# A note on harbour seal *(Phoca vitulina)* distribution and abundance in France and Belgium

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## ABSTRACT

The most southern European colonies of harbour seals *(Phoca vitulina)* are located in France, in three areas: Baie du Mont Saint Michel, Baie des Veys and Baie de Somme. The largest colony is situated at the Baie de Somme, with a maximum of 186 individuals recorded on one occasion in the summer of 2008. All colonies are regularly monitored by different organisations. Different monitoring methods are used, including land-based, air-based and ship-based survey techniques. The basic results of the monitoring indicate a regular increase in the population size since 1990, with the total count of hauled out harbour seals for the three colonies increasing from 24 in 1990 to 295 in 2008. During the last years, an increasing number of pregnant females, pups and post-weaned seals have been observed. The recorded number of pups in 2008 was 53. Along the Belgian coast, no harbour seal colonies exist anymore, although individual animals and small groups are regularly observed at different locations. The high recreational use of Belgian beaches may prevent the establishment of colonies or regularly used haulout sites.

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## INTRODUCTION

Since 1994, harbour seals were considered in France as *vulnerable* on the national red list edited by the "Muséum National d'Histoire Naturelle" (MNHN) (Maurin and Keith 1994). Recently, due to changes in the conservation status at the different colonies, they have become listed as *near threatened* (UICN France and MNHN 2009). During the 19th century, seals were legally hunted for meat and fur in France, and also because they were considered to pose a threat to fisheries. As a consequence, the number of seals declined dramatically (Robert and Triplet 1984). This was also the case in the Dutch Delta area (Zeeland), where probably more than 10.000 seals occurred around 1900 (Reijnders 1994). At the beginning of the 1930s, Havinga (1933) had estimated the population in Zeeland at 1.300 animals, a number which further declined until the 1970s, when the seal was considered as virtually extirpated (Reijnders 1985).

In France, breeding harbour seals were no longer recorded at Baie de Somme by 1930 and by 1960 the species had completely disappeared, not only from this area, but from the entire country. In 1961, a first decree for the protection of the species was issued, followed by laws in 1972 and 1980 (De Beaulieu *et al.* 1994). In 1991 and 1995, two other decrees came into force, resulting in a total protection of the species (Ridoux *et al.* 2000).

The measures related to the creation of natural reserves and Special Areas of Conservation (SACs) under the European Habitats Directive, at sites where the seals were historically present, have contributed to the recolonisation of the species in France and the increase in the number of individuals sighted, particularly at the end of the 1980s and the beginning of the 1990s (Table 1) (Robert and Triplet 1984, Thierry *et al.* 1994, Ridoux 1996, Groupe Mammalogique Normand 1998).

Along the Belgian coast harbour seals were frequently sighted until the 1950s, *e.g.* at haulout sites at Heist, at mouth of the River IJzer, and a sandbank off Koksijde (Den Oever), but thereafter no colonies existed anymore, mainly due to continuous and very high levels of disturbance. During the first half of the 20th century, harbour seals were also frequently observed at Doel, on the River Scheldt, and even up to Antwerp (De Smet, 1978).

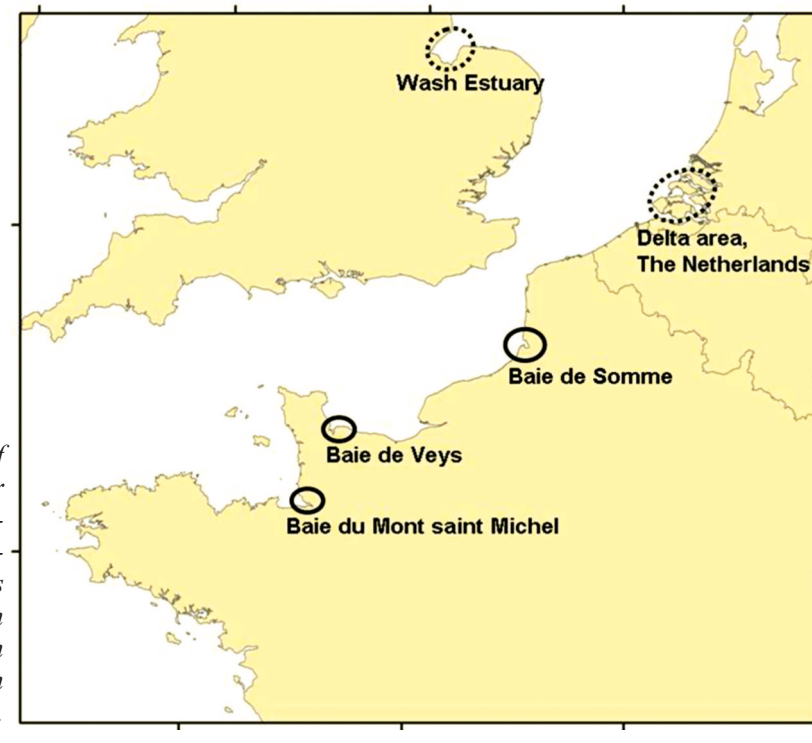


***Fig. 1.*** *Locations of the French harbour seal colonies (full circle line) and the closest foreign colonies mentioned (broken circle), the Wash estuary and the Dutch Delta area.*

This article reports harbour seal counts and pup production in the three French harbour seal colonies between the 1990s and 2008. It also reports on the scarce information available in Belgium, including strandings.

## MATERIALS AND METHODS

The 3 colonies of harbour seals in France, Baie du Mont Saint Michel, Baie des Veys and Baie de Somme (Fig. 1), are the southernmost harbour seal colonies of Europe, located at the latitudes of 48°40'N, 49°30'N and 50°14'N respectively. The 3 sites are large open sandy bays, with very little, if any, rocky-habitat (Fig. 2).

The colonies are regularly monitored to assess the growth of the colonies, breeding success, and human disturbances. The monitoring of the 3 sites is conducted by different organisations and the methodologies are not completely similar. Recently, aerial survey monitoring has been adopted by all, because of its easy implementation and higher quality, reliability and consistency of the results, as compared to land or boat surveys.

Monitoring at the Baie du Mont Saint Michel
Before 2002 land-based surveys of seal colonies were carried out at low tide by Gérard Gautier, the GMN *(Groupe Mammalogique Normand)* and *La Maison de la Baie*. During these surveys, the number of hauled-out individuals of both harbour and grey seal were recorded, and during the breeding season also the number of pups was counted. Currently the area is covered in one hour surveys with an ultra-light aircraft (ULM), operated by AEROBAIE. Surveys are conducted at an altitude of 150 m, 30 minutes around low tide, and when the weather conditions are favourable (wind less than 25 knots, no clouds and no rain). Each individual or group encountered is photographed and haul out locations are geo-referenced using GPS.

**Monitoring at the Baie des Veys**
Until 1990, land survey counts of hauled-out seals were conducted once per week by the GMN, and after by la *Reserve Naturelle de Beauguillot*. From 2005, land surveys have been combined with aerial surveys, while the frequency of surveys remains the same. The aerial survey is conducted using the same aircraft and survey protocols used at Baie du Mont Saint Michel.


***Fig. 2.*** *Typical sandy harbour seal haulout habitat in France at Baie des Veys.*

**Table 1.** Overview of the number of harbour seals at the three colonies, and annual total rate of increase.

| Year | Total number of seals | Annual increase rate | Total number of seals per colony | | |
|---|---|---|---|---|---|
| | | | Baie de Somme | Baie des des Veys | Baie du Mont Saint Michel |
| 1979-83 | 7 | - | 7 | 0 | 0 |
| 1986 | 10 | 43% | 10 | 0 | 0 |
| 1987 | 22 | 120% | 15 | 5 | 2 |
| 1988 | 25 | 14% | 16 | 6 | 3 |
| 1989 | 20 | -20% | 9 | 5 | 6 |
| 1990 | 24 | 20% | 10 | 5 | 9 |
| 1991 | 22 | -8% | 9 | 5 | 8 |
| 1992 | 26 | 18% | 12 | 5 | 9 |
| 1993 | 30 | 15% | 12 | 4 | 14 |
| 1994 | 40 | 33% | 22 | 8 | 10 |
| 1995 | 45 | 13% | 27 | 7 | 11 |
| 1996 | 58 | 29% | 35 | 12 | 11 |
| 1997 | 83 | 43% | 50 | 17 | 16 |
| 1998 | 103 | 24% | 59 | 23 | 21 |
| 1999 | 115 | 12% | 66 | 26 | 23 |
| 2000 | 122 | 6% | 74 | 25 | 23 |
| 2001 | 121 | -1% | 76 | 27 | 18 |
| 2002 | 162 | 34% | 104 | 32 | 26 |
| 2003 | 166 | 2% | 103 | 30 | 33 |
| 2004 | 191 | 15% | 121 | 34 | 36 |
| 2005 | 227 | 19% | 139 | 52 | 36 |
| 2006 | 261 | 15% | 165 | 58 | 38 |
| 2007 | 281 | 8% | 175 | 66 | 40 |
| 2008 | 295 | 5% | 186 | 71 | 38 |

**Monitoring at the Baie de Somme**

This colony has been surveyed for the longest period, since the first reporting of harbour seals are from 1979. Land-based surveys are conducted every 10 days from January to June and from September to December and daily from June to September. Depending on weather conditions, ship-based censuses are carried out at low tide from March to October. From 2006, aerial surveys have been conducted during low tide using an ultra-light aircraft (ULM) at an altitude of 300 m, at least once a month between June and September. The total number of hauled out seals, and the number of pups and weaned seals are recorded.

**Monitoring on the Belgian coast**

There is no colony or stable haulout site that is regularly monitored in Belgium. All sightings data are the result of opportunistic sightings and voluntary reporting. These data are archived in digital format at the Royal Belgian Institute of Natural Sciences (RBINS).

## RESULTS

Table 1 and figure 3 show the growth of the 3 French harbour seal colonies, based on the maximum counts. The general trend is a regular increase for all the sites. Between 1987 and 2008 the total number of seals present at the 3

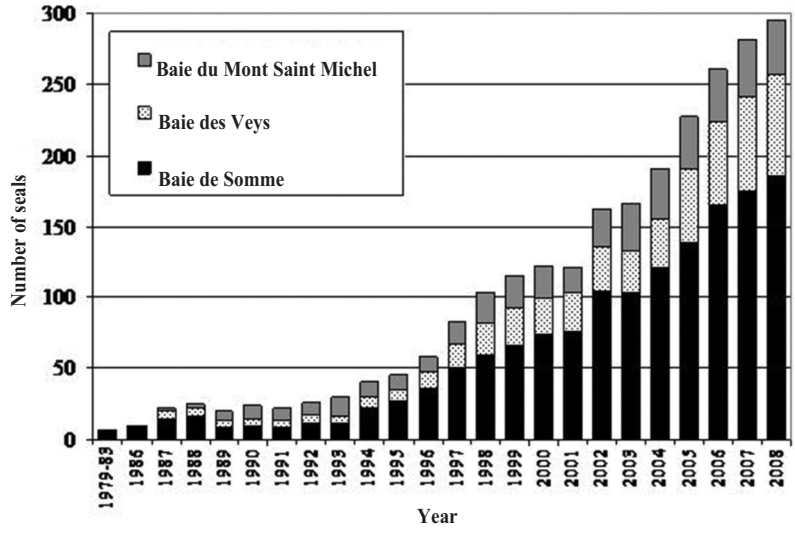


***Fig. 3.***
*Annual number of harbour seals observed in the three French colonies from 1986 to 2008.*

sites has increased from a mere 22 to 295 individuals, with an annual exponential increase of 16% ( $\lambda = 1.16$; $R^2 = 0.97$).

The largest increase rates were observed in 1987 (+120%), 1994 (+33%), 1997 (+43%) and 2002 (+34%). These increase rates can only be explained by an influx of animals from other colonies.

Figure 4 shows the harbour seal pup production per year by site. Table 2 indicates the annual pup production, and the annual breeding rate for each colony expressed by number of observed pups on the total number of animals. Most pups are born at the largest colony of the Baie de Somme (30 pups or 54 % of the total production). Over the study period, however, the Baie du Mont Saint Michel has the highest breeding rate (number of pups divided by total number of animals) with an average of 0.22 between 1997 and 2008, while the Baie des Veys and the Baie de Somme exhibit breeding rates of 0.18 and 0.13, respectively.

Figure 5 shows the recorded number of harbour seals and the pup production in France, and indicates the annual breeding rate. The breeding rate varied considerably at the beginning of the 1990s, due to a small number of seals. It remained fairly stable in the 21st century at around 16 %, except in 2001, when it was markedly higher.

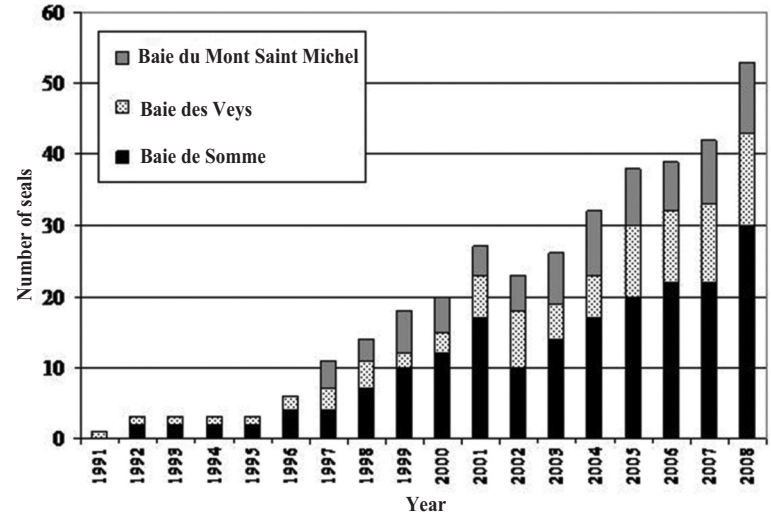


***Fig. 4.***
*Annual pup production observed at the three French harbour seal colonies.*

**Table 2.** Number of pups and breeding rate, for the three harbour seal colonies, expressed as number of pups per total number of animals.

| Year | Total number of pups | Number of pups per colony | | | Breeding rate per colony | | |
|---|---|---|---|---|---|---|---|
| | | Baie de Somme | Baie des Veys | Baie du Mont Saint Michel | Baie de Somme | Baie des Veys | Baie du Mont Saint Michel |
| 1991 | 1 | | 1 | | | 20% | |
| 1992 | 3 | 2 | 1 | | 17% | 20% | |
| 1993 | 3 | 2 | 1 | | 17% | 25% | |
| 1994 | 3 | 2 | 1 | | 9% | 13% | |
| 1995 | 3 | 2 | 1 | | 7% | 14% | |
| 1996 | 6 | 4 | 2 | | 11% | 17% | |
| 1997 | 11 | 4 | 3 | 4 | 8% | 18% | 25% |
| 1998 | 14 | 7 | 4 | 3 | 12% | 17% | 14% |
| 1999 | 18 | 10 | 2 | 6 | 15% | 8% | 26% |
| 2000 | 20 | 12 | 3 | 5 | 16% | 12% | 22% |
| 2001 | 27 | 17 | 6 | 4 | 22% | 22% | 22% |
| 2002 | 23 | 10 | 8 | 5 | 10% | 25% | 19% |
| 2003 | 26 | 14 | 5 | 7 | 14% | 17% | 21% |
| 2004 | 32 | 17 | 6 | 9 | 14% | 18% | 25% |
| 2005 | 38 | 20 | 10 | 8 | 14% | 19% | 22% |
| 2006 | 39 | 22 | 10 | 7 | 13% | 17% | 18% |
| 2007 | 42 | 22 | 11 | 9 | 13% | 17% | 23% |
| 2008 | 53 | 30 | 13 | 10 | 16% | 18% | 26% |

Currently around 5 to 20 harbour seals are regularly observed on the Belgian coast, and observations mainly come from the Belgian part of the river Scheldt. Only two regular haulout sites exist in this region (Nieuwpoort, Koksijde), but they are only visited by 1 to 8 seals at a time. Each summer, from July to October, a number of live harbour seal pups wash ashore at the Belgian coast. Between 1995 and 2007 a total of 90 live pups was recorded stranded, ranging from 1 to 18 per year. In addition, 50 dead animals (subadults and adults) were reported during the same time period. The cause of death for 12 of the animals was attributed to drowning in fishing gear, and 13 seals that washed ashore between 15 and 26 September 2002 died during the Phocine Distemper Virus (PDV) outbreak.

## DISCUSSION

Currently 3 harbour seal colonies exist in France. The numbers of seals at those colonies show a positive trend. Breeding rates have been fairly stable since 2000. The increase in numbers and the breeding success are due to a combination of factors. Seals have been legally protected since 1961, and the areas with colonies and haulout sites have been protected between the 1980s and the 1990s. The positive trend is certainly also due partly to the work of the different organisations *(Groupe Mammalogique Normand, Réserve Naturelle de Beauguillot, Picardie Nature)*, which included actions to avoid disturbance and the implementation of awareness campaigns about seals in France (Elder 2006, Hemon 2006, Dupuis 2006).

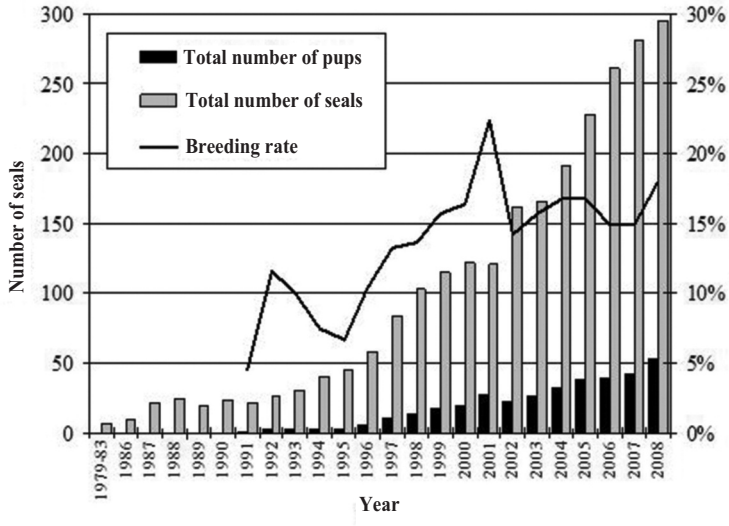


***Fig. 5.***
*Total number of harbour seals, pup production per year and breeding rate expressed as pup production per total number of seals counted in France.*

There is little information concerning the origin of the harbour seals in the French colonies. Individual animals probably originate from the Dutch (Zeeland and/or Wadden Sea) colonies, and/or from the colony at the Wash Estuary (UK). The nearest colonies are located in Zeeland (The Netherlands), numbering some hundreds of seals (Meininger *et al.* 2003, Reijnders *et al.* 2010), and in the estuary of the Wash (UK), numbering around 2.500 animals (Thompson *et al.* 2005). Currently, individuals tagged in different colonies (Dutch Delta colonies and Wash in UK) in the southern North Sea are regularly observed in the Baie de Somme (Dupuis, 2004), indicating migrations between nearby colonies.

Research performed in The Netherlands has indicated that satellite-tagged animals from the Dutch Delta area make regular visits to northern French waters, passing through Belgian waters (pers. communication Sophie Brasseur, data Wageningen-IMARES/Noordzeewind Nuon/Shell). To investigate such migrations in France, genetic and photo-identification studies should be implemented (Thierry, 1994). Some research has been undertaken in France already using GSM transmitters. The University of La Rochelle has equipped seals with GSM tags in the Baie du Mont Saint Michel (5 seals in 2006, 3 seals in 2007 and 7 seals in the Baie des Veys (2007). Results indicate that the seals remained in coastal waters at both sites, since 93% and 71%, respectively of at-sea locations were located in the intertidal zone (Vincent *et al.* 2010).

*Le Chene (Centre d'Hébergement et d'Etude sur la Nature et l'Environnement)* has released rehabilitated harbour seals equipped with Argos satellite tags (3 in 2006/2007 and 3 in 2007/2008). The data generated by these tracking efforts will increase our knowledge and provide a better understanding of the ecology of this species. The initial results indicate that the post weaned seals in particular are very mobile. Large scale movements were recorded for 5 individuals, including travel from Normandy to the British Channel coasts and Brittany to the limit of the continental shelf (Le Chene pers.comm., mapsavailableathttp://www.chene.asso.fr/suivi_phoques.html).

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