

Distribution and status of small cetaceans along the French Channel coasts: using opportunistic records for a preliminary assessment

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Abstract: Small cetaceans can use a variety of habitats and are generally wide-ranging. The study of their distribution and abundance is time-consuming and dedicated surveys are very expensive. In order to assess the diversity, distribution, and frequency of small cetaceans off the French Channel coasts, we collated opportunistic sightings collected by French mammalogist organisations, from the French/Belgian border to Pointe du Raz, western Brittany. A total of 1,350 small cetacean sightings are presented in this paper, collected between 1980 and 2000. Bottlenose dolphins (*Tursiops truncatus*) are common off the western French Channel coast. Long-finned pilot whales (*Globicephala melas*), Risso's dolphins (*Grampus griseus*) and common dolphins (*Delphinus delphis*) occurred infrequently in the Channel, mostly on a seasonal basis. The harbour porpoise (*Phocoena phocoena*) occurred regularly off the northern French coast. These results are important for planning systematic assessments of the distribution and abundance of small cetaceans off the French Channel coasts.

Keywords: small cetaceans, French Channel coasts, Normandy, Brittany, distribution, status, opportunistic records.

Introduction

Small cetaceans can use a variety of habitats and are generally wide-ranging. For this reason, extensive sighting surveys to assess their distribution, abundance, and habitat preference are needed (see for example: Buckland et al. 1993, Hammond et al. 1995). In some areas, where weather conditions are often difficult, these surveys can be rarely undertaken. However, the most limiting factor for setting-up dedicated cetacean sighting surveys is their prohibitive cost, which is a deterrent for attracting sources of funding. The use of opportunistic sighting records provides an alternative source of information on the distribution and diversity of cetaceans in a given area, and on a long-term basis.

The English Channel is an epicontinental sea. It constitutes a relatively narrow link between the Atlantic Ocean and the North Sea (figure 1) and is influenced by strong tides and freshwater inputs, which create well-mixed waters. This area is also characterised by the presence of hydrological fronts (at various spatial and temporal scales), which induces an important primary and secondary productivity (Brylinski 1997, Southward et al., in press). Large and varied stocks of fishes occur in the English Channel, and are heavily exploited. Only one dedicated cetacean sighting survey has been conducted in recent times, the SCANS programme (Small Cetacean Abundance in the North Sea and adjacent waters, summer 1994). This survey did not observe any cetaceans in "Block B" (the English Channel and southern North Sea), although this may be explained by the limited time spent in this area (Hammond et al. 1995, 2002). Some other surveys have been done in the area using sighting

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networks, data collected from onboard platforms of opportunity (especially the ferries between France and England), and dedicated sighting surveys focussing on resident populations of bottlenose dolphins (*Tursiops truncatus*) (see for example: Pourreau & Marin 1989, Tregenza 1992, Guinet et al. 1993, Lahaye & Mauger 2000, Ridoux et al. 2000, Brereton & Williams 2001, Coles et al. 2002, Kiszka et al., in press - a, MacLeod & Walker, in press). Several groups of bottlenose dolphin are known to occur in the English Channel, particularly along the southern coast of England and the coasts of the Brittanian peninsula and Normandy (Tregenza 1992, Williams et al. 1996, Lahaye & Mauger 2000, Ridoux et al. 2000). Data for the other species are relatively scarce. The common dolphin (*Delphinus delphis*) and the harbour porpoise (*Phocoena phocoena*) occur mainly in the western English Channel, and rarely in the central and eastern part (Evans 1980, Northridge et al. 1995, Rosen et al. 2000, Kiszka et al., in press - a). The presence of these species has also been documented through their incidental catches in fishing gear in the western English Channel and Celtic Sea (Tregenza et al. 1997a, Northridge, in press). The harbour porpoise is regularly sighted along the French and Belgian coasts of the southern North Sea, especially during the winter and early spring (Kiszka et al. 2004). Other cetacean species can be found in the English Channel too, such as the long-finned pilot whale (*Globicephala melas*), Risso's dolphin (*Grampus griseus*), killer whale (*Orcinus orca*), striped dolphin (*Stenella coeruleoalba*), white-beaked dolphin (*Lagenorhynchus albirostris*), and minke whale (*Balaenoptera acutorostrata*) (Evans 1980, Collet et al. 1994, Hammond et al. 1995, Williams & Brereton 2001, Pezeril & Kiszka, in press). However, their status and occurrence remain unclear.

The aim of this study was to investigate the diversity, distribution, and frequency of small cetaceans in the coastal waters of the French side of the English Channel. However, no attempt is made to provide relative abundance estimations due to the lack of data related to observation ef-

fort. The harbour porpoise and the bottlenose dolphin are placed under Appendix II of the European Union Habitats Directive, and an assessment of their status and distribution in the English Channel, very exposed to human activities, is much needed to identify conservation and management strategies. This preliminary assessment could help to define areas that are of special interest for some species, and could provide the basis for setting-up dedicated surveys in areas where sightings have been particularly numerous.

Materials and methods

The French Channel coasts (figure 1) are delimited in the north-east by the Belgian border, and in the south-west by the Pointe du Raz, i.e. approximately between 51°00' - 48°00' N of latitude and 06°00' W - 03°00' E of longitude. The topography of the study area is uniform, and maximum depth is approximately 70 metres, north of the Cotentin peninsula. The French Channel coasts are strongly influenced by tide cycles, especially in estuaries and bays, which are numerous throughout the area (from north to south the most important are: the Authie, Somme, Seine and Veys estuaries, and Mont-Saint-Michel Bay). Various biotopes can be found along the French Channel coasts, from mainly rocky (western French Channel coast) to sandy coasts (northern France). Channel waters are well mixed, turbid, and range, on average, from 4 to 20 °C, in winter and summer, respectively (Castel et al. 1997). In the western Channel, during summer, an important hydrological front permits high primary productivity, contributing to a huge amount of biomass in the higher trophic levels, a potential food source for cetaceans (Evans 1987).

Cetacean sightings data were collected from 1980 to 2000, by diverse organisations located along the coast, from the Belgian border to western Brittany. In northern France, records were collected by the Coordination Mammalogique du Nord de la France (CMNF), in Normandy most records were collected by the Groupe Mammalogique Normand (GMN), and finally,

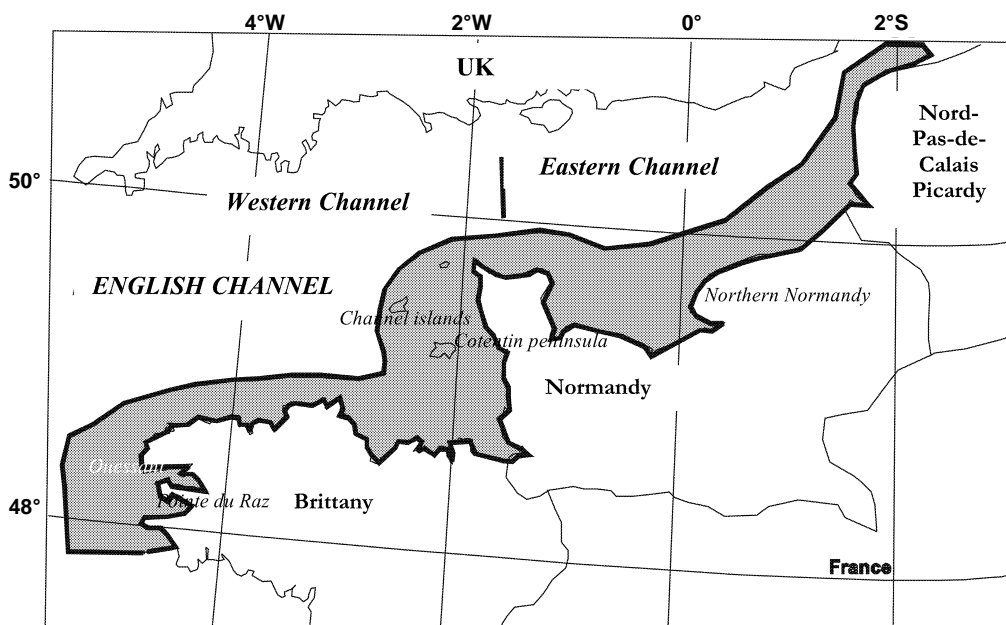


Figure 1. The study area; grey = areas where sighting data were collected.

in Brittany, records were collected by the Laboratoire d'Etude des Mammifères Marins, Océanopolis (LEMM).

The data were recorded by naturalists (particularly ornithologists), and also by recreational and, a few, professional fishermen, yachtsmen, and tourists. However, the bulk of the records we used (78%), were collected by accredited observers, and some marine mammalogists. A sighting was assigned to a species when the description of the animals was judged to be correct on the sighting form (pattern of behaviour, colouration, morphology, and pictures, if available). Consequently, we consider the bulk of the species identifications as valid. Nevertheless, it is still possible that some identifications are mistaken. Collection of the sighting data was undertaken with the collaboration of correspondents involved in the local sighting network. This was implemented in the early 1980s in Brittany and in Normandy, and in the late 1990s in northern France. For this study, we analysed the frequency (based only on the number of sightings for each species, and not calibrated with observation effort), distribution, and diversi-

ty of small cetaceans in French coastal waters.

Results

Overview

From 1980 to 2000, 1,350 small cetacean sightings data were collected along the French Channel coast. A total of eight species was recorded. In order of frequency, they are the bottlenose dolphin ($n=1,031$; 76.4% of the records), long-finned pilot whale ($n=123$; 9.1%), common dolphin ($n=83$; 6.1%), harbour porpoise ($n=47$; 3.5%), Risso's dolphin ($n=44$; 3.2%), killer whale ($n=10$; 0.7%), striped dolphin ($n=7$; 0.5%), and white-beaked dolphin ($n=5$; 0.4%).

Temporal and spatial distribution of sightings

The temporal analysis of the records shows a high heterogeneity (figure 2). Many sightings were reported from the mid-1980s to the early

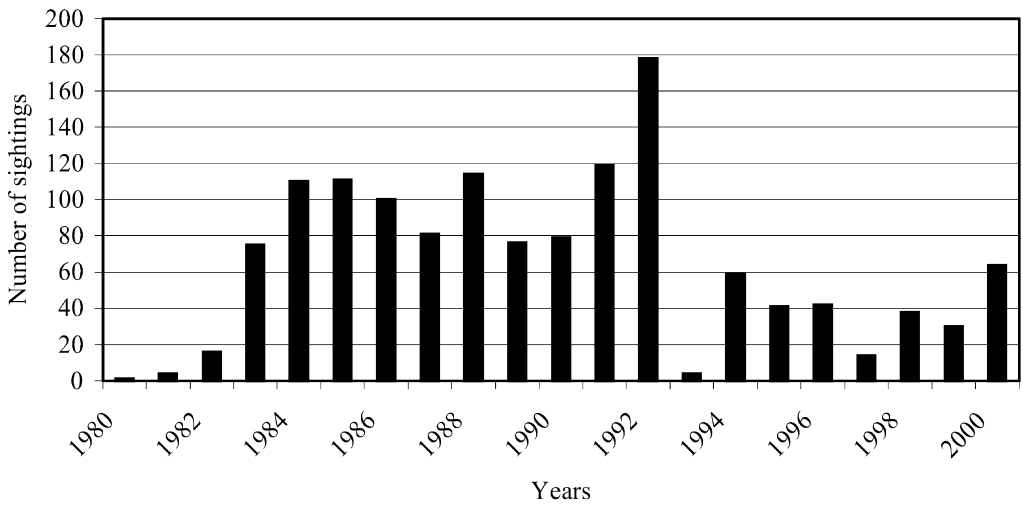


Figure 2. Inter-annual distribution of small cetacean sightings off the French Channel coasts between 1980 and 2000 ($n=1,350$).

1990s. After this period, the records decreased significantly. The average intra-annual distribution of sightings records from 1980 to 2000 shows that sightings are significantly more frequent during the summer months (notably in July and August; figure 3). The spatial distribution of opportunistic small cetacean records off

the French Channel coasts indicates a higher number of sightings in the western part of the study area; 181 records (13%) in the eastern part as against 1,169 in the western part (87%) (figure 4). To investigate the spatial distribution of small cetaceans off the French Channel coasts, a specific analysis is needed.

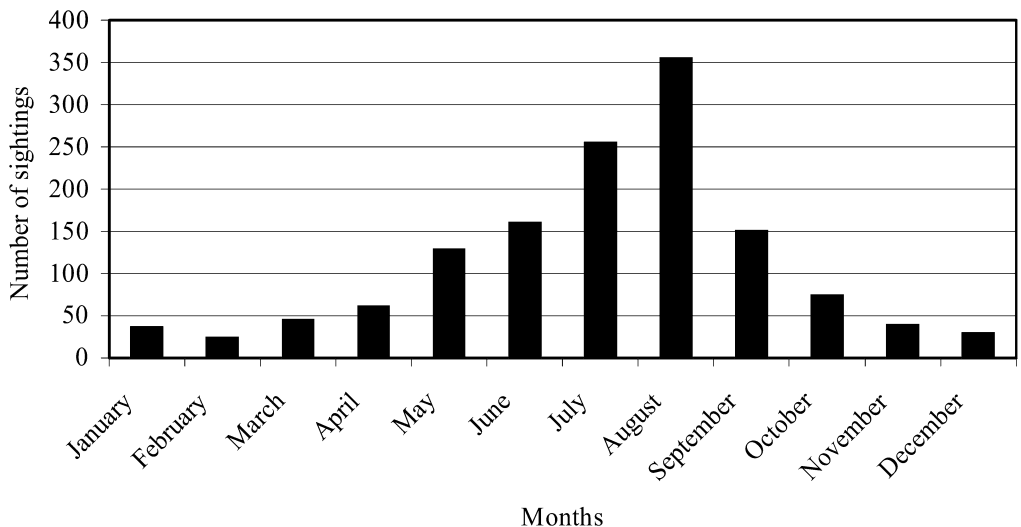


Figure 3. Intra-annual distribution of small cetacean sightings off the French Channel coasts between 1980 and 2000 ($n=1,350$).

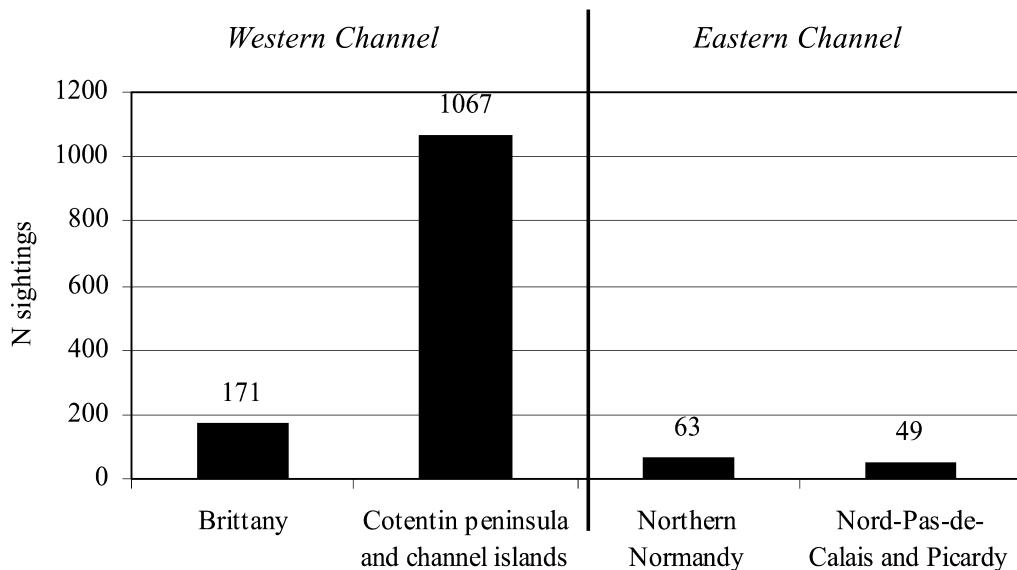


Figure 4. Number of sightings within each region ($n=1,350$).

Distribution and group size of each encountered species

The bottlenose dolphin was by far the most frequently encountered species: 1,031 sightings, i.e. 76% of all records. Sightings were mainly concentrated around the Cotentin peninsula and in the Mont-Saint-Michel Bay, especially during the summer months (figure 5). Few sightings have been reported in northern France and in Brittany. Group size ranged from 1 to 30 individuals, with an average group size of eleven dolphins.

The long-finned pilot whale ($n=123$ sightings; 9.1%) was encountered throughout the study area, but essentially in north-eastern Normandy and around the Channel Islands (figure 6). However, several records have been collected in northern France and northern Brittany. Group size was highly variable, ranging from a single individual to over 150 animals, with an average group size of 17 whales. 33% of the groups were made up of one to four animals.

The common dolphin has been recorded on 83 occasions (6.1% of all records) off the French Channel coasts from 1980 to 2000. The species has been recorded mainly around the island of

Ouessant (western Brittany), and north of the Channel Islands (figure 7). Only a few sightings were recorded in the eastern Channel and in the Mont-Saint-Michel Bay. Group size was highly variable, ranging from 2 to 500 individuals, with an average group size of 25 dolphins. The largest aggregations were observed north of Guernsey.

The harbour porpoise has been sighted on 47 occasions (3.5% of all records) during the study period. The bulk of the records have been collected in northern France, and a few in Normandy and Brittany (figure 8). Harbour porpoises were mainly singles (62%), but pairs (18%), groups with more than two individuals (11%) and even more than ten (9%) have been observed. The most important aggregations were found in northern France. The largest group involved more than 40 individuals near the Belgian border, probably foraging.

The Risso's dolphin was recorded on 44 occasions (3.2% of records). None were recorded in the eastern Channel. The bulk of the sightings were concentrated in the Mont-Saint-Michel Bay, with several also off the northern Brittany coast (figure 9). Group size ranged from one to

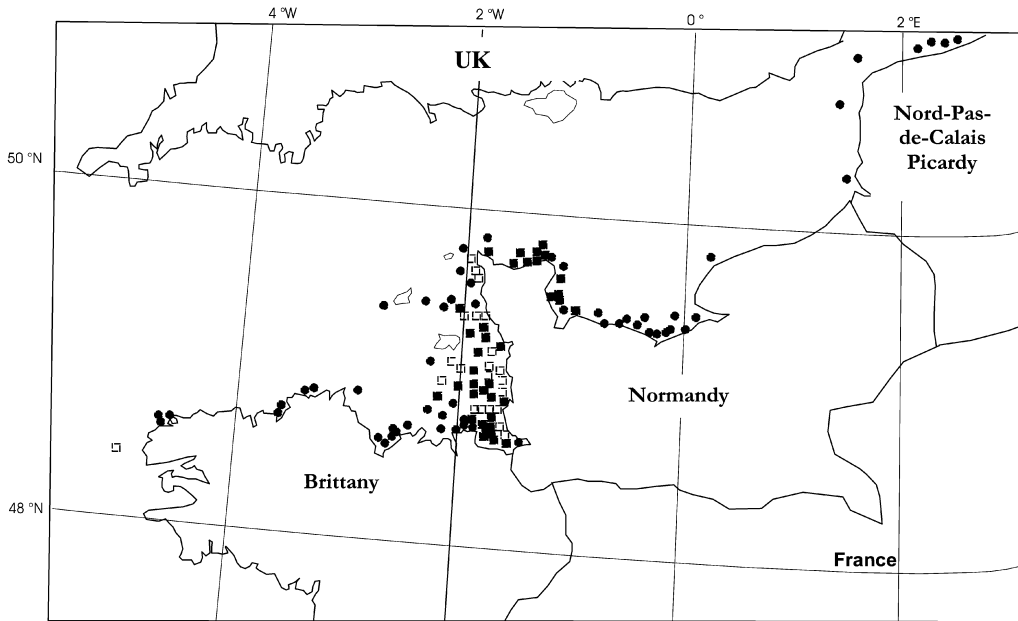


Figure 5. Distribution of bottlenose dolphin by opportunistic sightings off the French Channel coasts between 1980 and 2000 ($n=1,031$); \blacklozenge = 1 sighting; \blacksquare = 2-10 sightings, \square > 10 sightings.

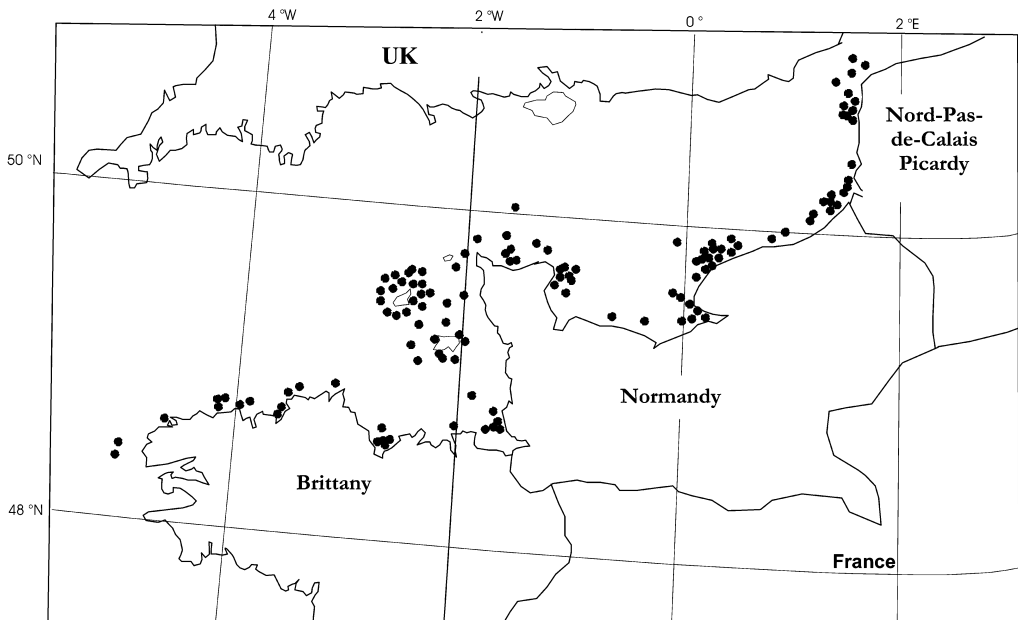


Figure 6. Distribution of long-finned pilot whale by opportunistic sightings off the French Channel coasts between 1980 and 2000 ($n=123$).

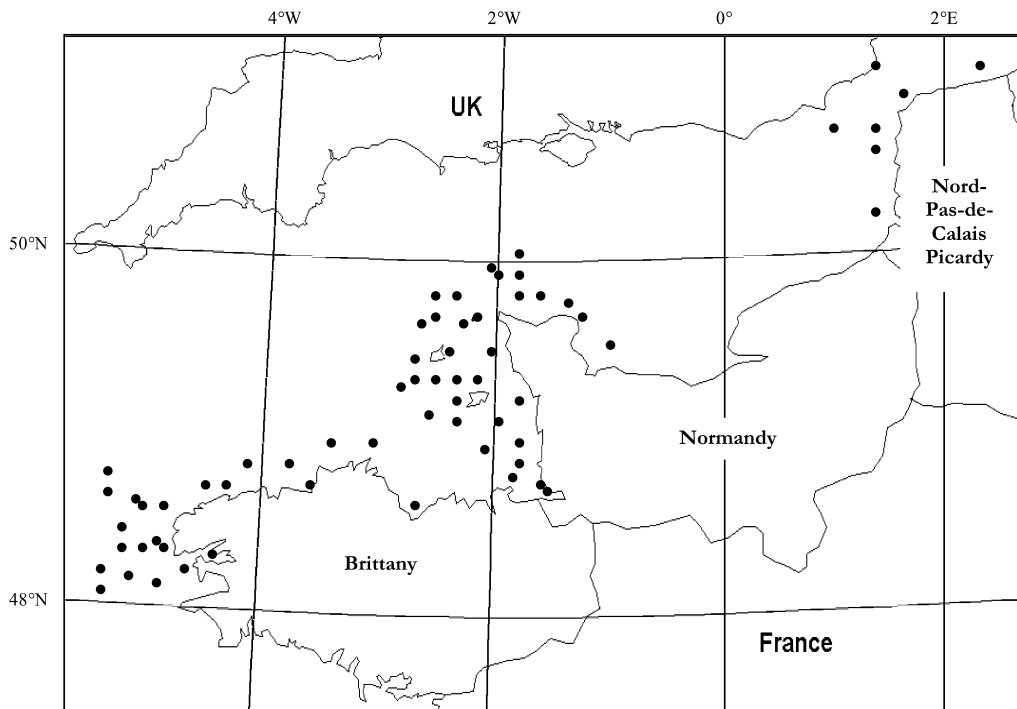


Figure 7. Distribution of common dolphin by opportunistic sightings off the French Channel coasts between 1980 and 2000 ($n=83$).

eight individuals, with an average group size of five dolphins.

Some other rare small cetacean species have been recorded off the French Channel coasts, including the killer whale (*Orcinus orca*), the striped dolphin (*Stenella coeruleoalba*), and the white-beaked dolphin (*Lagenorhynchus albirostris*). Killer whales have been recorded on three occasions in the Dover Strait (between November to March, in 1994, 1996 and 1997), on three occasions off eastern Normandy (between June to September in 1981, 1983 and 1989), and on four occasions off western Brittany, i.e. near Pointe du Raz off Ouessant and a long the northern coast (from April to October in 1996, 1997, 1998 and 1999). Striped dolphins, regularly stranding along the French Channel coast (Van Canneyt 2001, Van Canneyt 2002), were observed once in the Dover Strait in April (2000), once in northern Brittany (in November 1993), and off the western coast of Normandy, essen-

tially in winter. White-beaked dolphins were sighted once in Normandy (near the Channel Islands, during winter 1989) and in northern France (November, January and March 1998).

Discussion

Overview

This study reveals the limits of the use of occasional observations. Although there appears to be a decrease in the number of sightings after 1992 and this decrease is most probably due to a lower number of cetaceans, although it may also be due to a decrease in observational effort (not quantified), as the observers were not regularly approached during the latter period. Indeed, we suspect a lower motivation of the observers after the 1990s, probably due to less funds and active leaders in the organisations dedicated to marine

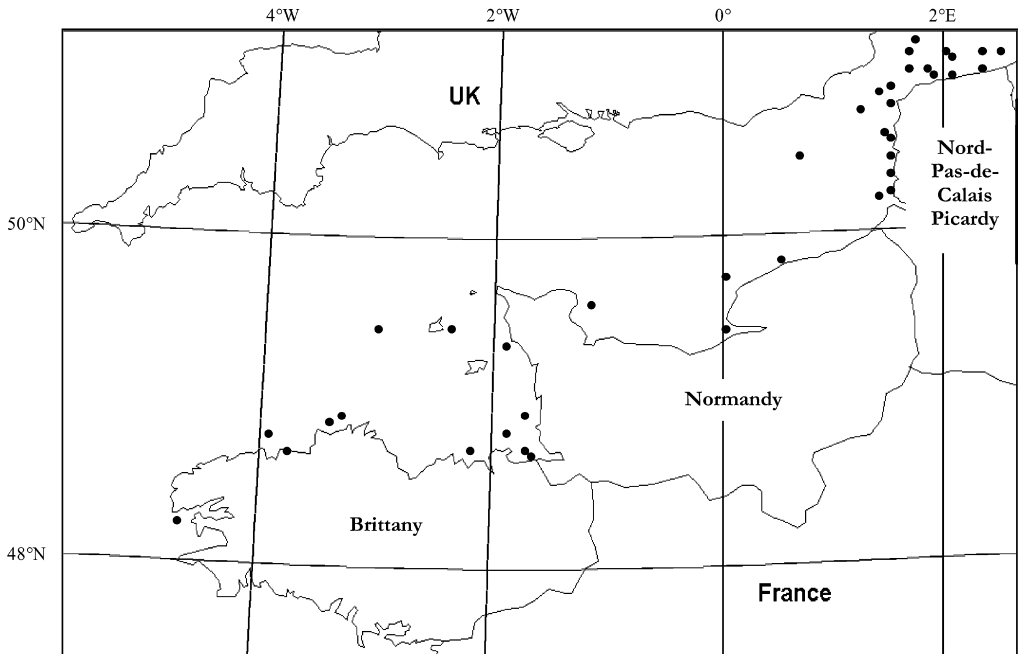


Figure 8. Distribution of harbour porpoise by opportunistic sightings off the French Channel coasts between 1980 and 2000 ($n=47$).

mammals. The summer records (from May to September) represent, by far, the bulk of the information presented in this study. The winter data may also be an underestimation, as observations are easier to undertake in the summer (due to better weather conditions) and recreational sailing activities increase during this period. However, the investigation of spatio-temporal trends of stranding records along the French Channel coasts, from 1972 to 2001, indicates a higher occurrence of cetaceans during winter in the area, especially involving the common dolphin (Van Canneyt 2001). Finally, there is a significant difference in the number of cetacean sightings between the eastern and western French Channel coasts. Our records indicate far more sightings off the western coasts (figure 4 to 9), except for the harbour porpoise and the long-finned pilot whale. This may be due to a higher presence of cetaceans in the western English Channel, better reporting and/or higher observation effort in this area (especially west of the Co-

tentin peninsula), or a combination of these factors. Opportunistic data collection started much later in northern France (in 1996) than in the other two regions, where it started in the early 1980s.

Although we do not have the answers to the questions relating to distribution patterns (for the seasonal distribution of bottlenose dolphin, see the results; however, the global trend follows the same pattern than the one in figure 3, as for the other species such as pilot whales and Risso's dolphin), the English Channel, especially the French Channel coastal waters, seems to constitute an important area for several cetacean species. There are resident groups of bottlenose dolphins (Lahaye & Mauger 2000, Ridoux et al. 2000) and other species appear to use this region, at least seasonally. As the western part of the Channel is open to the Atlantic Ocean, oceanic species such as common dolphins, long-finned pilot whales and Risso's dolphins can easily make incursions in their hunt for prey. Even

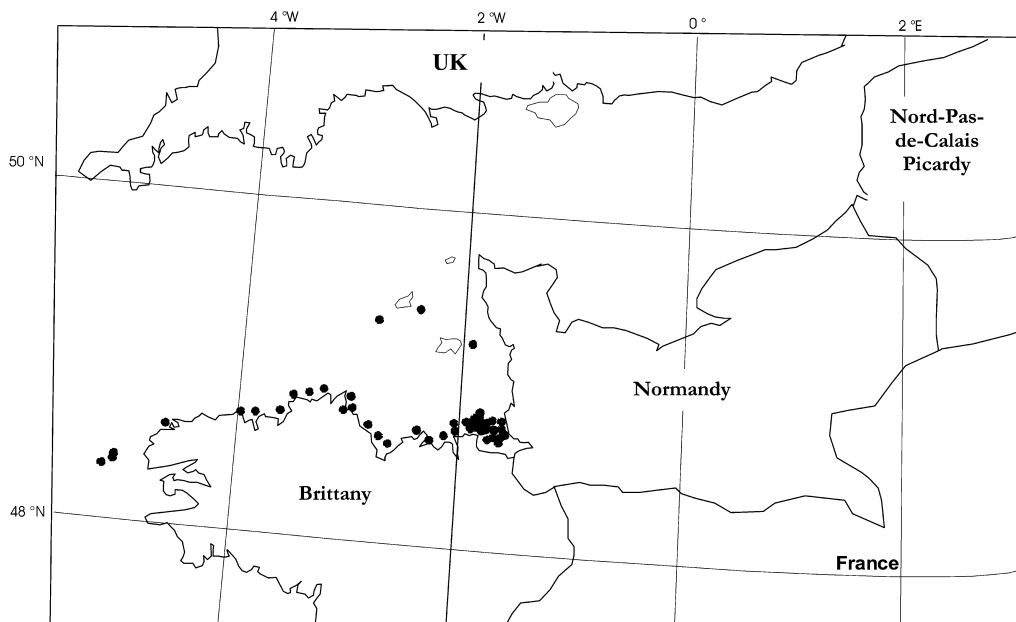


Figure 9. Distribution of Risso's dolphin by opportunistic sightings off the French Channel coasts between 1980 and 2000 ($n=44$).

though it is difficult to interpret these occasional observations in order to assess the abundance (or relative abundance), occurrence and distribution of cetaceans off the French coast in the English Channel (for reasons discussed earlier) these data can help to define particular locations for cetaceans and encourage more accurate studies following scientific protocol (for example, line transect surveys for abundance estimates and/or photo-identification surveys for site fidelity assessment).

Comparisons with previous knowledge of the status of small cetaceans in the English Channel

The bottlenose dolphin is the most commonly encountered species along the French Channel coasts. The high number of sightings is due to the presence of several resident populations in the French Channel coastal waters, especially around the Cotentin peninsula. Few data have been recorded in Brittany. This may be because local observers consider the species as resident,

so less interesting to record and report than, for example, pilot whales. There are two important groups of resident bottlenose dolphins in western Brittany: one around Île de Sein, and the other one in the Molène archipelago. The first one consisted in 2001 of 17 individuals, and the second of 35-50 individuals (Guinet et al. 1993, Ridoux et al. 2000, Liret 2001). In Normandy, the bulk of observations of bottlenose dolphins are located off the west coast of the Cotentin peninsula (in accordance with the observations by Pourreau & Marin 1989), yet many sightings were also made off the east coast, and in the Seine Bay – a phenomenon that has hardly been commented on before. Off the western and northern coast of the Cotentin peninsula, this species occurs on a year-round basis, with a substantial increase of records during summer, i.e. the same seasonal distribution pattern as in other species, such as pilot whales, Risso's dolphins and common dolphins. In Normandy, the resident bottlenose dolphin population probably involves more than 80 individuals, and individuals/groups seem to exploit all the coastal waters

of the Cotentin peninsula during summer (Lahaye & Mauger 2000, Pineau et al. 2000). In northern France, there have been only a few sightings of bottlenose dolphins.

Little is known about the status of the long-finned pilot whale in the English Channel. It has been recorded regularly off the south-west coast of England, notably during autumn and early winter (Evans 1980). This species, considered as oceanic (Bernard & Reilly 1999), regularly enters into shallow coastal waters, including those off the French Atlantic and Channel coast (Desportes 1983, Van Canneyt et al. 1999). Our data suggest a regular presence of pilot whales, especially around the Channel Islands, in north-eastern Normandy as well as in northern Brittany. In Normandy, pilot whales are considered as regular during the summer months. Movements of groups of pilot whales have been documented (Pezeril & Kiszka, in press), mainly between July and September, but also during winter. The main areas where the whales have been seen are the Channel Islands and the north-eastern coast of Normandy. Their presence in coastal waters could be linked to feeding behaviour, but more investigations are needed in order to prove this (Pezeril & Kiszka, in press).

Our results suggest that the common dolphin is a regularly occurring species in the western Channel, particularly around the Channel Islands and the island of Ouessant (western Brittany). Some sightings were made in the eastern Channel. The common dolphin is abundant in the western English Channel, especially during the winter months, but is rare in the eastern English Channel (Tregenza et al. 1997a, Rosen et al. 2000, Brereton & Williams 2001, MacLeod & Walker, in press). The presence of the common dolphin has been frequently associated with incidental catches in fishing gear in the western English Channel (Collet et al. 1994, Tregenza et al. 1997b, Northridge, in press).

It is generally considered that the harbour porpoise is rare in the English Channel, and in the southern North Sea (Hammond et al. 1995). In northern France, recent sighting and stranding records have indicated a probable recovery of the

harbour porpoise, which is borne out by similar results from the Belgian and the Dutch coasts (Camphuysen 1994, Kiszka et al. 2004). In the western English Channel, the harbour porpoise is relatively common, with a higher presence during summer (Brereton & Williams 2001, Rosen et al. 2000, Kiszka et al., in press - a). The presence of the species is, like the common dolphin, mentioned due to recurrent incidental catches in fishing nets in the western English Channel, Celtic Sea, and along the French Channel coasts (Collet et al. 1994; Tregenza et al. 1997a).

Our data suggest that the Risso's dolphin is absent in the eastern part of the study area, as suggested by Collet et al. (1994). However, in the western English Channel, Risso's dolphins were sighted on a regular basis in the Mont-Saint-Michel Bay, which seems to be a summer feeding ground for a small group of individuals, and along the northern Brittany coast. Beaulieu (1996) suggested that the species would occur in Brittany, and in the Mont-Saint-Michel Bay in summer, when cuttlefish (*Sepia officinalis*) come to reproduce in the shallow waters of the bay. A relatively stable group of eight to ten individuals was studied in the 1980s, notably using photo-identification (Hussenot 1985, Beaulieu 1996). This group was re-identified over several years, although no long-term follow-up studies have been undertaken in recent years. Risso's dolphins are still regularly seen, but more research would allow us to confirm the status of the group and provide new information about this little known species.

Certain other cetacean species, including the killer whale, striped dolphin and white-beaked dolphin have also been observed. These three species are generally considered as very rare off the French Channel coasts (Duguy 1983, Collet et al. 1994, Kiszka et al., in press - b). Striped dolphin sightings were mostly made in winter. Two unusual stranding records were made along the northern French Channel coasts, in the winter of 2001, but the bulk of stranding data were collected along the western French Channel coast (Van Canneyt 2002, Kiszka & Labruno 2003). Since the late 1990s, there has been a substantial

increase of striped dolphin observations around the North Sea and the Baltic (Isaksen & Syvertsen 2002). Environmental changes, linked to an increase of the sea surface temperature in the North Sea and adjacent waters could explain this phenomenon, as striped dolphins mostly occur in oceanic tropical, subtropical and warm temperate waters of both hemispheres (Evans 1987). However, no in-depth investigations have been undertaken to confirm this hypothesis. White-beaked dolphins were sighted in Normandy and in northern France. The species is rare, except in the southern North Sea French coast where some groups are regularly observed during the winter months (Kiszka & Labrune 2003, Kiszka et al., in press - b, J. Haelters, personal communication).

Conclusions

Some short-term quantitative studies have suggested that the English Channel is not an important area for cetaceans (Hammond et al. 1995). However, at least for the western French coastal waters, this long-term qualitative study underlines that several species do occur on a regular basis. The data we present here might be helpful in identifying areas where it might be justified to protect cetaceans. Before this more accurate studies would need to be carried out within a scientific protocol. Consequently, more research is needed in Normandy, especially on bottlenose dolphin distribution, movement patterns, and abundance. In the Mont-Saint-Michel Bay, a study focusing on the status of Risso's dolphins would also be interesting. This species, considered as mainly oceanic, has been regularly observed feeding in very shallow waters in this area during summer. The same phenomenon was observed with pilot whales, but at a larger spatial scale, i.e. along the French Channel coast and not in a localised site. Such behaviour seems to be relatively rare elsewhere. More knowledge about the ecology of both species could be obtained by implementing new long-term follow-up research along the French Channel coasts. At

the local scale, dedicated surveys on species making regular coastal incursions, such as pilot whales and Risso's dolphins, would confirm their abundance (using photo-identification, for example), site fidelity and behaviour (habitat use, movement patterns). At a broader scale, the use of platforms of opportunity (especially the ferries between France and England) on a regular basis could provide, at a low cost, more quantified data (with observation effort) on the distribution and seasonal occurrence of cetaceans in the English Channel. This research, both regional (French) and international (in cooperation with England for the broader studies) could also contribute to the conservation of small cetaceans in the highly disturbed habitat of the English Channel.

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Samenvatting

Verspreiding en status van kleine walvisachtigen langs de Franse Kanaalkust: het gebruik van incidentele waarnemingen voor een voorlopig overzicht

Kleine walvisachtigen kunnen een grote verscheidenheid aan habitats bewonen en komen over het algemeen op veel plaatsen voor. Onderzoek naar hun verspreiding en aantallen is tijdrovend en het maken van verantwoorde overzichten is buitengewoon kostbaar. Om de diversiteit, verspreiding en frequentie van voorkomen van kleine walvisachtigen langs de Franse kust van het Engelse Kanaal te achterhalen, vergeleken wij willekeurige waarnemingen verzameld door Franse zoogdierkundige organisaties, dat wil zeggen, vanaf de Frans-Belgische grens tot en met Pointe du Raz, in het westen van Bretagne. In dit artikel worden in totaal 1.350 waarnemingen van kleine walvisachtigen gepresenteerd, verzameld tussen 1980 en 2000. Tuimelaars (*Tursiops truncatus*) kwamen algemeen voor in het westelijk deel van het onderzoeksgebied; er konden drie afzonderlijke populaties worden on-

derscheiden. De griend (*Globicephala melas*), de gramper (*Grampus grisues*) en de gewone dolfijn (*Delphinus delphis*) kwamen onregelmatig voor in het Kanaal, meestal in een bepaald seizoen. De bruinvis (*Phocoena phocoena*) kwam regelmatig voor langs het noordelijk deel van de Franse kust. Deze resultaten zijn van be-

lang voor het opzetten van systematische schattingen van het voorkomen en de aantallen van kleine walvisachtigen langs de Franse Kanaalkust.

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