Federal Agency for Nature Conservation

Monitoring of marine mammals in the German North and Baltic Sea in 2023



Visual monitoring of harbour porpoises

Dr. Dominik Nachtsheim, Dr. Bianca Unger, Dr. Nadya C. Ramirez-Martinez, Julia Mari Murata, Prof. Prof. h.c. Dr. Ursula Siebert, Dr. Anita Gilles

Institute for Terrestrial and Aquatic Wildlife Research (ITAW), University of Veterinary Medicine Hannover, Foundation, Werftstraße 6, 25761 Büsum, Germany

February 27, 2024

Please cite as: Nachtsheim, D, Unger, B, Ramirez-Martinez, NC, Murata, JM, Siebert, U, Gilles, A, (2024). Monitoring of marine mammals in the German North and Baltic Sea in 2023. Monitoring report published February 2024. 8 pp. https://www.bfn.de/wirbeltiere

Photograph: View on the North Sea from the airplane; ©ITAW, Nadya C. Ramirez-Martinez

The long-term aerial monitoring of harbour porpoises in the German North Sea and Baltic Sea (with a focus on the German Exclusive Economic Zone (EEZ)) was continued in 2023 to estimate harbour porpoise abundance and density, as well as to determine distributional patterns. The dedicated monitoring serves to fulfil the European obligation under the Habitats Directive (Directive 92/43/EEC) and Marine Strategy Framework Directive (Directive 2008/56/EC), as well as the regional marine conventions OSPAR and HELCOM. The monitoring is funded by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and conducted by the Institute for Terrestrial and Aquatic Wildlife Research (ITAW) of the University of Veterinary Medicine Hannover, Foundation, on behalf of the Federal Agency for Nature Conservation (BfN). The work is implemented following the federal government and the states measurement program (BLMP). The sampling periods, as well as the selection of survey areas, were coordinated in close consultation with the BfN and followed the monitoring fact sheet "Mammals" (https://mhb.meeresschutz.info/de/kennblaetter/neue-kennblaetter/details/pid/30.html) from the BLMP monitoring manual. Data from the regular marine vertebrate monitoring are available as georeferenced data and web applications in the BfN portal (https://geodienste.bfn.de/schweinswalmonitoring and https://geodienste.bfn.de/schweinswalverbreitung).

Survey efforts and sightings

In order to monitor harbour porpoises in the North- and Baltic Seas a total flight distance of 3,757 km was covered within eight days in 2023 (Table 1). Six survey days took place in the North Sea (survey effort: 3,090 km) and two days in the Baltic Sea (survey effort: 667 km).

A survey of all North Sea areas A-H was planned for spring 2023. Due to persistently poor weather conditions, only the flights in areas D and E could be realised. The original plan for the summer was to survey the North Sea in areas C, D and the Baltic Sea areas K, L. The aerial surveys of areas A, C, D and G in the North Sea and areas I and J in the Baltic Sea were successfully completed. As a result, only an abundance and density estimate for harbour porpoises in the North Sea areas A, C, D and G and the Baltic Sea areas I and J could be determined.

In spring 2023, a total of 58 harbour porpoise groups with 63 individuals, including one calf, were recorded in the North Sea (Table 1, Figure 1, Figure 2). In summer, a total of 210 groups with 307 individuals, including 12 calves, were registered in the North Sea, while 25 harbour porpoise groups (26 animals, no calf) were sighted throughout the Baltic Sea (Table 1, Figure 3, Figure 4).

The observed distribution in 2023 reflects the known distribution pattern of harbour porpoises in German waters. In spring 2023, many harbour porpoises were sighted in the area of the eastern Sylt Outer Reef (D) and the whale sanctuary, which are designated as Special Areas of Conservation (SAC) (Figure 1). In summer of 2023, the distribution and number of harbour porpoise sightings in the North Sea were generally comparable to previous years in all surveyed areas, except that significantly more individuals were sighted in survey area A than in 2021. This could be due to the temporal differences between the surveys, in 2021 it was performed at the beginning of the season (10 June). The fine-scale distribution of harbour porpoises can vary even within such a short period of time, for example due to a short-term increase in the supply of prey organisms (promoted by increased primary and secondary production or currents). In addition, 2023 was an exceptionally warm year with significantly higher water temperatures in the North Sea, which also has an impact on the entire food web and the availability of harbour porpoise prey organisms (https://climate.copernicus.eu/record-breaking-north-atlantic-ocean-temperatures-contribute-extreme-marine-heatwaves). In the Baltic Sea, the number of sightings was highest near the Little Belt (Figure 3).

In the survey year 2023, sightings were also recorded again around the island of Fehmarn, which did not occur in 2021 with comparable survey effort.

Table 1: Aerial surveys carried out for harbour porpoise monitoring in the German EEZ of the North and Baltic Sea in spring and summer 2023. Effectively covered distance in kilometre (=survey effort), number of recorded harbour porpoise group sightings, individuals and calves. Mean group size = individuals / sightings of harbour porpoise groups. Survey effort, sightings and mean group size summarised by season and area are given in italics.

Date	Area	Survey effort [km]	No. of groups	No. of individuals	No. of calves	Mean group size
13.05.	D	630	35	39	1	1.11
14.05.	E	419	23	24	0	1.05
Spring	***Surveyed North Sea areas***	***1,049***	***58***	***63***	***1***	***1.08***
25.08.	A	469	113	188	5	1.66
24.08.	C	555	25	35	2	1.40
28.07.	D	683	61	72	5	1.18
16.08.	G	335	11	12	0	1.09
Summer	***Surveyed North Sea areas***	***2,042***	***210***	***307***	***12***	***1.33***
07.07.	I	328	18	19	0	1.06
11.08.	J	338	7	7	0	1.00
Summer	***Surveyed Baltic Sea areas***	***667***	***25***	***26***	***0***	***1.03***

Abundance and density estimates

In spring 2023, a total abundance of 6,544 harbour porpoises (95% confidence interval: 2332 – 13,826) was estimated for strata D and E, with a corresponding density of 0.58 individuals/km² (95% CI: 0.2 – 1.23) (Table 2).

Based on the sightings of summer 2023, an abundance of 26,163 harbour porpoises (95% confidence interval: 12,467 – 41,824) was estimated for the covered North Sea areas A, C, D and G, corresponding to a density of 1.12 individuals/km² (95% confidence interval: 0.53 – 1.8) (Table 2).

In summer 2023, the abundance of harbour porpoises in the survey area of the Baltic Sea (stratum I and J) was estimated to be 2,258 (95% CI: 672 – 4,449); The respective density was estimated to be 0.35 individuals/km² (95% CI: 0.1 – 0.7) (Table 2). The abundance and density estimates for the German North- and Baltic Sea seem comparable to the results of the surveys from the years before. Except the summer abundance and density of harbour porpoises in area A is comparatively very high.

Table 2: Summary of effort corrected, bootstrapped abundance and density estimates of harbour porpoises for spring and summer 2023 in the German EEZ of the North and Baltic Sea. Density (ind./km²) and abundance estimates are given as mean with respective 95% confidence interval (= 95% CI). Summaries by sampling period and survey area are shown in italics.

Area	Area size [km²]	Abundance (95% CI)	Density (95% CI)
D	6,897	4,044 (1,575 – 8,371)	0.59 (0.23 - 1.21)
E	4,377	2,500 (757 – 5,454)	0.57 (0.17 - 1.25)
Surveyed North Sea areas Spring	***11,274***	***6,544 (2,332 – 13,826)***	***0.58 (0.2 - 1.23)***
A	5,647	16,425 (7,319 – 26,037)	2.91 (1.3 - 4.61)
C	5,993	2,730 (1,159 – 4,703)	0.46 (0.19 - 0.78)
D	6,897	5,888 (3,551 – 9,143)	0.85 (0.51 - 1.33)
G	4,074	1,119 (437 – 1,941)	0.27 (0.11 - 0.48)
Surveyed North Sea areas Summer	***22,611***	***26,163 (12,467 – 41,824)***	***1.12 (0.53 - 1.8)***
I	3,116	1,749 (372 – 3,610)	0.56 (0.12 - 1.16)
J	3,575	509 (299 - 839)	0.14 (0.08 - 0.23)
Surveyed Baltic Sea areas Summer	***6,691***	***2,258 (672 – 4,449)***	***0.35 (0.1 - 0.7)***

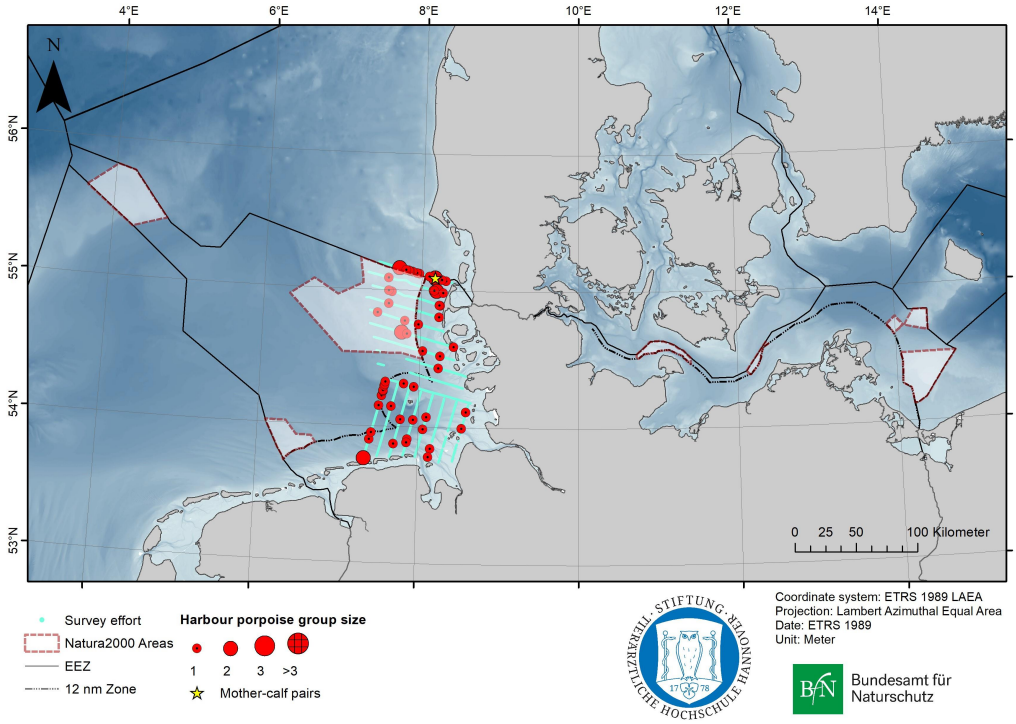


Figure 1: Survey effort and harbour porpoise sightings during aerial surveys (under good or moderate conditions) in the areas D and E in spring 2023.

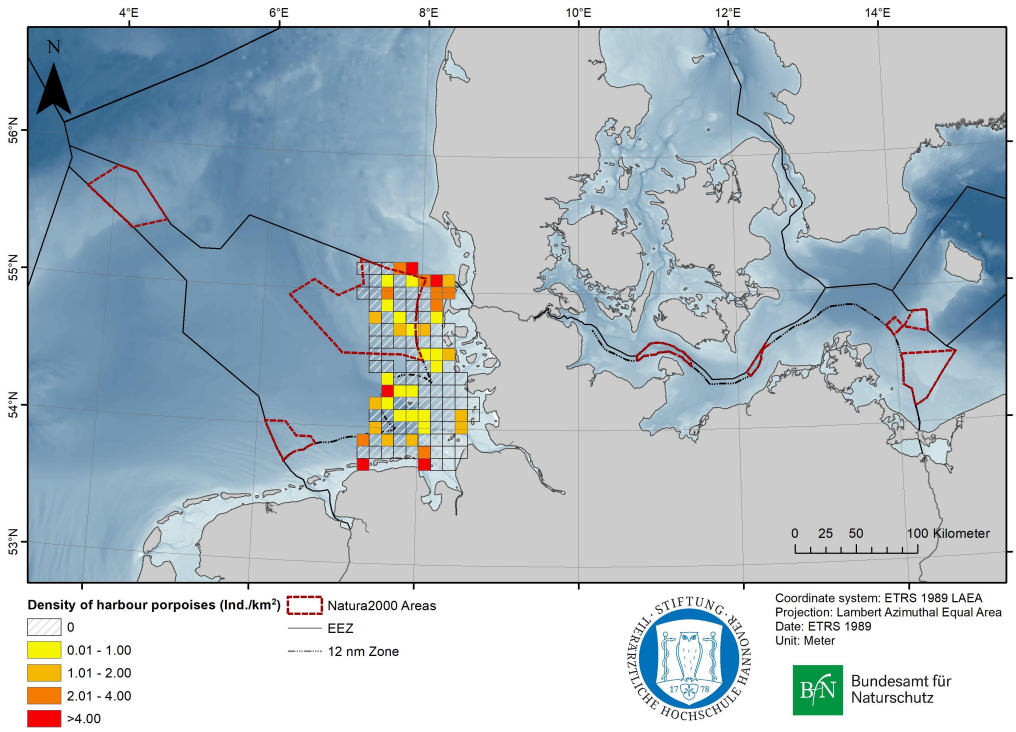


Figure 2: Estimated mean harbour porpoise density per grid cell (here: 10x10 km) in spring 2023. Calculation based on aerial surveys in the areas D and E.

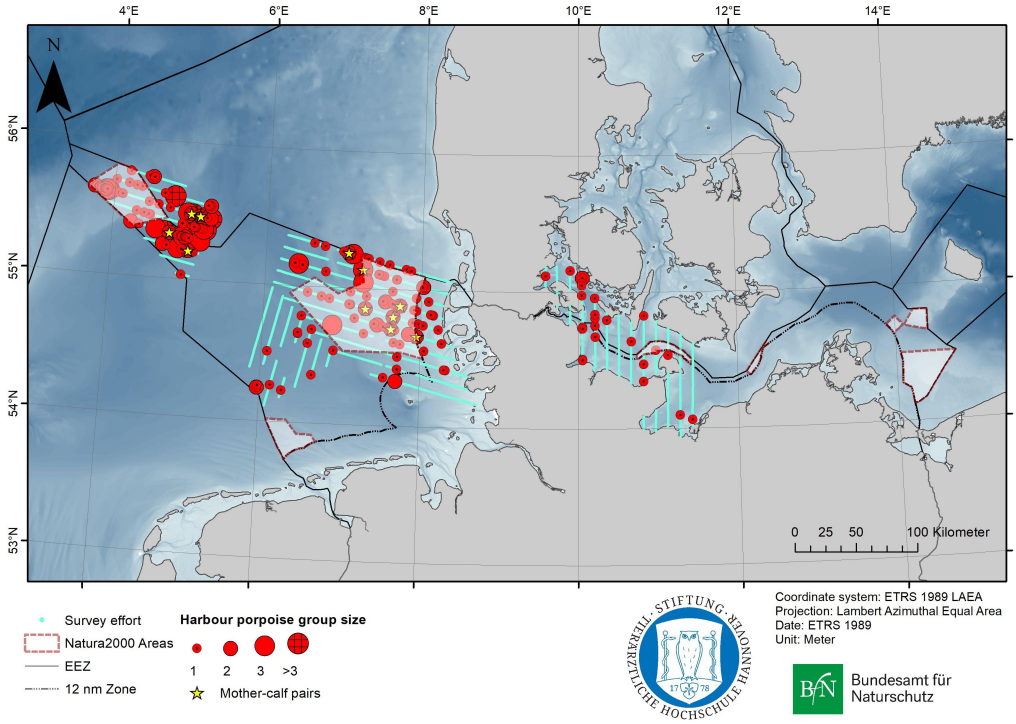


Figure 3: Survey effort and harbour porpoise sightings during aerial surveys (under good or moderate conditions) in the areas A, C, D, G and I, J of the German North and Baltic Sea in summer 2023.

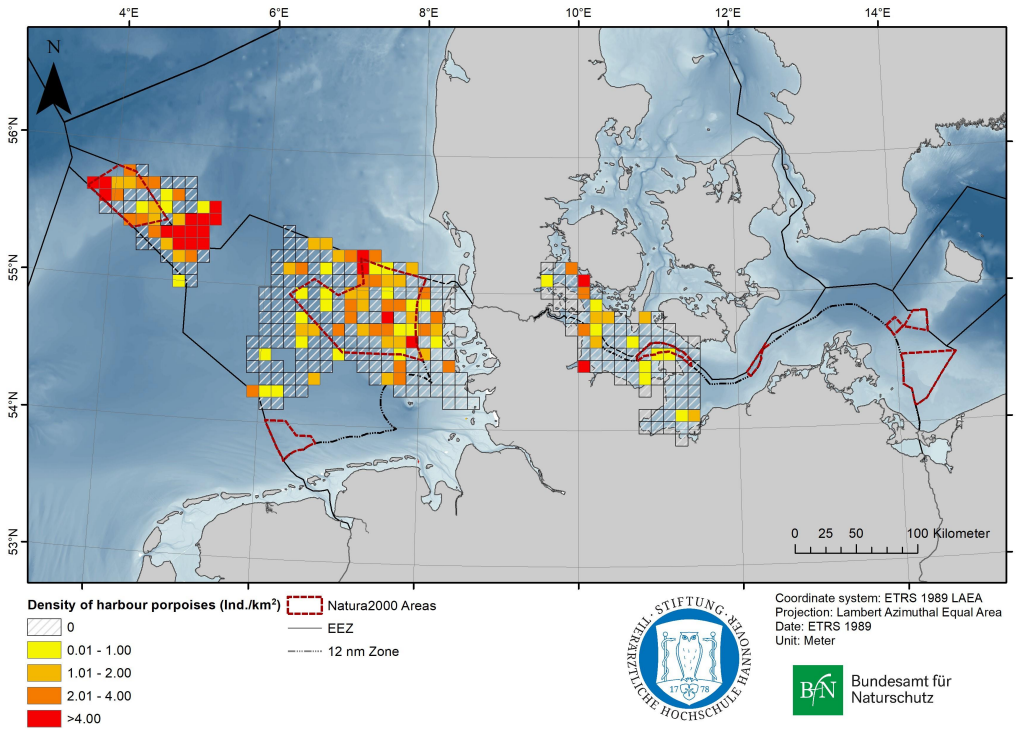


Figure 4: Estimated mean harbour porpoise density per grid cell (here: 10x10 km) in summer 2023. Calculation based on aerial surveys in the German EEZ of the North and Baltic Sea (survey areas A, C, D, G and I, J).

Special observations

In summer 2023, three sightings of single minke whales (*Balaenoptera acutorostrata*) were observed in stratum A, near the Dogger Bank (Figure 5).

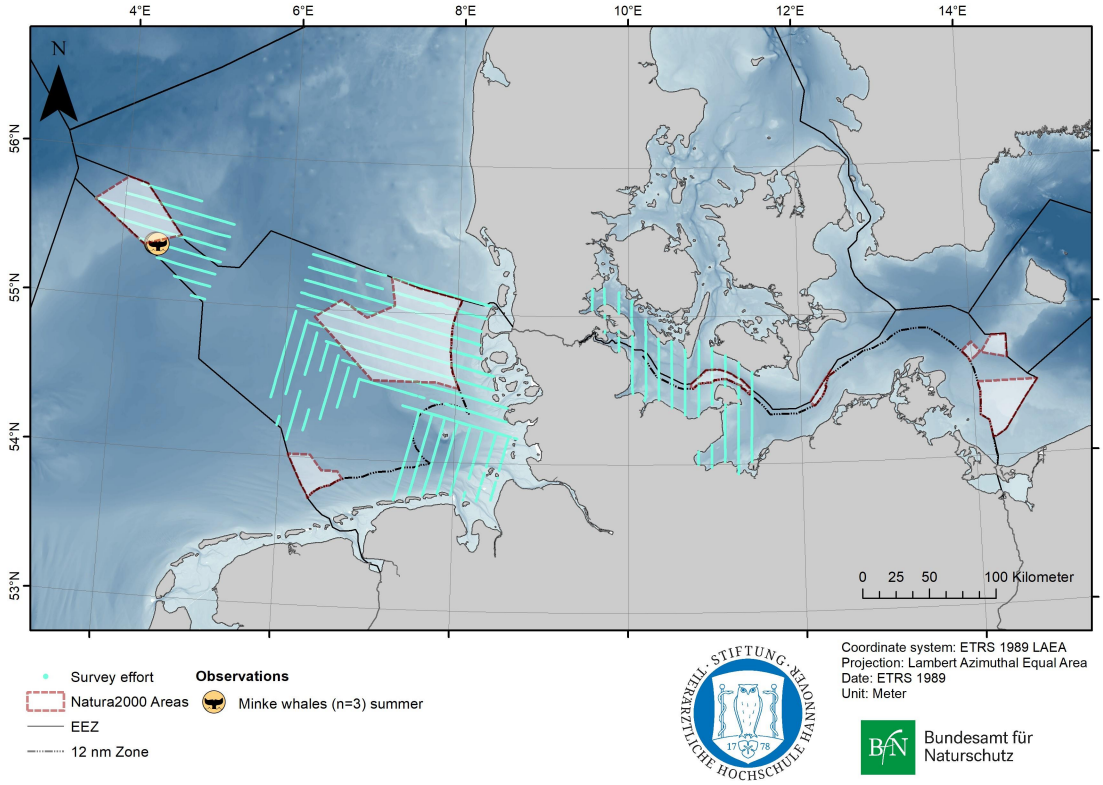


Figure 5: Three minke whale sightings during aerial surveys in summer 2023 (25.08.2023) as well as corresponding survey effort (under good or moderate conditions). Please note the three sightings were recorded in close proximity to each other, hence the points are overlapping.