

# How many porpoises are there in the North Sea — and how many is enough?

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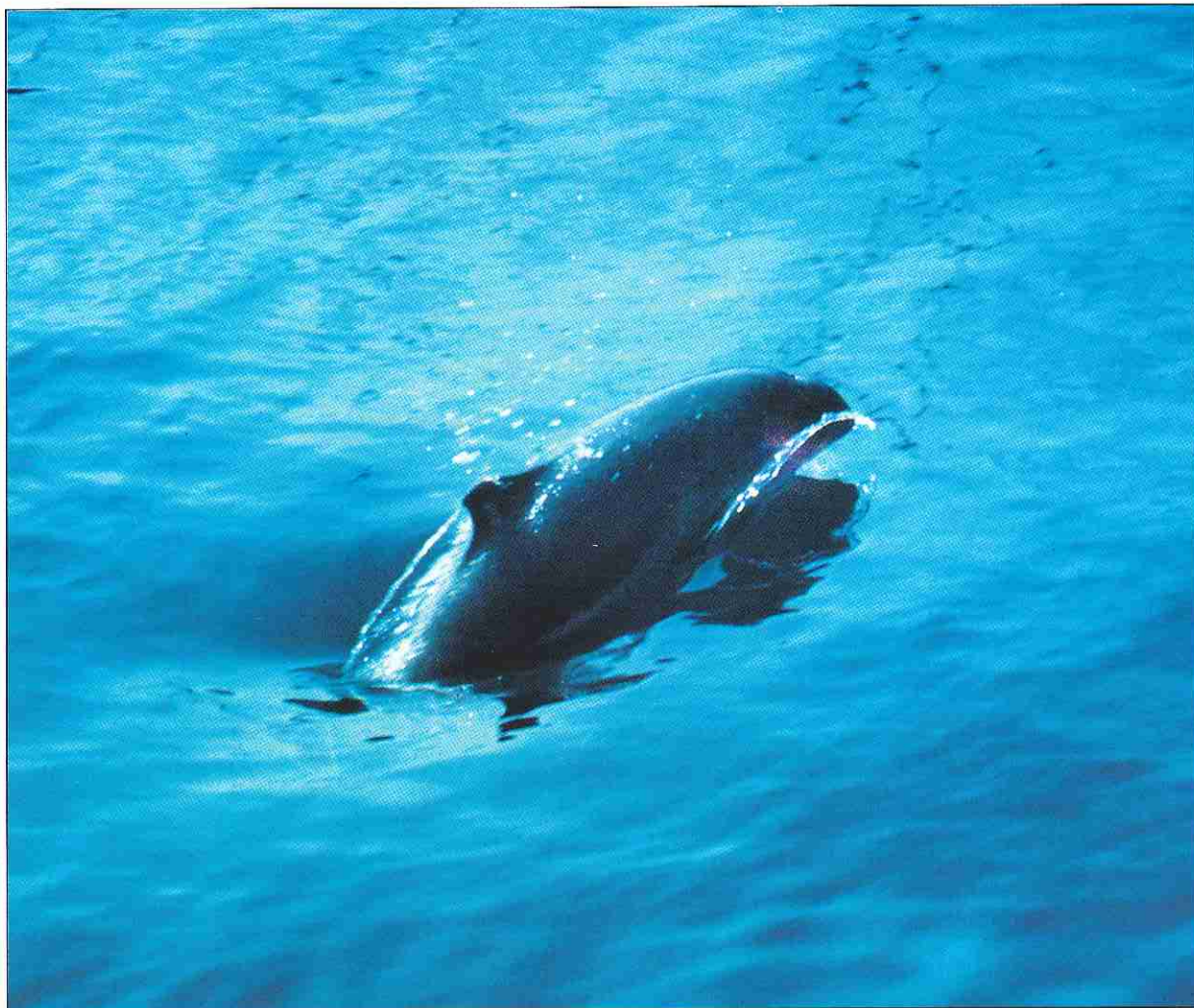


Figure 1: Harbour Porpoise

Photo credit: © John Y. Wang/NATURART

Have you ever wondered how many whales, dolphins or porpoises there are in the waters around our European coastline? Many people have, including scientists and conservationists, who are concerned for the health of these populations in waters which hold several potential threats to their well-being. In coastal waters particularly, whales, dolphins and porpoises, (collectively known as "cetaceans") run the risk of being affected by man's less-than-considerate use of the environment. These misuses include allowing toxic chemicals into the sea, over-fishing the marine animals which are eaten by cetaceans, and disturbance of their natural habitat through oil exploration, commerce and recreation. But the most immediate and direct threat in European waters is accidental capture of small cetaceans in fishing gear.

The accidental capture of cetaceans in fisheries (known as "bycatch") is not a new threat but during the last few years Europeans have become increasingly worried about this problem. The most serious concern is for the harbour porpoise (Figure 1) which can become entangled and drowned in gillnets set on or near the sea bed. But to determine whether or not bycatches could be causing a decline in the number of porpoises in European waters, we need to know at least how many are killed each year in fishing operations and how many animals there are altogether.

Harbour porpoises are the most commonly seen cetacean in European waters - but how many actually are there: one thousand, ten thousand, one hundred thousand, a million?

# SCANS - Small Cetacean Abundance in the North Sea

In February 1992, a group of scientists from several European countries put together a proposal with the main aim of finding out the number of harbour porpoises in a key part of their range in European waters. The proposal was called "SCANS" - Small Cetacean Abundance in the North Sea (and adjacent waters). It received financial support from the European Commission's LIFE programme, and from the governments of Denmark, France, Germany, Ireland, the Netherlands, Norway, Sweden and the U.K., as well as from WWF Sweden.

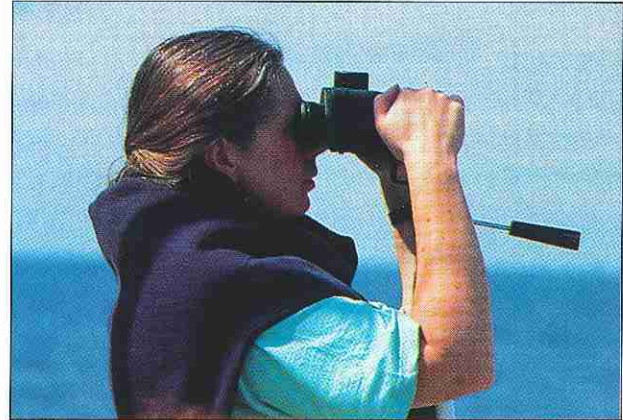
Porpoises, and other small cetaceans, spend all their lives in the sea. They can travel around over large areas and most of the time they are underwater, except when they break the surface to breathe. How is it possible to count how many there are? In fact, it is not possible to count porpoises. Instead, we have to rely on collecting a limited amount of information (called a sample) and then use statistical analyses to extrapolate from this sample to the population of porpoises in the whole study area, in this case the North Sea and adjacent waters. Extrapolation involves some uncertainty so it is never possible to say exactly how many porpoises there are. But we can make sure that the estimated number is as accurate as possible and also that the uncertainty is minimised.

With this in mind, a major part of the preparatory work of project SCANS was the development of methods which specifically took account of the behaviour of porpoises and the practical problems of working at sea.



Aircraft used on SCANS survey

*Photo credit: Greg Donovan*



Observer searching for cetaceans

*Photo credit: Jaume Forcada*

More data reduces the uncertainty in the estimated numbers, so the project team spent as much time as possible collecting data at sea.

Project SCANS centred on an intensive sightings survey of the North Sea and adjacent waters using a method known as line transect sampling. This is where trained scientists (observers) search for animals with the naked eye or through binoculars as they move through the study area along a series of transect lines. Because harbour porpoises and other small cetaceans live in the sea, the observers must search from ships or aircraft suitably modified to accommodate them and their equipment (Figure 2). When a group of porpoises or other cetaceans is spotted by an observer, the distance of the group from the transect line is recorded along with other information such as which species are present and the number of animals in the group. At the end of the sightings survey, this information is used, together with the lengths of the transects and other relevant data, to estimate the numbers of animals of each species in the area sampled on either side of the transect lines. Because we know the size of the whole study area, we can estimate the total number of porpoises and other small cetaceans in the North Sea and adjacent waters. Note that although not all the animals will be seen, this is taken account of by the estimation method.

Details of the methods used in project SCANS to estimate numbers of porpoises and other small cetaceans in the North Sea and adjacent waters are given in the Technical Report of the project.

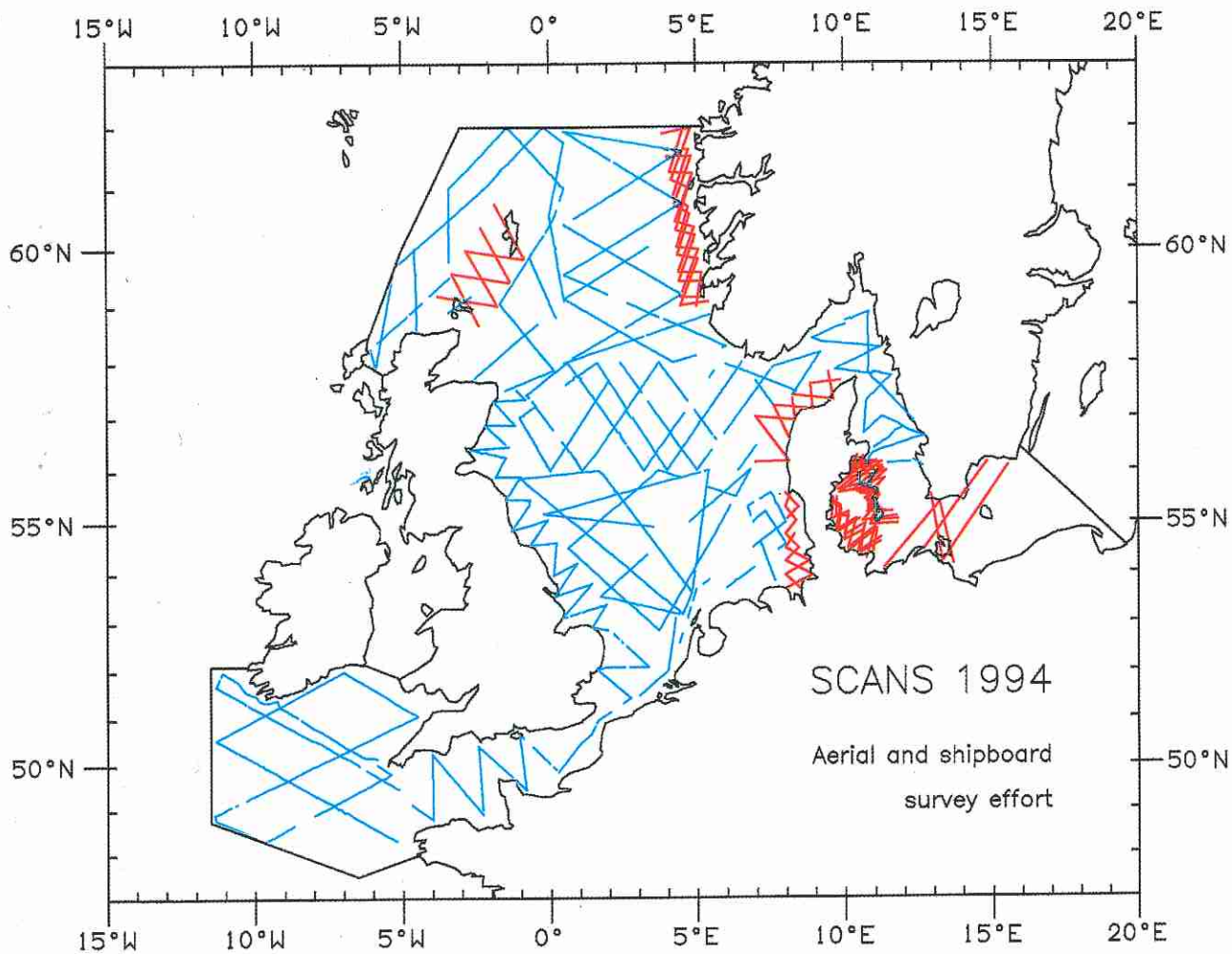


Figure 2: Survey area showing ship (blue lines) and aircraft (red lines) transect lines searched



Minke whale surfacing

Photo credit: Sara Heimlich-Boran

## Results

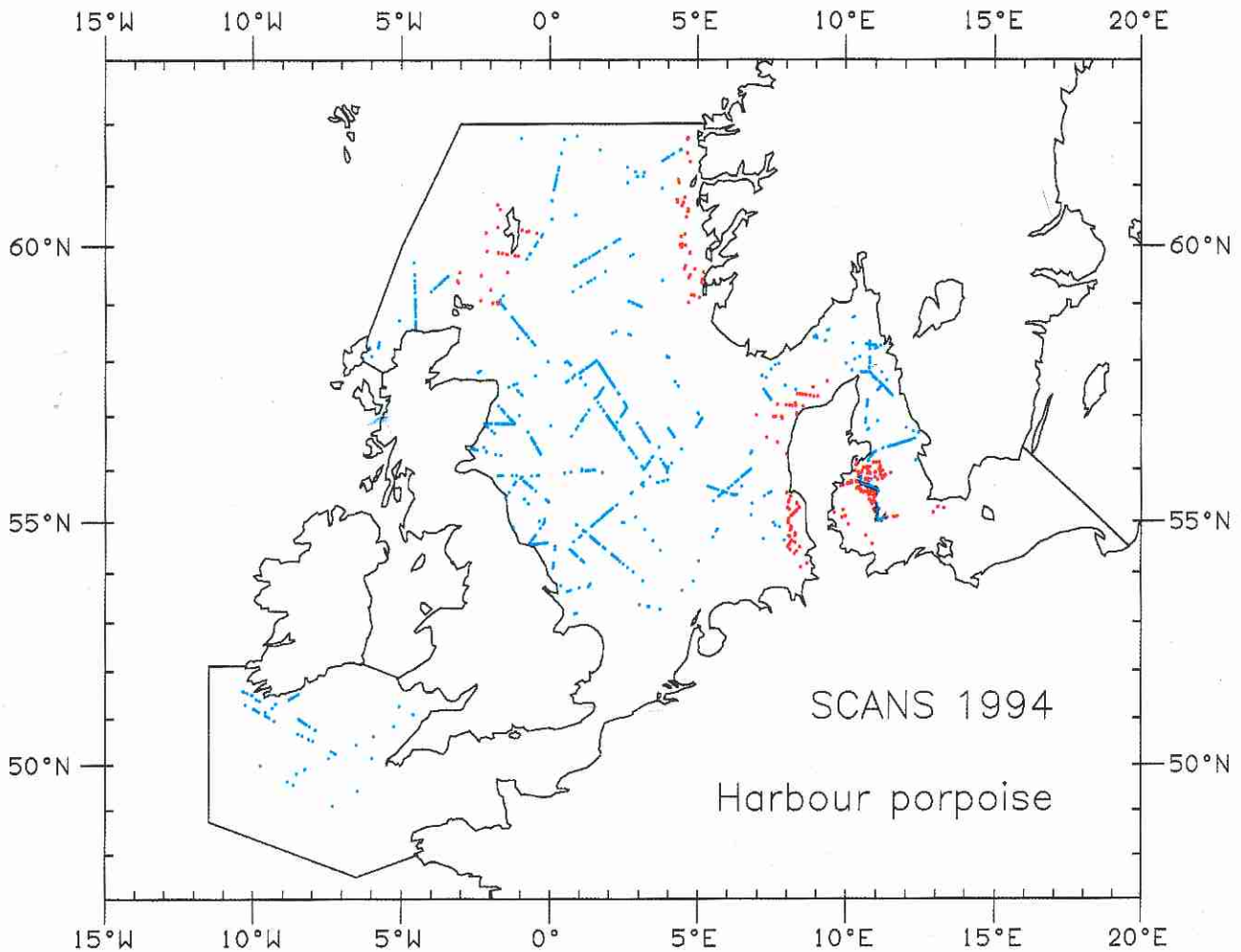
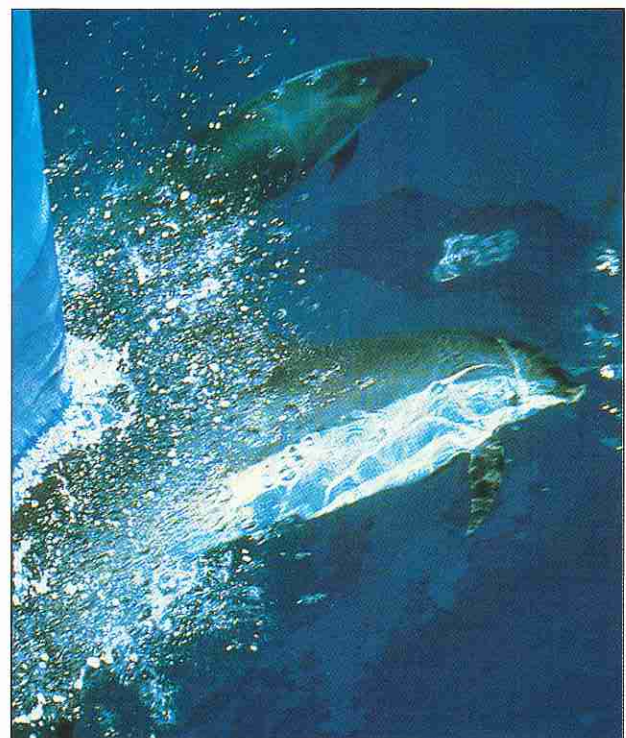


Figure 3: Map showing locations of porpoises seen from ships (blue dots) and from aircraft (red dots)

The area surveyed included the North Sea, the Skagerrak and Kattegat to the north and west of Denmark, the English Channel and the Celtic Sea. It was divided into 15 sub-areas, for practical reasons, which were searched by nine ships and two aircraft from late June until early August in 1994.

Figure 2 shows the transects searched by the ships (blue lines) and aircraft (red lines) in each sub-area. The weather was better than expected, enabling excellent coverage of almost all the area.

The most commonly seen cetacean was, as expected, the harbour porpoise. Figure 3 shows a map of where porpoises were seen from the ships (blue dots) and aircraft (red dots). They were found throughout most of the North Sea, Skagerrak and Kattegat and the Celtic Sea. But none was seen in the English Channel nor in the southern part of the North Sea. Two other species of cetacean were also frequently spotted; the whitebeaked dolphin



White-beaked dolphins bow riding survey vessel  
Photo credit: Harald Benke

and the minke whale. Figure 4 shows that sightings of whitebeaked dolphins were concentrated in the western part of the central North Sea. Figure 5 shows that minke whales were seen throughout the northern North Sea, again mostly to the west, and also in the Celtic Sea. Sightings of all other species of cetacean were relatively rare, except for common dolphins which were often seen in the Celtic Sea.

Enough data were collected to calculate estimates of the number of harbour porpoises, whitebeaked dolphins and minke whales in the North Sea and adjacent waters. Our best estimates were, in round numbers: 340,000 porpoises; 8,000 whitebeaked dolphins and 8,500 minke whales. But, as stressed above, it is important to take account of our uncertainty in these estimates, so it is more appropriate to consider a range within which the true number of animals should lie. These ranges are: 260,000 - 450,000 porpoises; 4,000 - 13,000 whitebeaked dolphins and 5,000 - 13,500 minke whales.

## Implications

What do these numbers tell us about the importance of the threats to harbour porpoises and other small cetaceans? The main result is that there seem to be a lot of porpoises living in European waters. Surely, populations of this size cannot be in danger of decline from bycatches in fishing gear? But a simple calculation leads to a different conclusion.

Although we do not know exactly how many porpoises are accidentally caught in fishing gear in European waters, the available information indicates that it may be at least 7,000 each year. If we divide the annual estimated bycatch by the best estimate of the number of porpoises in the area, we get a figure of about 2%. This means that the porpoise populations must increase their numbers by at least 2% a year simply to avoid declining in numbers as a result of bycatches. The best information available on how fast porpoises are able to reproduce

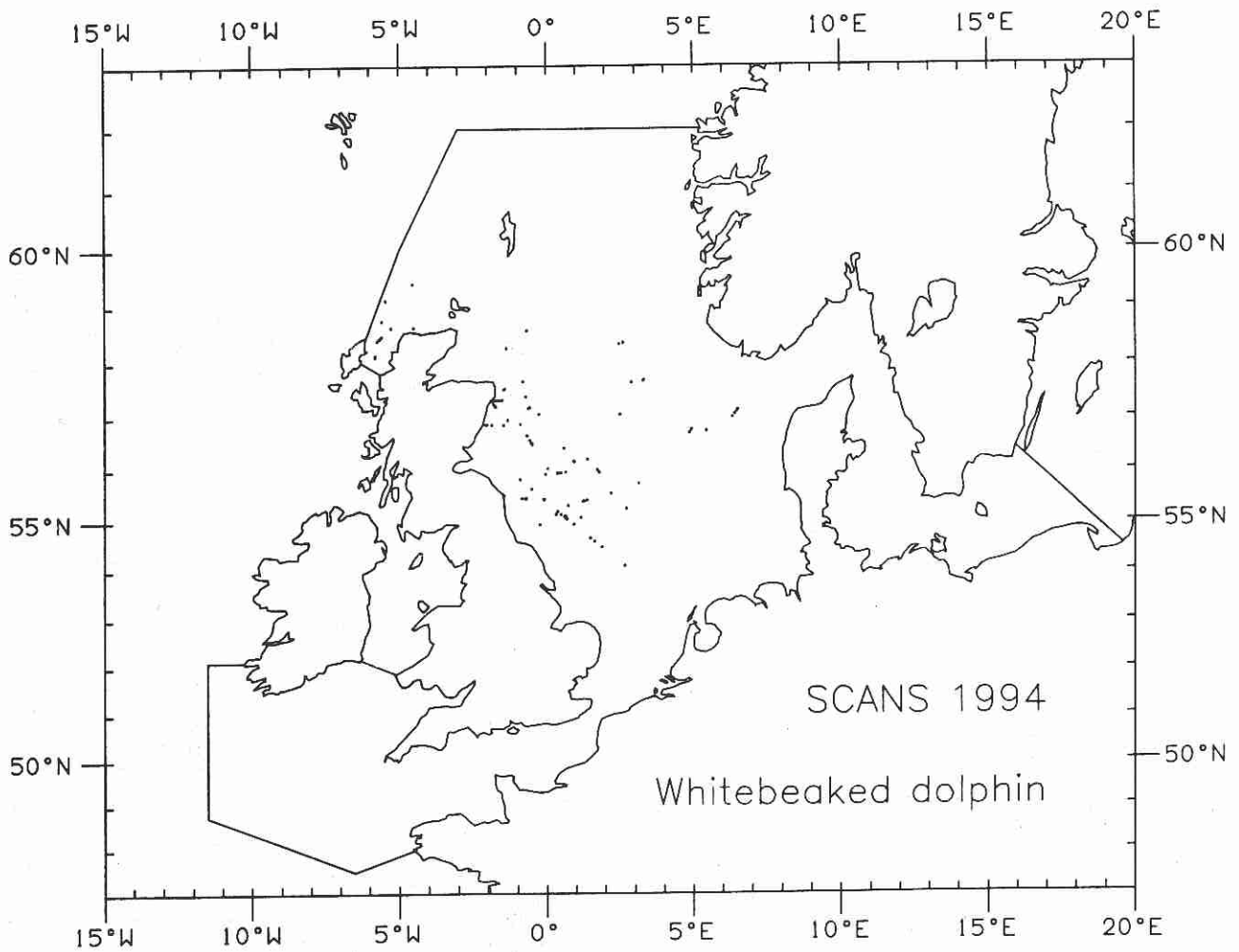


Figure 4: Map showing locations of whitebeaked dolphins

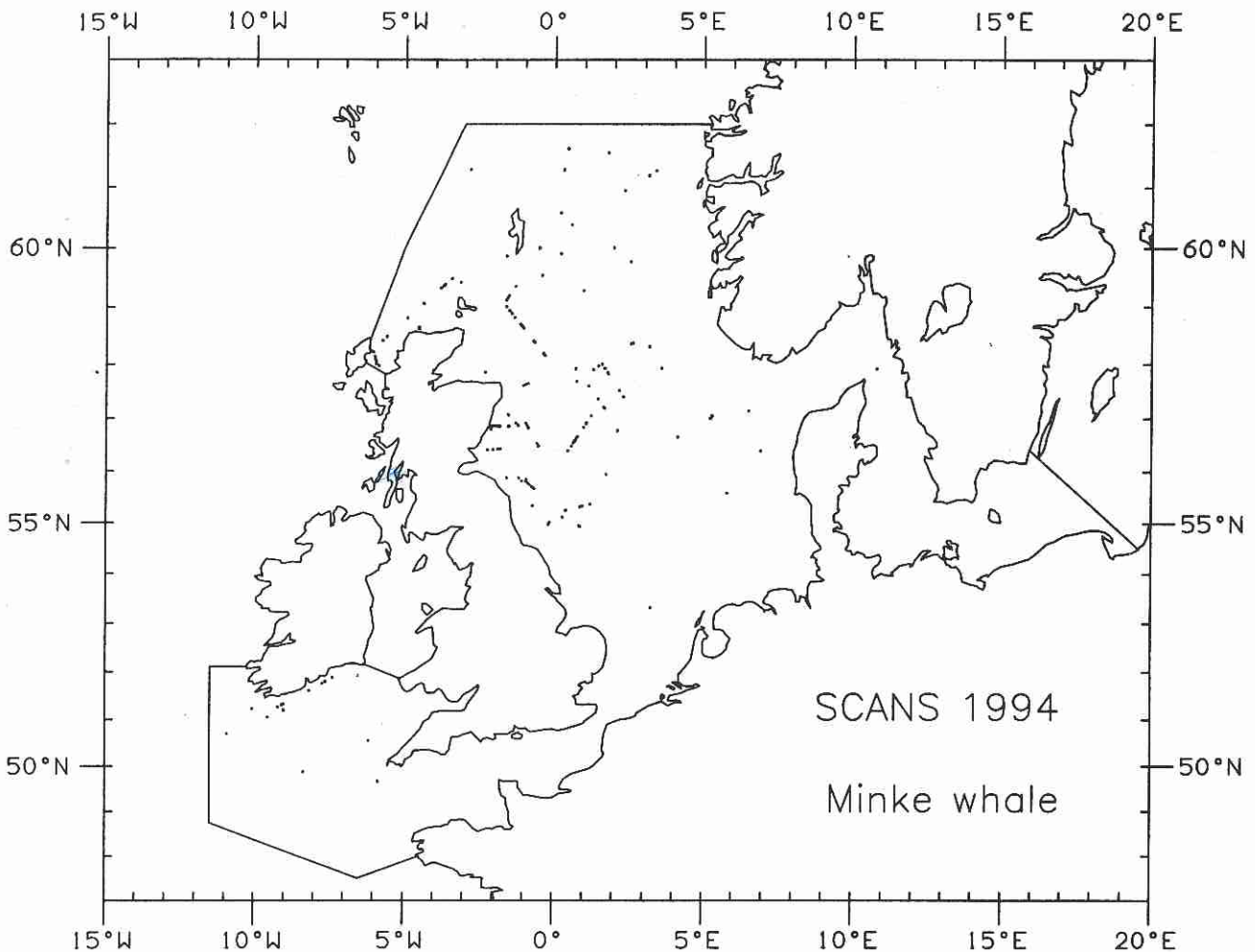


Figure 5: Map showing locations of minke whales

suggests that it is a maximum of 4% per year and that a figure of 2% per year, or even less, may be more appropriate. In other words, even though there seem to be a lot of porpoises in the North Sea and adjacent waters, there may not be enough to sustain current estimated levels of bycatch.

The situation is more complicated than the simple scenario presented above and there is

still much that we do not know about porpoise populations in European waters. But when we consider the possibility that pollution, over-fishing and disturbance may also be affecting small cetaceans in coastal waters, there must be cause for concern that harbour porpoises in European waters could be declining in number as a direct result of man's activities.



One of the research vessels, *Esvagt Dana*, chartered for the survey  
Photo credit: Jaume Forcada



Data collection on a sighting platform  
Photo credit: Jaume Forcada

## **SCANS - a successful project?**

Was the project a success?

The answer is unquestionably yes. We now know how many porpoises there currently are in the North Sea and adjacent waters. This simple but vital piece of information is essential for making an informed assessment of the impact of bycatches on harbour porpoises in European waters. And it will serve as a baseline for their future monitoring for decades to come.

The total cost of the project was around 1.5 million ecu. It is tempting to think that there

must be a less expensive way simply to count porpoises. But when one considers the sheer magnitude of the task, the importance of ensuring that the best possible methods are used, the practical difficulties of the work and the cost of conducting research at sea, it is clear that this type of information will always be expensive to collect. But if, in years to come, it is seen to be desirable to repeat this work as part of a scheme to monitor the porpoise populations in the North Sea, the data collection and analysis methods developed and the lessons learned in this project will help to minimise the cost of future research.

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