

Bird distributions in parts of the Danish North Sea and in Kattegat, autumn 2019

A cruise report

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Ib Krag Petersen & Jacob Sterup

Department of Bioscience

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The Danish Energy Agency
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Referee:
Rasmus Due Nielsen
Quality assurance, DCE:
Jesper R. Fredshavn



AARHUS
UNIVERSITY

DCE - DANISH CENTRE FOR ENVIRONMENT AND ENERGY

Tel.: +45 8715 0000
E-mail: dce@au.dk
<http://dce.au.dk>

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Introduction

In August 2019 DCE, Aarhus University contracted the Danish Energy Agency to conduct surveys of birds in two predefined Danish marine areas. This contract was an extension of a similar contract for aerial surveys of birds in the same areas between December 2018 and April 2019 (Petersen & Sterup 2019). One area was between the north coast of Sjælland, northwards to Anholt, eastwards to the Swedish/Danish EEZ border and westwards to Sjællands Odde. The other area was west of Jutland, from the coast approximately 70 km westwards, southwards to ca. 15 km north of Blåvandshuk and northwards to the western entrance of Limfjorden.

At each site, three aerial surveys of birds was scheduled between September and December 2019. Of these, two surveys were conducted at each of the two sites. The third survey was cancelled due to weather conditions. The aerial surveys were conducted as line transect sampling counts, performed along predefined transect lines.

In this report, we present data from the four surveys. The report presents the number of observed birds by species or species group and their geographical distribution. Estimation of total numbers of the bird species are not presented here, according to the tender from the Energy Agency.

In both survey areas the bird community was dominated by marine species as for instance diver (primarily Red-throated Diver), Gannets, Herring Gull, Great Black-backed Gull, Kittiwake, Razorbill and Common Guillemot. In the coastal and shallow areas of both survey areas a number of diving ducks were recorded, mainly Common Eider and Common Scoter.

This report does not attempt to assess the potential effects or impacts from offshore wind farms on the bird communities in the two study areas.

Method

The two survey areas were in the North Sea and Kattegat. In the North Sea the survey area was west of Jutland, from the coast stretching approximately 70 km westwards, southwards to ca. 15 km north of Blåvandshuk and northwards to the western entrance of Limfjorden (Figure 1). The Kattegat survey area was between north coast of Sjælland, northwards to Anholt, eastwards to the Swedish/Danish EEZ border and westwards to Sjællands Odde (Figure 2). The surveys were conducted from a high winged, twin-engined Partenavia P-68, flying at an altitude of 76 m (250 feet) and with a cruising speed of approximately 185 km/h (100 knots).

The observations were carried out using the Distance Sampling line transect survey method (Buckland et al. 2001, 2015). The predefined transect lines and associated waypoints were entered in a GPS from which the pilot could navigate (Figure 1 & 2). The total length of the transect lines in the North Sea survey area was 812 km, and 735 km in Kattegat.

During the surveys, two experienced observers familiar with species identification covered each side of the aircraft. All observations were continuously recorded on dictaphones, giving information on species, number, behaviour, transect band and time. The behaviour of the observed birds included the activities: sitting (on the water), diving, flushing or flying.

Observations were related to transect bands, which were determined by using an inclinometer (predetermined angles of 4°, 10° and 25° below the horizontal measured abeam flight direction), and thus included four bands on each side of the aircraft. Beneath the aircraft, a band of 44 m on each side of the flight track could not be observed.

During the aerial surveys, a GPS logged flight track data at six second intervals. Each record contained longitude, latitude, altitude and time. Accuracy of GPS longitude and latitude was normally considered to be within 2 m. In cases with high density of birds the recording of a time can be delayed, which can lead to reduced accuracy.

The majority of observations were considered to be accurate to within four seconds. With a flight speed of 185 km/h the positional accuracy on the longitudinal axis was within 206 m. In a few circumstances with high bird densities, grouping of observations in periods of up to 10 seconds may have occurred, leading to an accuracy of observation positioning of up to 515 m.

As the survey results are highly sensitive to weather conditions, surveys were not carried out when wind speeds exceeded 6 m/s, because detectability of birds on the sea surface was severely reduced. Low visibility or glare also reduced detectability. In cases of severe glare, observations from one side of the aircraft were temporarily discontinued.

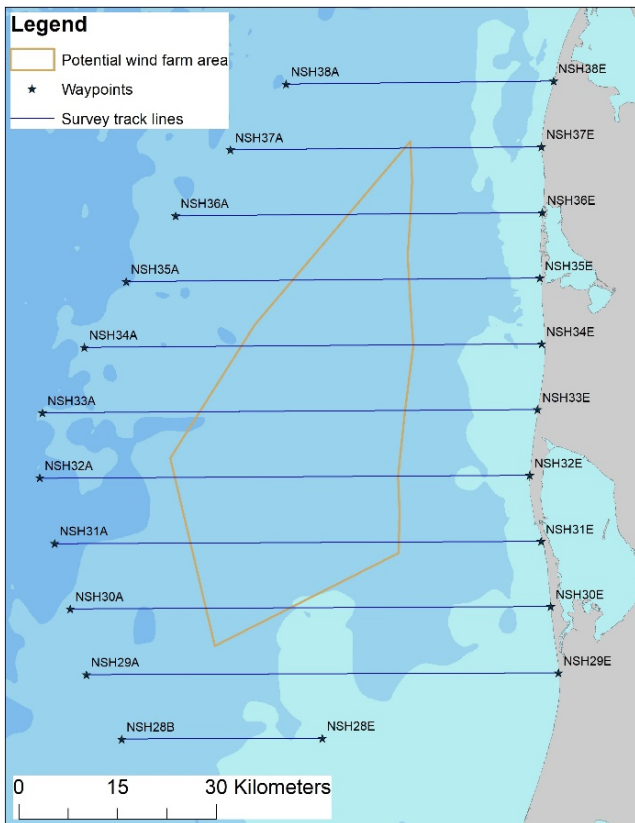


Figure 1. The North Sea bird survey area. The potential offshore wind farm area is indicated. Survey track lines and associated waypoints are shown.

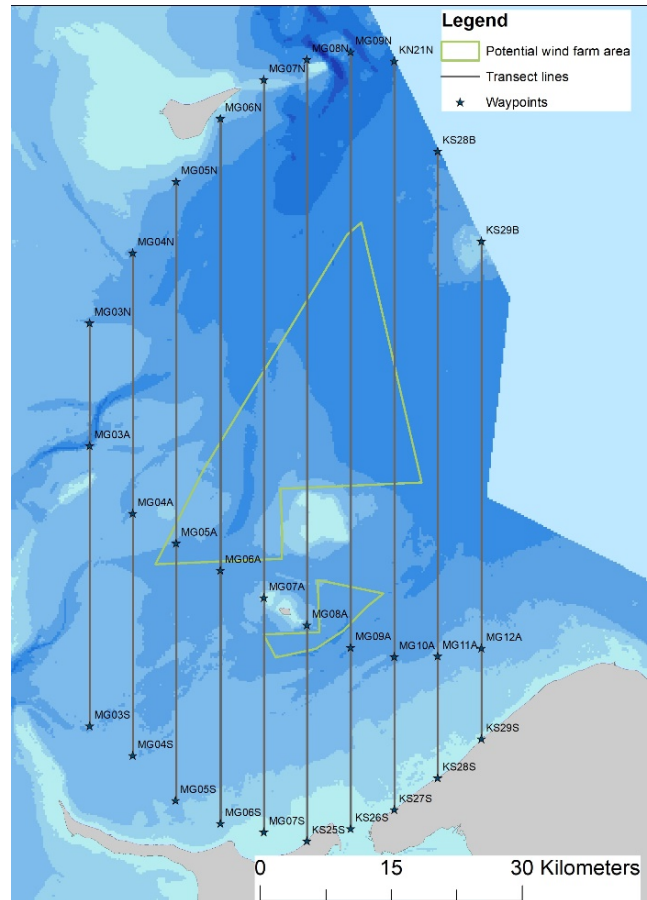


Figure 2. The Kattegat bird survey area. The potential offshore wind farm areas are indicated. Survey track lines and associated waypoints are shown.

The survey data were established on a GIS platform, and numbers and distributions of selected bird species are presented on thematic maps. In this report, no attempt is done to assess the effect of potential wind farms in the two study areas.

Results

Two surveys were conducted in each of the two survey areas. In the North Sea the surveys were conducted on 3 October and 31 October 2019. The survey coverage was complete on 3 October, while on 31 October the southernmost transect line could not be completed due to time constraints for the aircraft (Table 1).

Table 1. The total length of transect covered during each of the two aerial surveys of birds in the Kattegat study area.

Date	Length (Km)
03-10-2019	665
31-10-2019	647

A total of 13 bird species and 3 species groups were observed during the two surveys in the North Sea study area (Table 2). The most abundantly recorded species was razorbill/common guillemot. Harbour seal, seal sp., and harbour porpoise were also observed..

Table 2. The number of observed birds and marine mammals by species or species group during two surveys in the study area in the Danish North Sea. Sum of observations are given, though this number does not indicate total numbers present in the area

Species	3 rd October 2019	31 st October 2019
Diver sp.	4	17
Red-throated Diver	2	13
Fulmar	4	
Gannet	24	2
Cormorant	5	
Common Scoter	1	8
Grey Plover	1	
Herring Gull	27	154
Great Black-backed Gull	2	1
Black-headed Gull	35	
Little Gull		4
Kittiwake	92	43
Gull sp.	1	2
Razorbill		2
Razorbill/Guillemot	113	279
Common Guillemot	29	15
Harbour Seal	3	1
Seal sp.	5	2
Harbour Porpoise	8	14

In the Kattegat area, the two surveys were conducted on 9 September and 11 November. In both cases the military restriction areas R14 off Sjællands Odde was active, and that area therefore had to be omitted from the survey transect lines (Table 3). The rest of the transect set was surveyed as scheduled.

Table 3. The total length of transect covered during each of the two aerial surveys of birds in the Kattegat study area.

Date	Length (km)
09-09-2019	576
06-11-2019	652

A total of 17 bird species and 3 species groups were observed during the two surveys in the North Sea study area (Table 4). The most numerous observed species were cormorants, common eiders and razorbills/common guillemots. Harbour seal, seal sp. And harbor porpoises were also observed.

Table 4. The number of observed birds and marine mammals by species or species group during two surveys in the study area in the Kattegat. Sum of observations are given, though this number does not indicate total numbers present in the area.

Species	9 th September 2019	6 th November 2019
Diver sp.	1	
Red-necked Grebe		2
Gannet	14	21
Cormorant	50	367
Mute Swan		2
Whooper Swan		39
Canada Goose		4
Long-tailed Duck		9
Common Eider	18	297
Common Scoter		144
Great Skua	4	
Common Gull	1	10
Herring Gull	11	20
Great Black-backed Gull	15	9
Kittiwake		24
Gull sp.	13	161
Razorbill	26	2
Razorbill/Guillemot	119	108
Common Guillemot	111	
Black Guillemot	1	
Harbour Seal	130	400
Seal sp.	1	
Harbour Porpoise	5	1

North Sea study area

Divers

Only few divers were recorded during the two surveys in the North Sea, 4 unidentified divers and 2 red-throated divers on 3 October and 17 unidentified divers and 13 red-throated divers on 31 October (Table 2). All but three sightings were done close to the coast, and only a single diver was recorded within the proposed wind farm area (Figure 3).

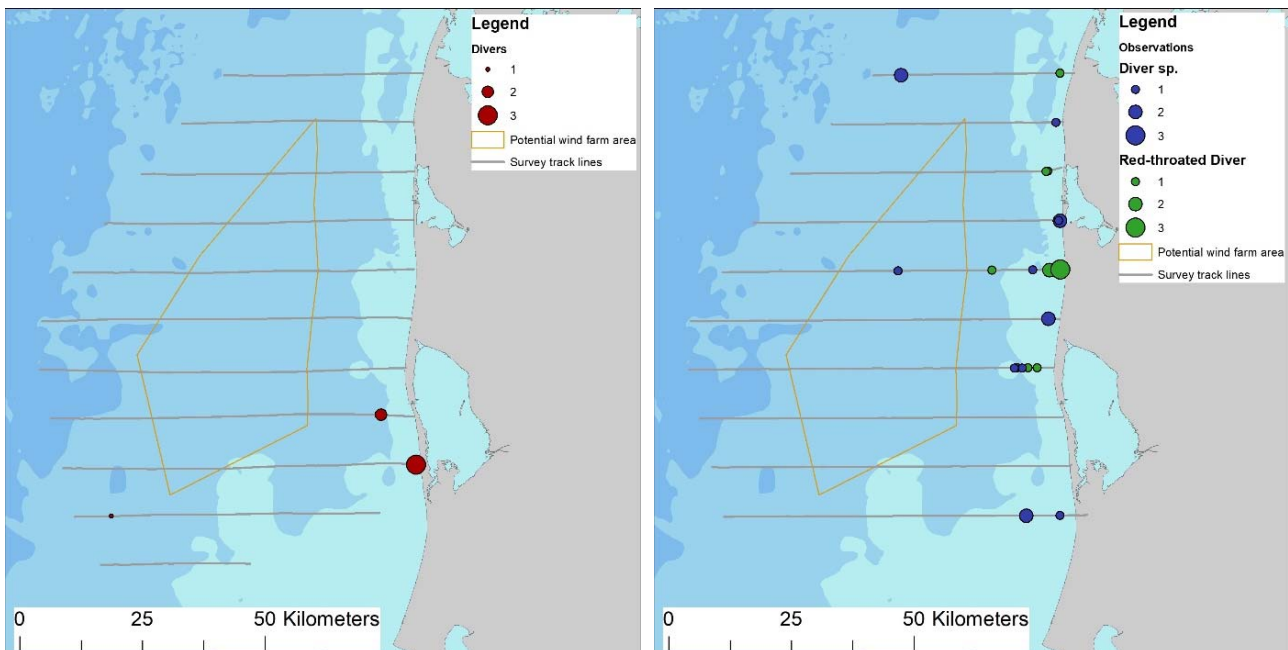


Figure 3. The spatial distribution of observed divers in the North Sea survey area during surveys on 3 October (left) and 31 October (right) 2019.

Gulls

The following species of gulls were recorded during the two surveys; herring gull (27 recorded birds on 3 October and 254 recorded birds on 31 October), great black-backed gull (2 recorded birds on 3 October and 1 recorded birds on 31 October), black-headed gull (35 recorded birds on 3 October and no recorded birds on 31 October), little gull (no recorded birds on 3 October and 4 recorded birds on 31 October), kittiwake (92 recorded birds on 3 October and 43 recorded birds on 31 October) and a few unidentified gulls, 1 on 3 October and 2 on 31 October (Table 2).

Herring gulls were mainly distributed in the coastal area on 3 October, while on 31 October they were concentrated in the southern central parts of the area (Figure 4). Little Gull was recorded in the southern central parts of the study area on 31 October (Figure 4). Black-headed gulls were seen in the central parts on 3 October (Figure 4). Kittiwakes were recorded in the southwestern and central parts on 3 October, while primarily in the southern central parts of the study area on 31 October (Figure 5).

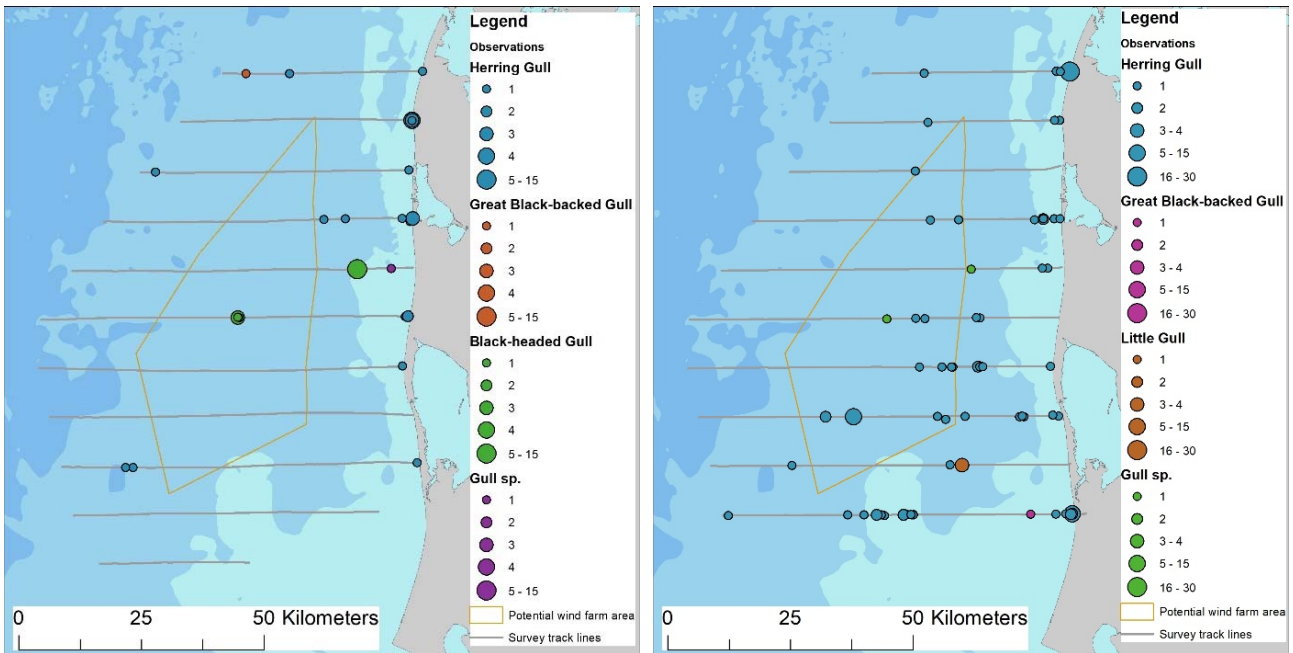


Figure 4. The spatial distribution of observed gulls in the North Sea survey area during surveys on 3 October (left) and 31 October (right) 2019.

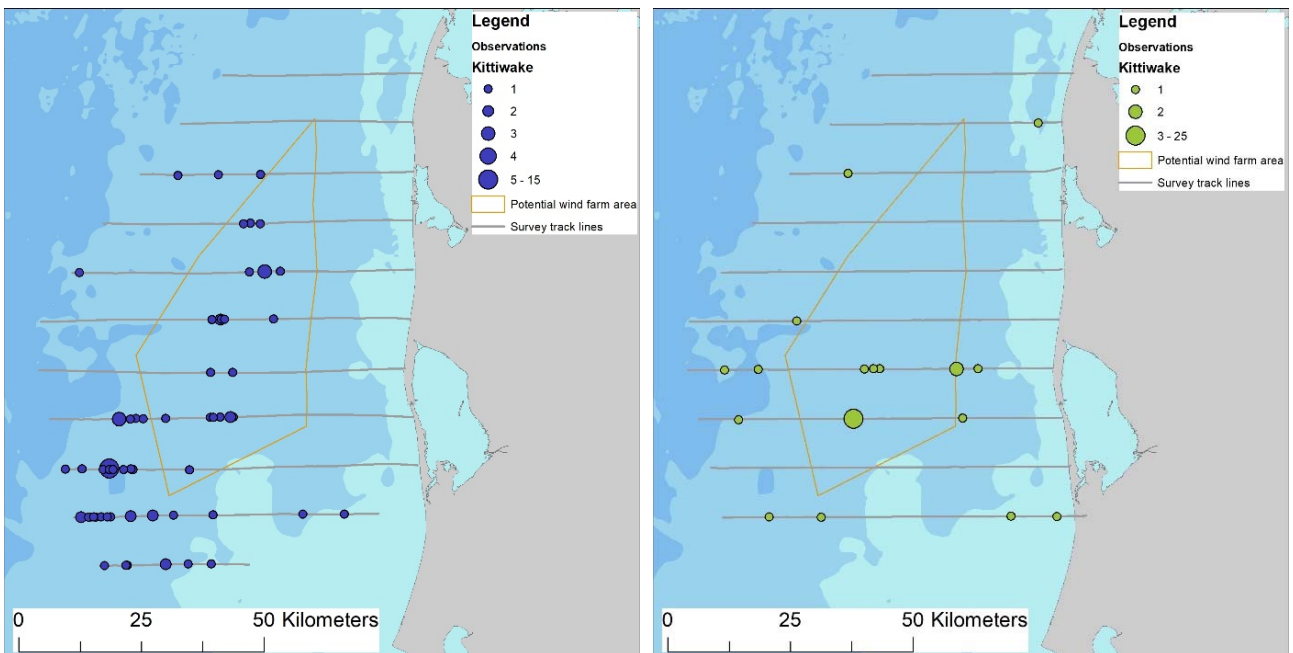


Figure 5. The spatial distribution of observed kittiwakes in the North Sea survey area during surveys on 3 October (left) and 31 October (right) 2019.

Razorbill/Common Guillemot

A total of 113 razorbills/common guillemots were recorded on 3 October, and 279 were recorded on 31 October. Of the alcids identified to species, 29 common guillemots were observed on 3 October and 15 on 31 October. Only 2 razorbills were positively identified, both on 31 October (Table 2). The razorbills/common guillemots were dispersed over the entire study area on 3 October, but with a higher concentration in the southern parts. On 31 October the razorbills/common guillemots were concentrated in the central parts of the study area (Figure 6).

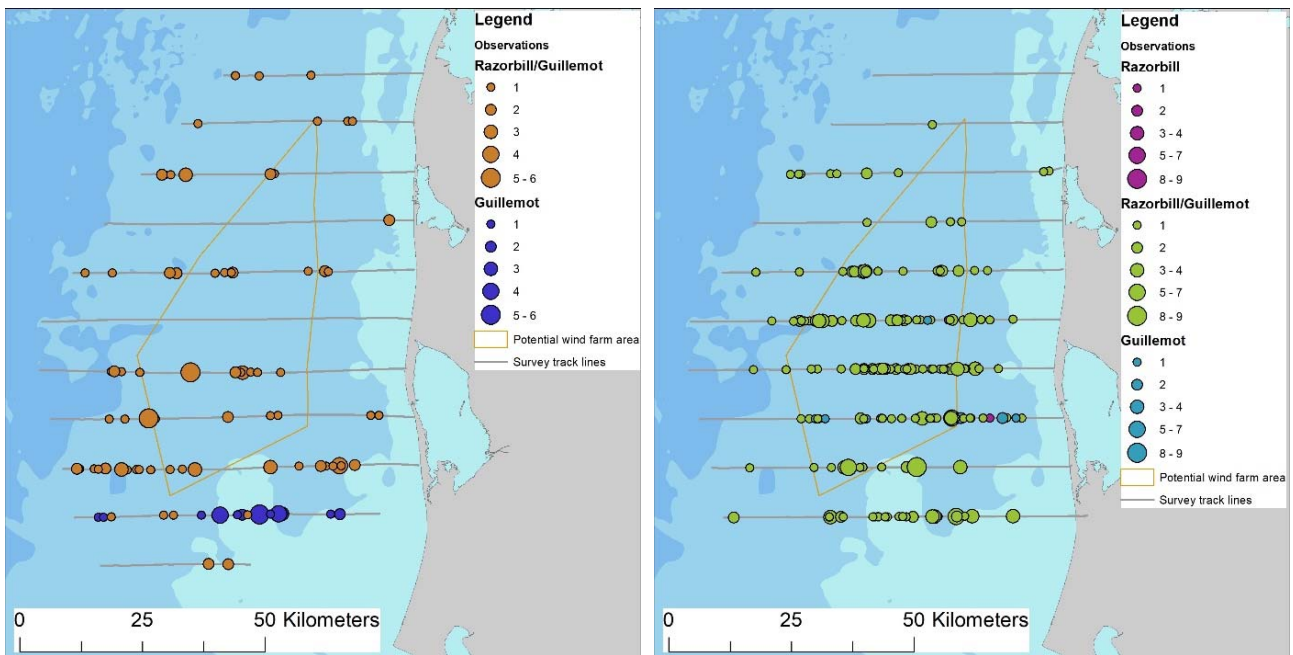


Figure 6. The spatial distribution of observed razorbills and common guillemots in the North Sea survey area during surveys on 3 October (left) and 31 October (right) 2019.

Harbour Porpoise

A total of 8 harbour porpoises were recorded on 3 October, and 14 were recorded on 31 October (Table 2). The distribution of the observed harbour porpoises is shown in Figure 7.

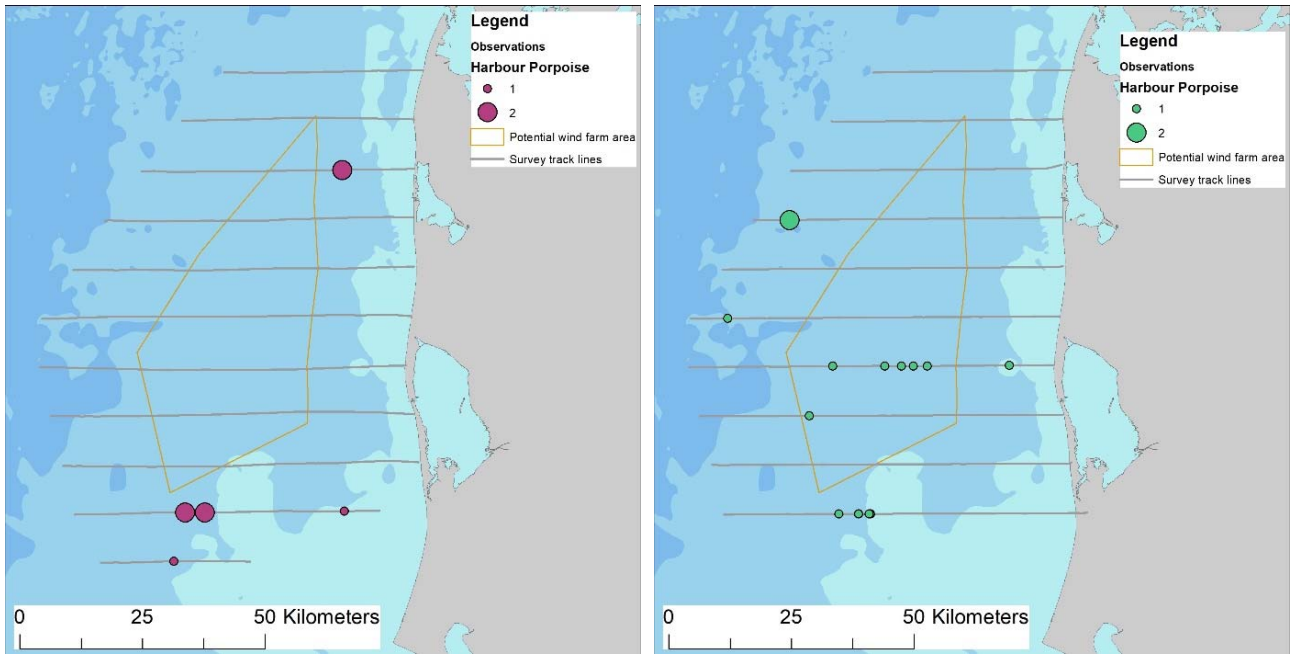


Figure 7. The spatial distribution of observed harbor porpoises in the North Sea survey area during surveys on 3 October (left) and 31 October (right) 2019.

Kattegat study area

Gannet

A total of 14 gannets were recorded on 9 September and 21 on 6 November (Table 4). During both surveys, the birds were scattered across the study area (Figure 8).

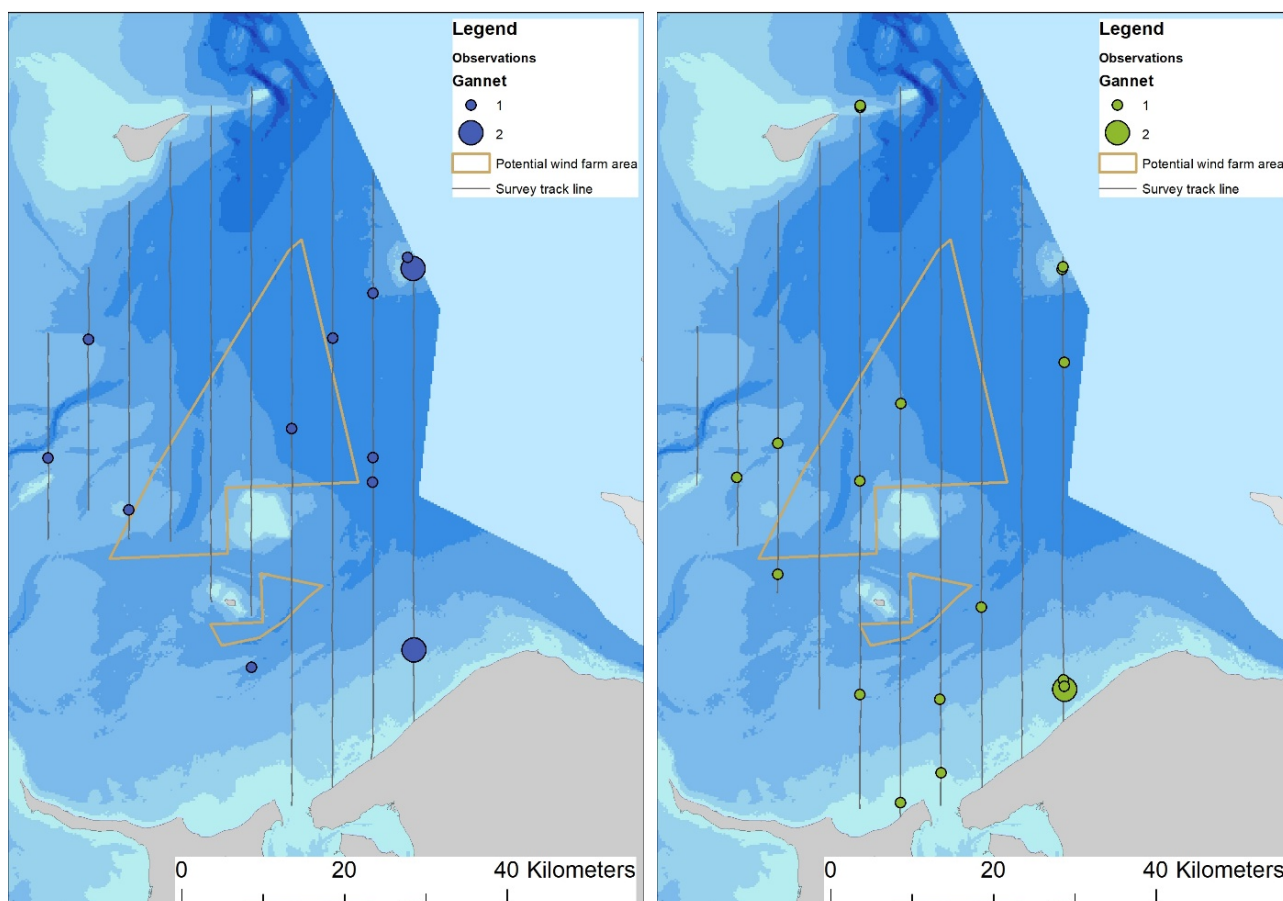


Figure 8. The spatial distribution of observed gannets in the Kattegat survey area during surveys on 9 September (left) and 6 November (right) 2019.

Common eider and common scoter

On 9 September 18 common eiders were recorded, while on 6 November 297 birds were observed (Table 4). No common scoters was recorded on 9 September, while on 6 November 144 common scoters were observed (Table 4).

All common eiders and common scoters were recorded on shallow water, mainly along the north coast of Sjælland, but some birds were also recorded near Hesselø and on Store Lysegrund, the shallow area northeast of Hesselø (Figure 9).

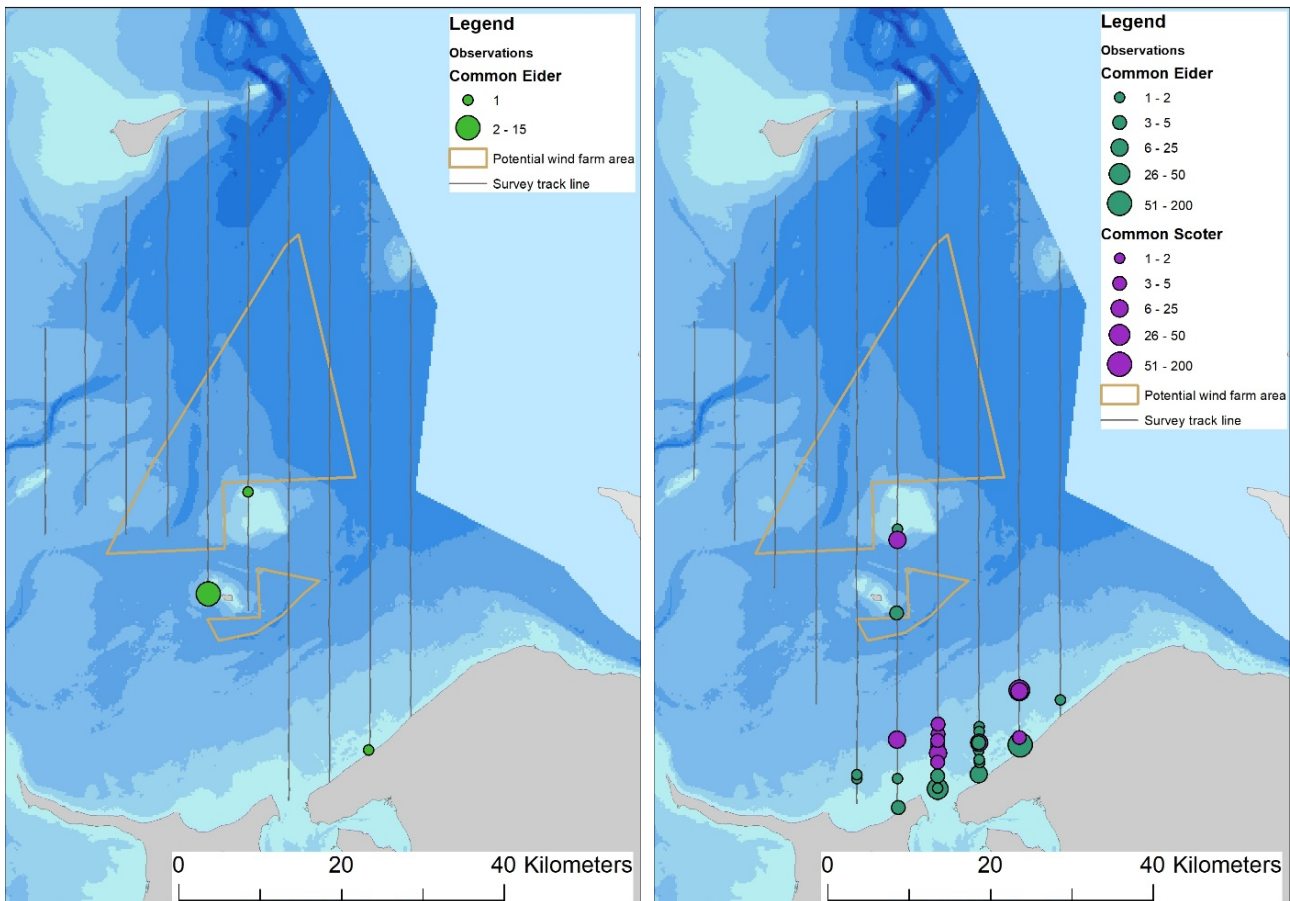


Figure 9. The spatial distribution of observed common eiders and common scoters in the Kattegat survey area during surveys on 9 September (left) and 6 November (right) 2019.

Gulls

In the Kattegat study area the following gull species were recorded; common gull (1 on 9 September and 10 on 6 November), herring gull (11 on 9 September and 20 on 6 November), great black-backed gull (15 on 9 September and 9 on 6 November), kittiwake (none on 9 September and 24 on 6 November) and unidentified gulls (13 on 9 September and 161 on 6 November, Table 4).

The distribution of the recorded common gulls, herring gulls, great black-backed gulls and unidentified gulls can be seen in Figure 10. The kittiwakes observed on 6 November were observed in a concentration in the westernmost part of the study area and in the central eastern parts (Figure 11).

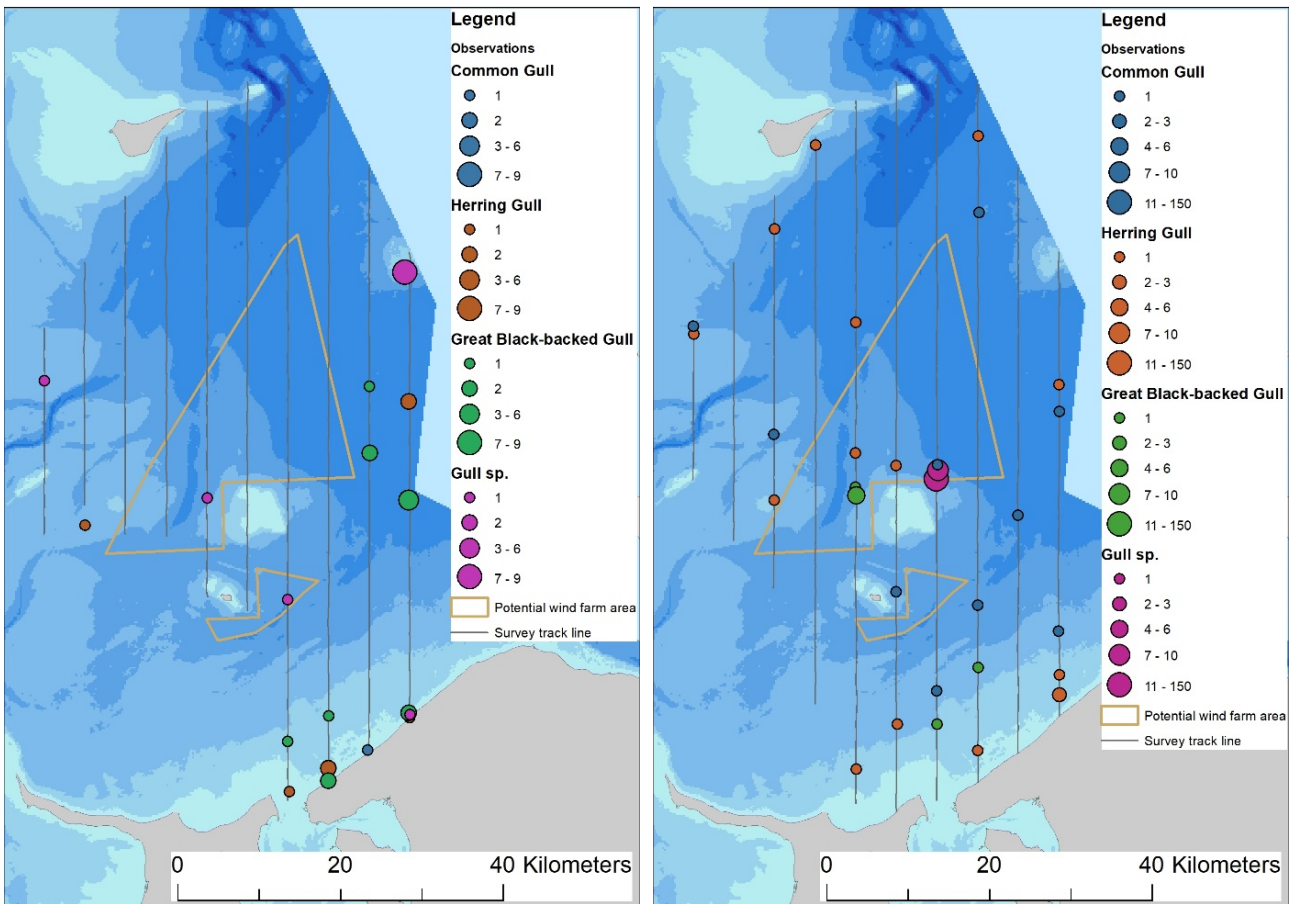
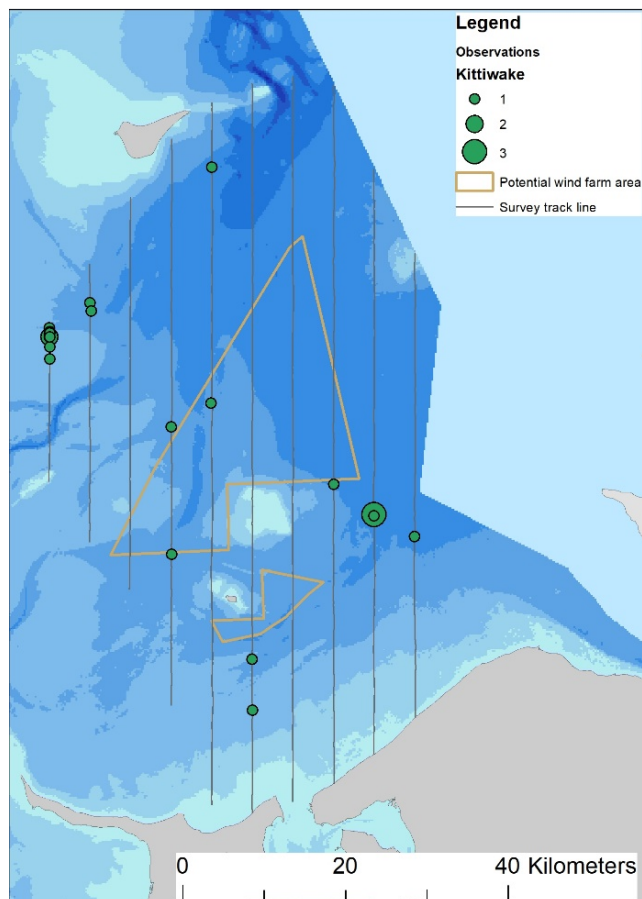


Figure 10. The spatial distribution of observed gulls in the Kattegat survey area during surveys on 9 September (left) and 6 November (right) 2019.

Figure 11. The spatial distribution of observed kittiwakes in the Kattegat survey area during a survey on 6 November 2019.



Razorbill/Common Guillemot

On 9 September, a total of 256 razorbills/common guillemots were recorded, composed by 26 razorbills, 111 common guillemots and 119 unidentified razorbills/common guillemots. On 6 November 110 razorbills/common guillemots were observed, 2 razorbills and 108 unidentified birds (Table 4).

On 9 September, the razorbills/common guillemots were concentrated in the central and eastern parts of the study area. On 6 November, the birds were scattered across the entire study area (Figure 12).

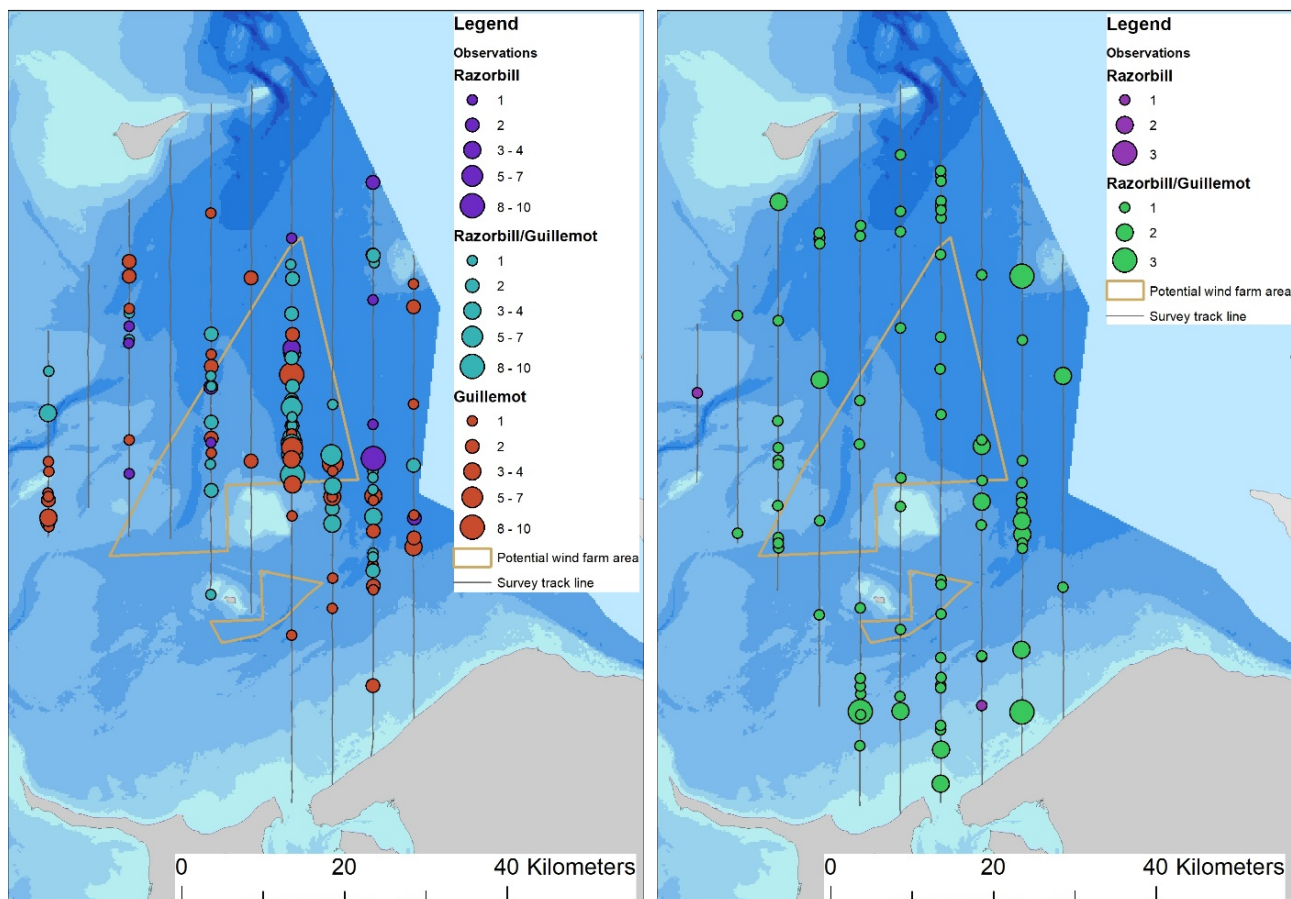


Figure 12. The spatial distribution of observed razorbills/common guillemots in the Kattegat survey area during surveys on 9 September (left) and 6 November (right) 2019.

Literature

Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L., Thomas, L., 2001. Introduction to Distance Sampling: Estimating Abundance of Biological Populations. Oxford University Press, New York.

Buckland, S.T., Rexstad, E.A., Marques, T.A., Oedekoven, C.S., 2015. Distance Sampling: Methods and Applications. Springer International Publishing, Switzerland.

Petersen, I.K. & Nielsen, R.D. 2011. Abundance and distribution of selected waterbird species in Danish marine areas. Report commissioned by Vattenfall A/S. National Environmental Research Institute, Aarhus University, Denmark. 62 pp.

Petersen, I.K. & Sterup, J. 2019. Number and distribution of birds in and around two potential offshore wind farm areas in the Danish North Sea and Kattegat. Aarhus University, DCE - Danish Centre for Environment and Energy, 40 pp. Scientific Report No. 327.
<http://dce2.au.dk/pub/SR327.pdf>