-up tag (PAT-MK-10) • 1 pop-up tag (PAT-MK-10) • 7 pop-up tags (PAT-MK-10)	Ecobask Sur les traces du requin pèlerin: Satellite tracking of basking sharks in the North-East Atlantic Ocean	Stephan *et al.* (2011) http://www.asso-apecs.org/ECOBASK-Ecologie-des-requins.html http://www.asso-apecs.org/-Programme-de-marquage-satellite-.html
IRELAND (Irish Elasmobranch Group) http://www.irishelasmobran	2013	• 4 SPOT5 tags • 5 pop-up tags (PAT-	Shark Spotting project Monster Munch	http://www.baskingshark.ie/index.php?option=com_k2&view=item&layout=item&id=123&Itemid=103

chgroup.org/	2012 2009	MK-10-F) • 2 pop-up tags (PAT-MK-10)	Project 2012	http://www.baskingshark.ie/index.php?option=com_k2&view=item&id=97&Itemid=95
ENGLAND & SCOTLAND (Marine Biological Association, CEFAS) http://www.mba.ac.uk/simslab/	2004 2002 2001	• 2 pop-up tags (PAT) • 11 pop-up tags (PAT) • 10 pop-up tags (PAT)	Basking shark population assessment	Sims *et al.,* (2005)

In Britain, Southall *et al.*, 2005 compared the data derived from surface observations with that of geolocalised satellite tags. The broad distribution patterns revealed by these different methods are similar, but there are considerable differences in density distributions. Surface sightings data show high densities, or "hotspots" in the Hebridean Sea, Clyde Sea, Irish Sea and close inshore around Devon and Cornwall. Tag geolocations, in contrast, identified two areas where individuals spent considerable time outside the distributions indicated by surveys and public sighting: the Celtic Sea and Western Approaches of the English Channel.

Migration

It was thought that basking sharks carried out migrations on a scale linked to the North-East Atlantic, until a recent study (G*ore et* al., 2008) with a tagged individual showed the migration of a mature female (8 m) basking shark tagged in south-west Isle of Man reaching the east of the Newfoundland shelf edge (Canada). This basking shark travelled a horizontal distance of 9 589 km and reached a record depth of 1 264 m. This result provides the first evidence for a link between European and American populations and indicates that basking sharks make use of deep-water habitats beyond the shelf edge. Satellite tracking has also revealed that basking sharks in the North--East Atlantic overwinter on the continental shelf and shelf edge in deeper waters (Southall *et al.,* 2006). Shepard *et al.,* (2006) documented strong circadian periodicity in the diving behavior of five electronically tracked basking sharks off Plymouth and western Scotland. Skomal *et al.,* (2009), 50 years later, confirmed the hypothesis of Briggs (1960) who suggested that while basking sharks are usually encountered in cold waters, they make transequatorial movements since they are found in both the northern and southern hemispheres. Furthermore, if the species can be observed near the surface in cold to warm-temperate water, data from tropical and equatorial regions are only from deep waters, below the thermocline (Ebert *et al*., 2013).

In 2009, the project "Sur les traces du requin pèlerin: Satellite tracking of basking sharks in the North-East Atlantic Ocean" brings together APECS, the Malpelo and Other Marine Ecosystems Foundation and the Manx Wildlife Trust, along with the French Marine Protected Areas Agency, the Iroise Marine Nature Park, the Fondation Nicolas Hulot pour la Nature et l'Homme, the Hopkins Marine Station (USA), Océanopolis, the Fondation Nature et Découvertes and Sillinger (Stephan *et al.*, 2011).

The objectives of this project were:

- to collect new information on large-scale movements of this species in the North-East Atlantic;
- to locate the sectors where the shark is present in autumn and winter when sightings of individuals at the surface are very rare;
- to identify the sectors which may be of capital importance in terms of conservation in order to provide help for administrators in developing management and conservation strategies for this apparently very-mobile species.

Ten popup archival transmitting tags were deployed on basking sharks, two off the west coast of Brittany (France) within the National Marine Protected Area of the Iroise Sea in June 2009 and eight off the southwest Isle of Man in July 2009 (Stephan *et al.*, 2011). Six males and four females were tagged, ranging in body size from between 3 to and 8 meters. Nine out of the ten tags transmitted data through Argos satellites while the last one was has been physically recovered on a beach. Two tags popped off prematurely after less than 20 days and were not considered for the analysis. For the 8 remaining tags, deployment periods lasted from between 37 to and 245 days (Stephan *et al.*, 2011).

Horizontal movement:

All of the sharks tagged in July around the Isle of Man moved south. Two sharks were tracked for less than 75 days, and all others were tracked for more than 200 days. The basking sharks tracked during

this study mainly occupied the European continental shelf, a result which confirms those of previous studies (Sims *et al.,* 2005). The Irish Sea and the Celtic Sea, seem however to be two particularly used areas that six of the eight tagged sharks did not leave (like the shark 95 766, Figure 12A). Two individuals (39 338 and 79781) only transited through these areas before they joined the continental slope (39 338, Figure 12B) or the waters off the west coast of Ireland and the Hebrides (79 781, Figure 12C). The track of shark 79 781 confirms that some sharks sighted at the entrance to the Channel can swiftly reach the waters of the Hebrides via the west of Ireland (Sims *et al.* 2005). The unusual track of shark 39 338 shows that the Bay of Biscay is also used in its southern part.

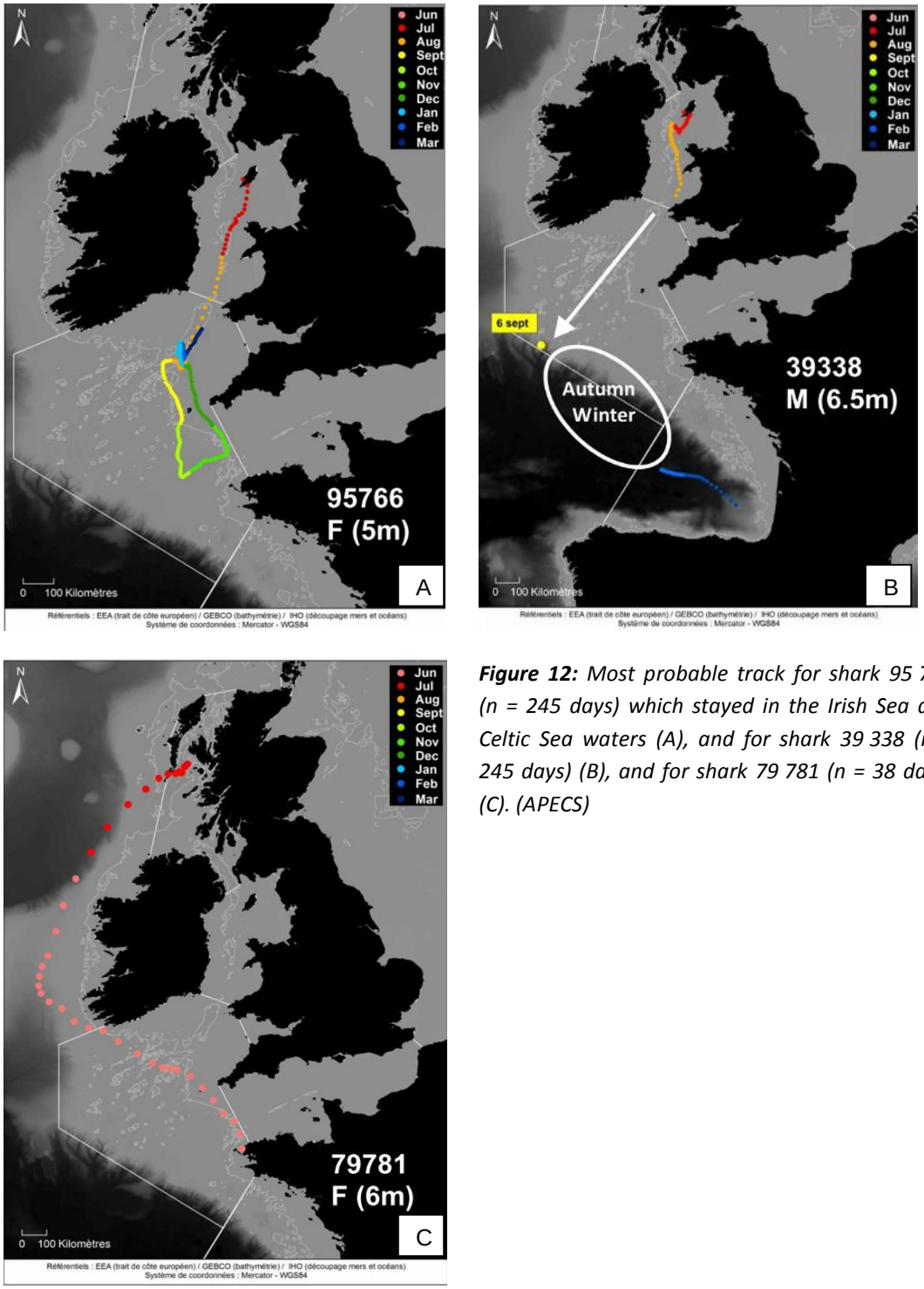


Figure 12: *Most probable track for shark 95 766 (n = 245 days) which stayed in the Irish Sea and Celtic Sea waters (A), and for shark 39 338 (n = 245 days) (B), and for shark 79 781 (n = 38 days) (C). (APECS)*

While sightings recording schemes based on sea-user participation have identified favourable sectors and periods for observing basking sharks swimming at the surface (Bloomfield & Solandt 2008, APECS unpublished data, Manx Wildlife Trust unpublished data), this survey shows that other sectors are also used significantly. Five of the eight sharks tagged spent several weeks between July and September in the stratified waters located between Ireland and the Isle of Man. The north-western part of the Celtic Sea also seems to be used, particularly in autumn and winter. The temperature profiles recorded by the tags reveal the types of water column the sharks travelled through and thus the geographical sectors occupied (Stephan *et al.*, 2011).

No noteworthy difference in behaviour linked to the sex or size of the sharks was revealed. The results obtained for males measuring over 7 metres and considered as sexually mature (n=4), hitherto never tracked, are similar to those obtained for the smaller size classes (Stephan *et al.*, 2011).

Vertical movements

Variations in the vertical distribution according to the weather and the characteristics of the water masses occupied by sharks have already been noted for the species (Sims *et al.,* 2005). The basking sharks cross water with wide range of ambient temperatures (7-17 °C) (Stephan *et al.*, 2011). The "standard profiles" identified reflect daily vertical movements which are very likely related to the vertical movements of the zooplankton the basking sharks search for (Stephan *et al.*, 2011). For six sharks (like 95766, Figure 13A) tagged in the Isle of Man which did not subsequently leave the waters of the European continental shelf, they spent most of their time between the surface and a depth of 100 meters, with a few incursions between 100 and 200 meters. These vertical distribution profiles reflect the bathymetry of the occupied area and show that the sharks exploited the entire water column available. Shark 39338 (Figure 13B) occupied a much broader depth range and reached a maximum depth of 840 meters. It spent most of its time (60%) between 200 and 800 meters, Shark 79781 (Figure 13C) reached a maximum depth of 184 meters, which also reflects the bathymetry in the area occupied. But unlike the other sharks, this one mainly used the water layer ranging between the surface and a 20-meter depth.

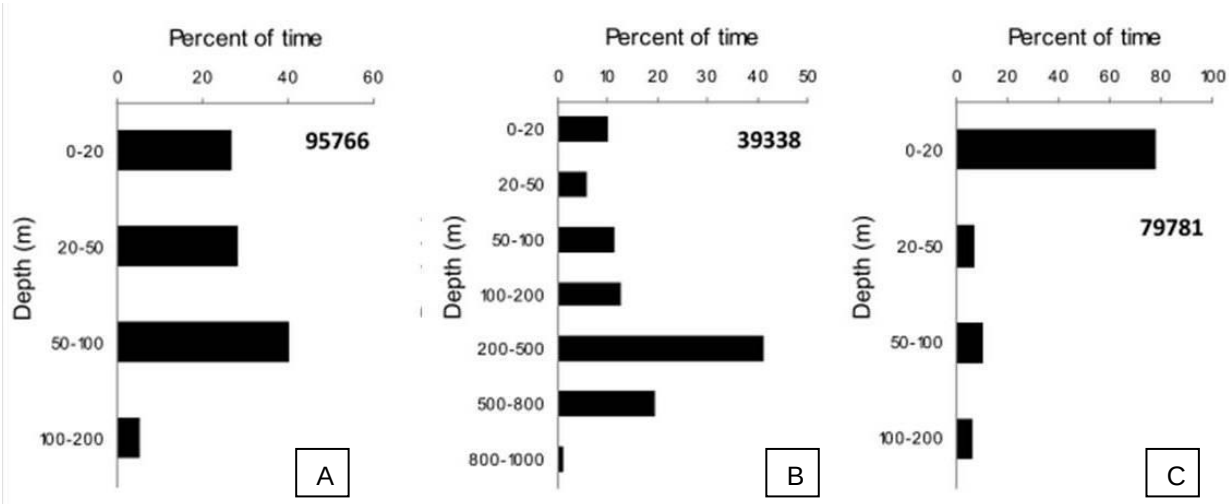


Figure 13: *Vertical distribution: percentage of time spent in each depth interval over the entire tracking period (with the shark number on each diagram A, B and C). (APECS)*

Vertical distribution differs between individuals, but also varies seasonally. However, in a given geographical area and during the same period, the vertical distribution profiles of sharks are very similar. For example, in summer, the tagged sharks occupied five sectors: the Manx West Coast front waters, the stratified waters between the Isle of Man and Ireland, the northern part of the Celtic Sea, the west of Ireland and the Hebrides. The archival data retrieved allows this vertical distribution to be analyzed more accurately and provides better insight into daily movements (Stephan *et al.*, 2011). During the day, sharks occupy the surface water layer (0-5 meters) and movements to deeper waters are rare. At night, the average depth is greater and vertical moves are more frequent, without reaching the surface layer (Figure 14A). Two sectors were occupied in autumn and winter: the Celtic Sea and the Bay of Biscay. The archival data collected for shark 95766 shows that in spite of these various profiles, the vertical migration behavior is similar during both periods. In winter, like other sharks, this shark stayed at a depth of about 100 meters during the day with very few movements towards the surface. At night, it occupied a depth of about 50 meters, with regular migrations towards the seabed. During that period, incursions into the surface water layer were rare (Figure 14B).

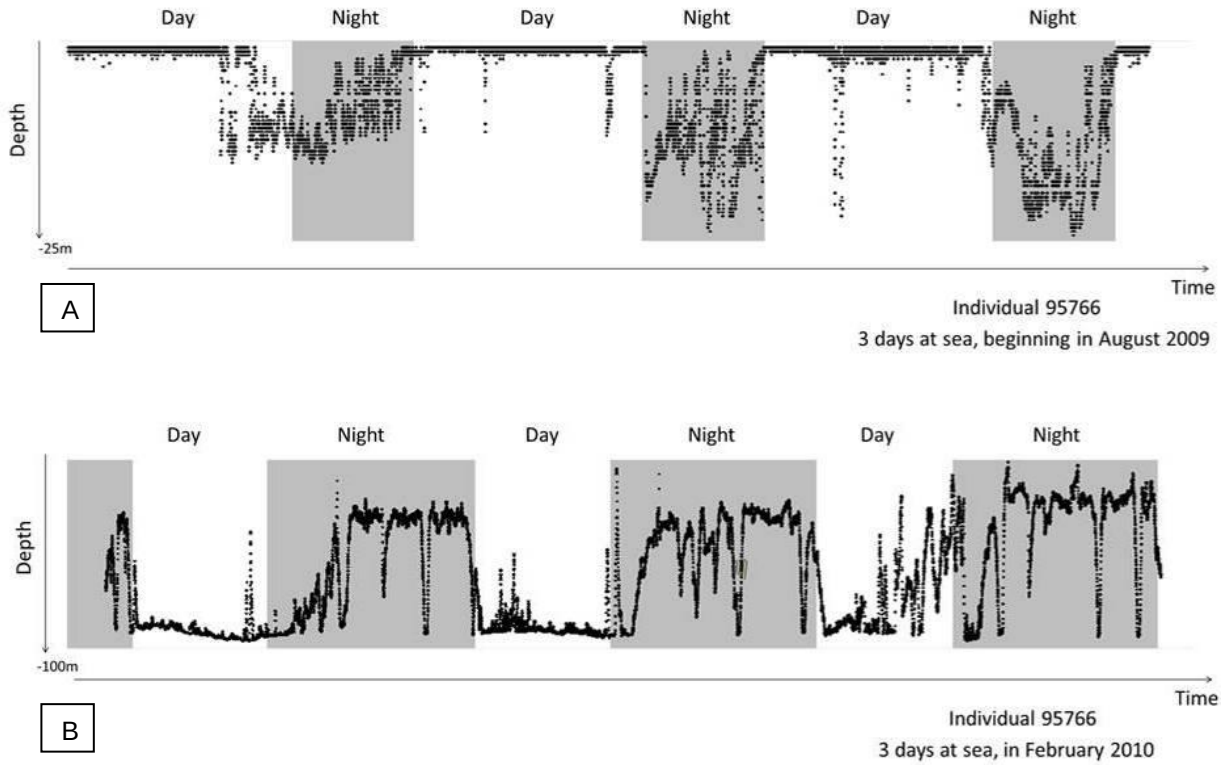


Figure 14: *Zoom on a 3 days period of shark 95766 diving profile, during the summer (A) and during the winter (B). Grey areas represent night-time. (APECS)*

These vertical distribution profiles show why public sightings recording schemes did not identify a sector like the stratified waters of the Irish Sea as a "hotspot". Indeed, despite spending a longer time in the area at the end of the summer, the sharks only spent a small proportion of their time at the surface waters. Likewise, the vertical distributions observed in autumn and winter (Figure 14A) explain why practically no animals were sighted at the surface at that time of year, a trend noted by all of the sighting programs.

2 Historical background fishing information

Basking sharks have proven to be exceptionally sensitive to exploitation (Compagno, 2001). Long periods spent surface feeding (Sims & Quayle, 1998) make this species an easy target for harpoon fisheries.

Unregulated commercial and subsistence fisheries for basking sharks have existed in the North-East Atlantic region for at least two hundred years (McNally, 1976; Fairfax, 1998). Targeted fisheries have been recorded from Norway, Ireland, Scotland, Iceland and France and Galicia (north coast of Spain) in the OSPAR Area (Compagno, 1984, Chenard *et al.*, 1951). Indeed, the earliest directed fisheries for pelagic sharks were probably for this species (Pawson & Vince, 1999).

Historically, basking sharks were fished mainly for liver oil[2], which was used as lighting fuel for lamps in the past, along with exploitation of their meat and hide. The recently burgeoning market for shark fins includes a demand for basking shark fins, with single, large fins fetching up to US$ 57 000 (Clarke, 2004; Hareide, 2006) (Figure 15).

Despite the finning ban on European Community vessels (EC 1185/2003 of the26/06/03) navigating inside and outside of EU waters, two factors are largely responsible for the current inability to assess the extent of basking shark exploitation and trade in its products: firstly, most nations do not collect species-specific information on the volume of their shark fisheries. Secondly, and more importantly from a tracking and regulation enforcement perspective, accurate species identification of basking sharks products remains difficult for the non expert (CITES, 2006).

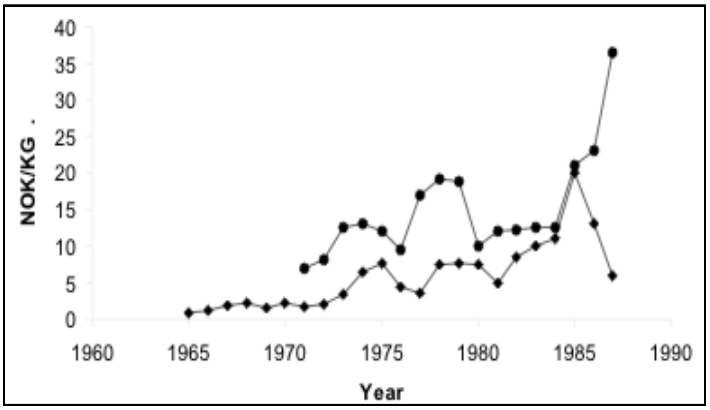


Figure 15: *Basking sharks in the North-East Atlantic prices (NOK/kg) of liver (diamonds) and fins (circles), (Hareide, 2006).*

The biology of basking sharks makes them especially vulnerable to exploitation. Even the life history characteristics of basking sharks are inadequately known and key parameters such as growth rate, natural mortality and fecundity are assumed rather than known; there is little doubt that the species is relatively unproductive and incapable of sustaining even modest mortality rates. The most recent estimates of population resilience or productivity (r_{msy}) range from 0.013 to 0.023 (S.E. Smith, *pers. comm*.) and maximum age is assumed to be 50, with female maturity being reached around 18 years (Pauly, 2002), 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, hence the sensitivity of basking sharks to unregulated fisheries mortality.

2

The liver comprises about 17-25% of the total body weight (Mc Nally 1976).

Even though targeted basking sharks fishing is nowadays totally banned (EC n°41/2007 of the 21/12/2006 and equivalent Norwegian regulations), population recovery will be very slow and the species remains threatened and vulnerable, although the recent size increases reported by public sightings schemes for UK sharks give a tantalising evidence that the North-East Atlantic population may be recovering from decades of exploitation (Bloomfield & Solandt, 2008).

Basking sharks are accidentally caught by trawlers and drift-nets in particular. The extent of this phenomenon is unknown and merits more attention, particularly as the high prices fetched by basking shark fins on the Asian market incites a greater exploitation of accidental bycatch in countries where this species is not protected.

Landings throughout the North-East Atlantic have also fluctuated, but a continued downwards trend is evident over the past few decades. A few well-documented declines in catches by directed fisheries for the basking shark suggest that reduction 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, 2005a) (Figure 18). These declines have persisted into the long-term with no apparent recovery several decades after exploitation has ceased.

Background on historical fishing grounds within the OSPAR zone

Landings data within ICES Areas I–XIV from 1977–2011 are presented in Figure 16. Landings of basking shark peaked in 1979 at a total of 5 266 t, and declined rapidly towards 1988. A new peak in landings was seen in 1992, with 1697 t basking shark landed. Since the ban in direct fishery in 2006/2007, yearly landings have been <30 t.

Reported landings data come from UK (1984 and 2009), Portugal (1991-2008), France (1990-2008) and Norway (1977-2011). Most catches are from Subareas I, II and IV and are taken by Norway. For Portugal and France the reported landings were between 0.3 and 2 t.

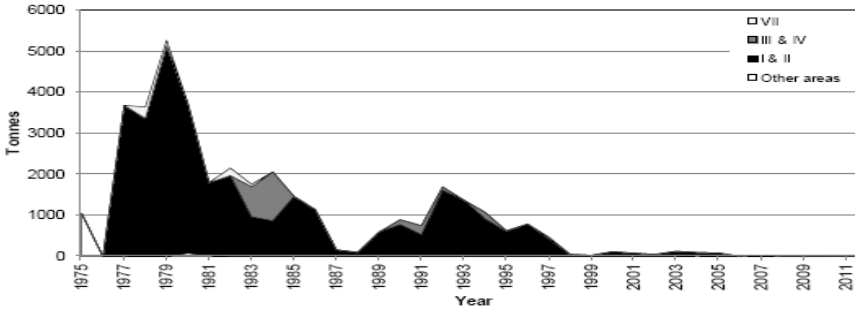


Figure 16: *Basking sharks in the Northeast Atlantic. Total landings (t) of basking sharks in ICES Areas I–XIV from 1977-2012 (ICES, 2013)*

Four historical basking shark fisheries are briefly overviewed: those of Ireland, Norway, Scotland and France (Figure 18).

Norway: Norwegian fishermen have always been major catchers of basking sharks in the North-East Atlantic. Norway has a basking shark fishery that dates back to the 16th century when the dry flesh was used for human consumption. In the 1960s, a high demand for shark livers spurred a great expansion in this traditional fishery and catches between 1 266 and 4 266 basking sharks per year were made in the period 1959-80 (Kunzlik 1988, Bonfil 1994). This fishery subsequently declined with the decline of the whaling fleet, which also harpooned basking sharks. Vessels required a licence to take basking sharks. Since 2006, the targeted fishing of basking sharks in Norway is forbidden. In 2006, Norwegian by-catch of basking sharks was 16 t (ICES, 2007)

Scotland: Fairfax (1998) and Kunzlik (1988) presented data on landings from the 20th century Scottish basking shark fisheries which focused on the Firth of Clyde and West Coast. 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. Fishing ceased after the decline in basking shark stocks and the uncertain price of their oil, and when the basking shark was listed on domestic wildlife conservation legislation in the UK in 1998 (the Wildlife and Countryside Act) which prohibited it being intentionally killed.

Catch in numbers from Norway and Scotland are presented in Figure 17. The trends are very similar to those of landings in biomass (Figure 16), with a first maximum of 1 748 individuals in 1979, a second maximum of 573 individuals in 1992, and less than ten individuals after 2006.

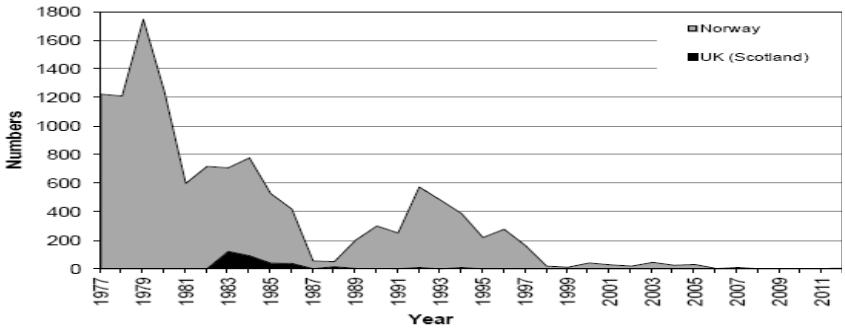


Figure 17: *Basking sharks in the Nort-East Atlantic. Numbers of basking sharks caught by Nor-way and Scotland from 1977–2010 in ICES Areas I–XIV from 1977-2012 (ICES, 2013)*

Ireland: In Ireland, there were two historical basking sharks fisheries off the Irish west coast:

- the 18th to 19th century Sunfish Bank fishery
- the mid – 20th century Achill Island fishery

A fishery around Achill Island, in Ireland, operated from 1947 to 1975 with decreasing catches after an initial peak of 1 800 sharks taken in 1952 (Fowler, 1996). The season only lasted for a few weeks in April and May. A third fishery operated briefly off Waterford.

France: On the southern coast of Brittany, an artisanal basking shark fishery started up in 1942, during the war. The basking shark then became the base of an entire subsistence economy. After the war, the fishery became an additional source of seasonal revenue which continued until the early 1960s. 1957 marked the beginning of a more industrial fishery. Two boats from Concarneau were equipped with harpoon-canons to practice this fishing method: around a hundred basking sharks could then be fished per season (Gautier, 1960). The last basking shark was harpooned in Brittany in May 1990 (APECS, unpublished).

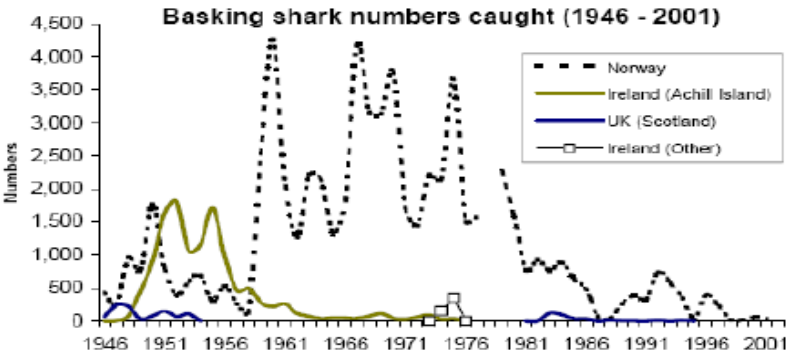


Figure 18: *Targeted North-East Atlantic basking shark catches 1946-2001 (ICES, 2007)*

Annex 5: Basking shark codes of conduct - Shark Trust / APECS

Basking Shark Code of Conduct

BOAT HANDLERS

The following guidelines have been designed to help boat handlers reduce the risk of injuring or harassing Basking Sharks.

Boat control near Basking Sharks

- Restrict your speed to below 6 knots and avoid sudden speed changes.
- When closer than 100 m switch the engine to neutral to avoid injuring sharks.
- The viewing distance between the boat and large groups or courting sharks should be at least 500m.
- Be extremely cautious in areas where Basking Sharks have been seen breaching.
- Jet-skis should stay at least 500 m away from Basking Sharks.
- Remember that for every shark visible on the surface there are likely to be more hidden just below.

Tips

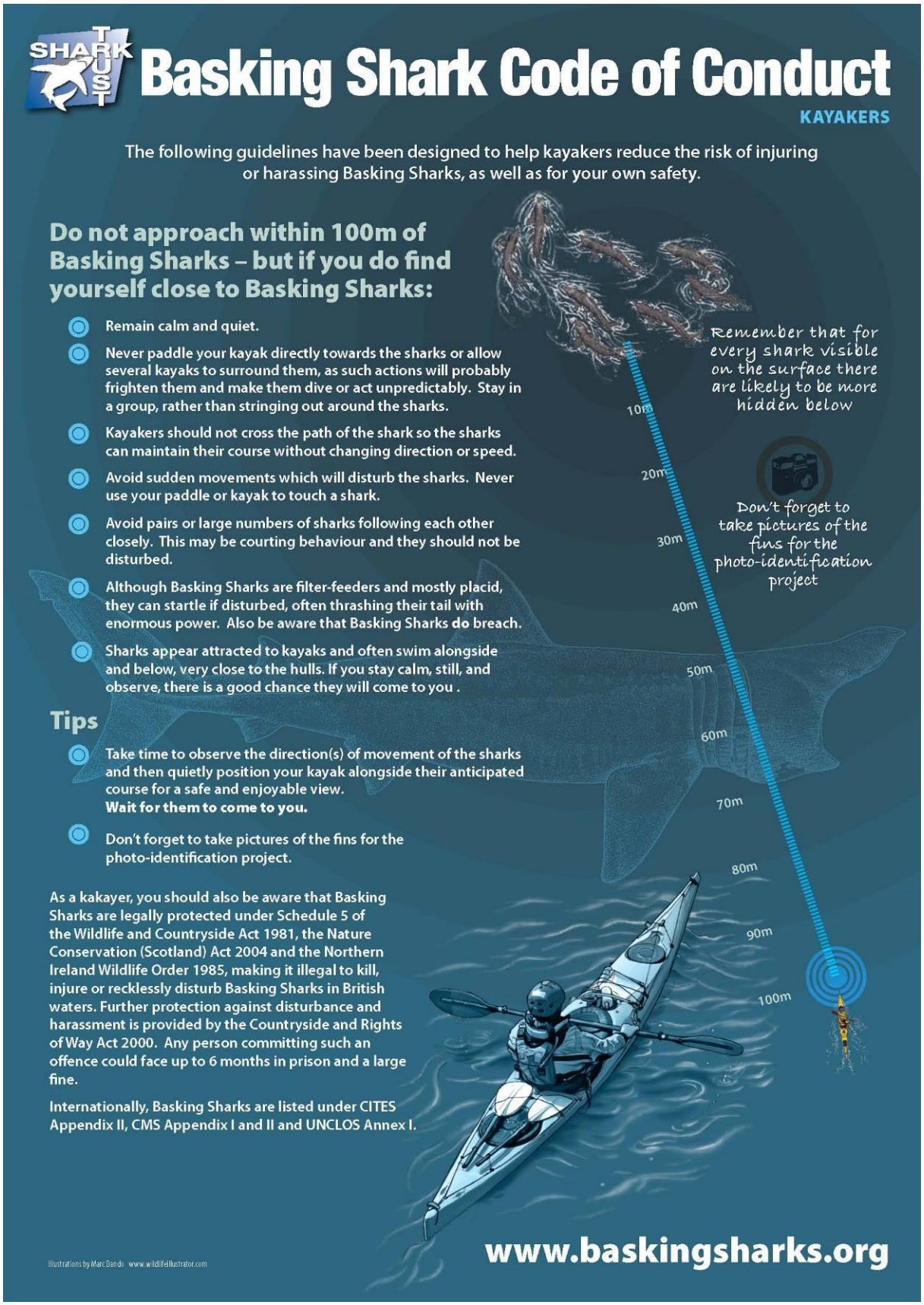
- Take time to observe the direction of movement of the Basking Sharks to anticipate their course – you can then position yourself for the best view.
- Don't forget to take pictures of the fins for the photo-identification project.

Basking Sharks are protected under the Wildlife and Countryside Act (1981), the Countryside and Rights of Way Act (2000), the Northern Ireland Wildlife Order (1985) and the Nature Conservation (Scotland) Act (2004). These Acts make it illegal to intentionally kill, injure or recklessly disturb or harass Basking Sharks in British waters. Any person committing such an offence could face up to 6 months in prison and a large fine.

Internationally, Basking Sharks are listed under CITES Appendix II, CMS Appendix I and II and UNCLOS Annex I.

Illustrations by Marc Dando www.wildlifeillustrator.com

www.baskingsharks.org


SHARK TRUST
Basking Shark Code of Conduct
KAYAKERS
The following guidelines have been designed to help kayakers reduce the risk of injuring or harassing Basking Sharks, as well as for your own safety.
Do not approach within 100m of Basking Sharks – but if you do find yourself close to Basking Sharks:
Remain calm and quiet.
Never paddle your kayak directly towards the sharks or allow several kayaks to surround them, as such actions will probably frighten them and make them dive or act unpredictably. Stay in a group, rather than stringing out around the sharks.
Kayakers should not cross the path of the shark so the sharks can maintain their course without changing direction or speed.
Avoid sudden movements which will disturb the sharks. Never use your paddle or kayak to touch a shark.
Avoid pairs or large numbers of sharks following each other closely. This may be courting behaviour and they should not be disturbed.
Although Basking Sharks are filter-feeders and mostly placid, they can startle if disturbed, often thrashing their tail with enormous power. Also be aware that Basking Sharks do breach.
Sharks appear attracted to kayaks and often swim alongside and below, very close to the hulls. If you stay calm, still, and observe, there is a good chance they will come to you .
Tips
Take time to observe the direction(s) of movement of the sharks and then quietly position your kayak alongside their anticipated course for a safe and enjoyable view.
Wait for them to come to you.
Don't forget to take pictures of the fins for the photo-identification project.
As a kakayer, you should also be aware that Basking Sharks are legally protected under Schedule 5 of the Wildlife and Countryside Act 1981, the Nature Conservation (Scotland) Act 2004 and the Northern Ireland Wildlife Order 1985, making it illegal to kill, injure or recklessly disturb Basking Sharks in British waters. Further protection against disturbance and harassment is provided by the Countryside and Rights of Way Act 2000. Any person committing such an offence could face up to 6 months in prison and a large fine.
Internationally, Basking Sharks are listed under CITES Appendix II, CMS Appendix I and II and UNCLOS Annex I.
Remember that for every shark visible on the surface there are likely to be more hidden below
Don't forget to take pictures of the fins for the photo-identification project
10m
20m
30m
40m
50m
60m
70m
80m
90m
100m
Illustrations by Marc Dando www.wildlifeillustrator.com
www.baskingsharks.org

Basking Shark Code of Conduct

The following guidelines have been designed to help swimmers and divers reduce the risk of injuring or harassing Basking Sharks.

Swimming with Basking Sharks

- Do not try to touch the sharks.
- Maintain a distance of 4 m from each shark and be wary of the tail.
- Groups of swimmers should stay together and ideally remain at the surface.
- Restrict the number of people in the water at any one time.
- Take plenty of pictures but avoid flash photography which can scare the sharks. Photograph any characteristic features which may help re-identify the shark in the future.
- Do not use underwater propelled devices.

Remember that for every shark visible on the surface there are likely to be more hidden below

1m

2m

3m

Tips

- Aim to anticipate the direction of movement of the sharks and enter the water 100 m ahead of the sharks.

Under Schedule 5 of the Wildlife and Countryside Act (1981) it is illegal to kill, injure or recklessly disturb Basking Sharks in British waters. Any person committing such an offence could face up to 6 months in prison.

Maintain a distance 4 metres away from each shark

4m

5m

6m

7m

Restrict the number of people in the water at any one time

Illustrations by Marc Dando

www.baskingsharks.org

SHARK TRUST

The Wildlife Trusts

ef Esmée Fairbairn FOUNDATION

MCS Marine Conservation Society

Prévenez dès que possible l'APECS au 06 77 59 69 83.
Si l'équipe de terrain est dans la zone elle pourra ainsi se rendre rapidement sur place afin de collecter diverses informations nécessaires pour améliorer les connaissances sur la biologie de cette espèce.
Si aucun scientifique de l'APECS ne peut se rendre sur place vous pouvez participer au programme de recherche en relevant les informations suivantes pour l'association.
Assurez-vous de toujours respecter le code de bonne conduite afin de déranger le moins possible l'animal.
1 Notez la date, le lieu (point GPS si possible), l'heure, les conditions météorologiques et toutes observations intéressantes concernant le comportement du requin pèlerin.
2 Estimez la taille du requin.
3 Essayez de photographier l'aileron dorsal (les 2 faces si possible). Certaines marques constituant des caractères individuels pourront peut-être permettre d'identifier l'animal.
L'APECS, l'Association pour l'Etude et la Conservation des Sélaciens agit pour la conservation des requins et des raies en contribuant à l'amélioration des connaissances scientifiques et en développant des actions d'éducation et de sensibilisation.
Depuis de nombreuses années elle étudie la présence du requin pèlerin dans les eaux françaises en recensant les observations. En Bretagne, secteur particulièrement fréquenté par l'espèce, l'association mène en plus des actions sur le terrain de mai à août, notamment dans le secteur de l'archipel des Glénan et en Mer d'Iroise.
Rejoignez-nous et contribuez à la sauvegarde de cette espèce vulnérable.
APECS - BP 51151
29211 BREST cedex 1
asso@asso-apecs.org
02 98 05 40 38 / 06 77 59 69 83
VOUS ALLEZ EN MER ?
PEUT-ÊTRE ALLEZ-VOUS RENCONTRER UN
Requin Pèlerin
Comment profiter du spectacle sans déranger l'animal ?
Comment aider les scientifiques qui étudient cette espèce ?
Qui prévenir ?
www.asso-apecs.org

CODE DE BONNE CONDUITE À TENIR LORS DE L'OBSERVATION D'UN REQUIN PÈLERIN

LE GUIDE SUIVANT A ÉTÉ RÉALISÉ AFIN D'AIDER LES PLAISANCIERS ET LES NAGEURS À RÉDUIRE LES RISQUES DE DÉRANGER OU BLESSER L'ANIMAL

Le requin pèlerin (*Cetorhinus maximus*) peut mesurer plus de 10 m de long. C'est le deuxième plus gros poisson du monde après le requin baleine.

Comme ce dernier il est parfaitement inoffensif puisqu'il se nourrit de plancton en filtrant d'énormes quantités d'eau grâce à des peignes branchiaux. Pendant le printemps et l'été, des requins pèlerins peuvent être observés sur nos côtes, évoluant tranquillement en surface pour se nourrir.

Le requin pèlerin est classé comme "en danger" sur la Liste Rouge des espèces menacées de l'UICN (l'Union Mondiale pour la Nature) et est inscrit en annexe II de la CITES (convention relative au commerce international des espèces menacées d'extinction) ainsi que sur plusieurs autres conventions internationales.
Depuis 2007, il est interdit de pêcher et de débarquer cette espèce en Europe.

MERCI DE CONTACTER L'APECS POUR TOUT ÉCHOUAGE OU CAPTURE ACCIDENTELLE !

Contrôle du bateau à proximité d'un requin.

- Limitez la vitesse à 6 nœuds et évitez de changer brusquement de direction.
- Prenez le temps d'observer la direction suivie par le requin pour anticiper ses mouvements. Essayez de vous placer parallèlement à lui sans jamais lui couper la route. Si plusieurs bateaux sont présents, n'encerclez jamais le requin. Placez vous du même côté.
- Mettez le moteur au point mort si vous êtes à moins de 100 m du requin.
- Les jets ski sont incompatibles avec l'observation des requins pèlerins et doivent rester à plus de 500 m.

Comportement du plongeur à l'approche d'un requin.

- N'essayez pas de le toucher.
- Gardez une distance de sécurité de 4 m.
- Pas plus de 4 nageurs à l'eau simultanément. Les nageurs doivent être groupés et rester de préférence en surface.
- Evitez les flashs qui peuvent effrayer l'animal.
- N'utilisez pas de dispositifs sous-marins de propulsion.

Si le requin pèlerin passe sous votre embarcation, assurez-vous que le moteur est bien au point mort, restez calme et silencieux et profitez du spectacle. N'oubliez pas de prendre des photos !

Association Pour l'Etude et la Conservation des Sélaciens
Rue de Liège - BP 51151 29211 BREST CEDEX 1 - 06 77 59 69 83

www.asso-apecs.org

OSPAR COMMISSION

Victoria House
37-63 Southampton Row
London WC1B 4DA
United Kingdom

t: +44 (0)20 7430 5200
f: +44 (0)20 7242 3737
e: secretariat@ospar.org
www.ospar.org

OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

ISBN 978-1-909159-77-8
Publication Number: 646/2015

© OSPAR Commission, 2015. Permission may be granted by the publishers for the report to be wholly or partly reproduced in publications provided that the source of the extract is clearly indicated.

© Commission OSPAR, 2015. La reproduction de tout ou partie de ce rapport dans une publication peut être autorisée par l'Editeur, sous réserve que l'origine de l'extrait soit clairement mentionnée.