

Spatial and temporal occurrence of 'transient' cetaceans in the German Bight in 2001-2005

Introduction

At first sight, the management and conservation of cetaceans appears to be rather simple with respect to biodiversity in German waters, as only the harbour porpoise (*Phocoena phocoena*) is commonly encountered and other species are reportedly rare (Benke and Siebert 1994; Hammond *et al.* 2002). Therefore, human activities such as shipping and construction seem to present few problems for populations of species besides harbour porpoises. In this study, we investigated the long-term occurrence of cetacean species besides harbour porpoises in the German Bight to gain a more comprehensive overview of cetacean diversity in these waters.

Methods

Between 2001-2005, we undertook 422 shipboard and 188 aerial line transect surveys in seven offshore areas within the German Bight (Northern Frisia - central German Bight - Eastern Frisia; total effort ~ 120,000 km, Figures 1, 2 and 3; for details on methodology, see Buckland *et al.* 2001, Thomsen *et al.* 2004, 2006, 2007). Sightings were recorded either on notepads (ship), or orally on dictaphones (airplane) and were later transferred into ArcGIS to obtain accurate sighting positions.



Figure 1: BN2-Islander plane that was used for aerial surveys between 2001-2005.



Figure 2: Bubble window, placed at both rear seats for unobstructed observation on the transect line.

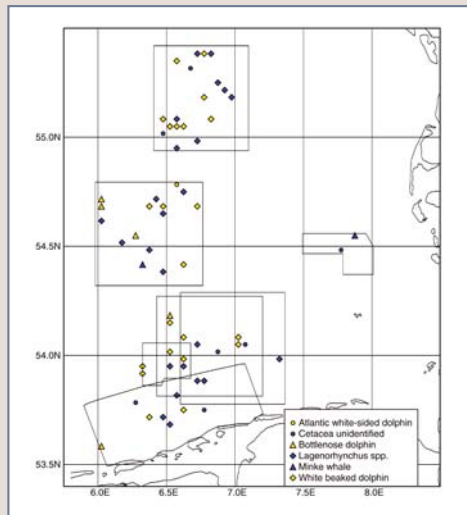


Figure 3: Overview of the distribution of sightings of cetacean species in the German Bight during 2001-2005 (squares / blocks = survey areas).

Results

We obtained 68 sightings of non-porpoise-cetaceans, comprising 133 individuals. Most frequent were species of the genus *Lagenorhynchus* (*Lagenorhynchus* spp. = 29 sightings / 49 individuals; white-beaked dolphin, *Lagenorhynchus albirostris* = 24 / 67; Atlantic white-sided dolphin, *Lagenorhynchus acutus* = 1 / 2), followed by the bottlenose dolphin (*Tursiops truncatus* = 6 / 7), and the minke whale (*Balaenoptera acutorostrata* = 2 / 2). In addition, six sightings of unidentified cetaceans were obtained, of which 3 were unidentified baleen whales. Sightings were recorded in all study areas, with most off Northern Frisia and in the central German Bight (Figure 3). For all sightings of the genus *Lagenorhynchus* (N = 54), we devised a simple sighting index (N sightings / km transect * 100), and compared sighting indices across seasons. As can be seen in Figure 4, the genus *Lagenorhynchus* was observed most often in spring. The bottlenose dolphin sightings were all obtained in summer, the two minke whale observations took place in spring and summer.

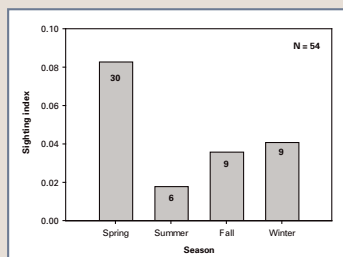


Figure 4: Sighting index (N sightings / km transect * 100) for the genus *Lagenorhynchus* compared across seasons (spring = March - May, summer = June - August, fall = September - November, winter = December - February).



Left: Minke whale (*Balaenoptera acutorostrata*)



Below: Bottlenose dolphins (*Tursiops truncatus*)

Discussion

The results of the study confirm the overall scarcity of cetacean species besides harbour porpoises in German waters as only four species could be positively identified. It is, therefore, likely that minke whales, white-sided dolphins, bottlenose dolphins and perhaps other species use the area only sporadically, probably as a transit route. However, our results suggest that the white-beaked dolphin might occur more often than was expected, and on a more or less regular basis at certain times of the year. These results confirm earlier findings, based on data from strandings by Benke and Siebert (1994), who described the white-beaked dolphin as the second most abundant cetacean species in German waters. The seasonal trends shown here might provide a first insight into the ecology of species in German waters. However, as the overall number of sightings is small, the trends should be interpreted with caution until further analysis has been undertaken. The described trends could be investigated further, possibly using satellite telemetry and passive acoustic monitoring, to gain a more detailed view of cetacean diversity in German waters.

Acknowledgements

We would like to thank Plambeck Neue Energien AG, Nordsee Windpower GmbH & Co KG, ENOVA Energieanlagen GmbH, Amrumbank West GmbH and Sandbank 24 GmbH & Co KG for the permission to use the data for the present study. We thank OLT and LFH for coordinating and executing the aerial surveys. We are grateful to the many observers who helped collecting data and to Danja Kölln for maintaining the sightings database and for further assistance.

References

- Benke, H. and Siebert, U. (1994). Zur Situation Der Kleinwale im Wattenmeer und in der südöstlichen Nordsee. - In: Lozan, J.L., Rachor, E., Reise, K., Westernhagen, H.V. & W. Lenz (ed.): Warnsignale aus dem Wattenmeer. - Blackwell Wissenschafts-Verlag, Berlin: 309-316.
- Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L., Thomas L. (2001). Introduction to distance sampling. Oxford University Press, Oxford.
- Hammond, P.S., Berggren, P., Benke, H., Borchers, D.L., Collet, A., Heide-Jørgensen, M.P., Heimlich, S., Hilby, A.R., Leopold, M.F. and Øien, N. (2002). Abundance of the harbour porpoise and other cetaceans in the North Sea and adjacent waters. *J Appl Ecol* 41: 1129-1139.
- Thomsen, F., Laczny, M. and Piper, W. (2004). Methodik zur Erfassung von Schweinswalen (*Phocoena phocoena*) und anderen marinen Säugern mittels Flugtransekt-Zählungen. *Seevogel* 25: 3-12 (English Summary).
- Thomsen, F., Laczny, M. and Piper, W. (2006). A recovery of harbour porpoises (*Phocoena phocoena*) in the southern North Sea? A case study off Eastern Frisia, Germany. *Hel. Mar. Res.*, 60: 189-195.
- Thomsen, F., Laczny, M. and Piper, W. (2007). The harbour porpoise (*Phocoena phocoena*) in the central German Bight: Phenology, abundance and distribution in 2002-2004. *Hel. Mar. Res.* (online first DOI 10.1007/s10152-007-0075-6).