ORNIS SVECICA 3:11-26, 1993

Seabird distribution and numbers in selected offshore parts of the Baltic Sea, winter 1992

JAN DURINCK, HENRIK SKOV & PER ANDELL

Abstract

In the period from 27 January to 10 March, 1992, a seabird line-transect study was carried out in the Baltic Sea. The study focused on selected shallow waters and included previously largely unsurveyed areas of the former Soviet Block. The results of this study give a lot of new information on the distributions and numbers of several waterfowl species. Black- and Red-throated Divers *Gavia arctica/ stellata* totalled 26,000 of which at least 18,500 were Red-throated Divers. Three areas (the Gulf of Pommern, the Gulf of Riga and the Irbe Strait) each housed more than 10% of the estimated populations of Black- and Red-throated Divers in NW Europe. Long-tailed Ducks *Clangula hyemalis* totalled 2,500,000 with ca 1 mill. in the Gulf of Pommern, 682,000 in and around the Gulf of Riga and 532,000 in the area off eastern Gotland, Hoburgs Bank and the Midsjö Banks. Velvet Scoters *Melanitta fusca* totalled 450,000 with 286,000 in the Gulf of Pommern and 137,000 in the Gulf of Riga. Red-necked Grebes *Podiceps grisegena* totalled ca 1,800, Slavonian Grebes *Podiceps auritus* ca 2,000 and Black Guillemots *Cepphus grylle* 26,000.

J. Durinck, Ornis Consult Ltd., Vesterbrogade 140, DK-1620 Copenhagen V, Denmark.
H. Skov, Ornis Consult Ltd., Vesterbrogade 140, DK-1620 Copenhagen V, Denmark.
P. Andell, Ecology Building, University of Lund, S-223 62 Lund, Sweden.

Received 1 February 1993, Accepted 12 April 1993, Edited by A. Brodin

Introduction

This paper presents the main results of a ship-based survey of seabirds, which was conducted in selected areas of the Baltic Sea from 27 January to 10 March 1992.

The numbers and distribution of birds in the offshore sectors of the Baltic Sea have so far mainly been studied through coastal counts and small-scale aerial surveys organized by the IWRB (International Waterfowl and Wetlands Research Bureau). Although some of these counts covered shallow water areas in Sweden, Denmark and western Germany, a substantial portion of the shallow areas in the Baltic Sea have remained unsurveyed. Because of the insufficient coverage a number of species have been suspected to be underestimated in numbers (eg. Laursen 1989).

Based on line-transect studies from research ships, the deeper areas of the Baltic Sea are now known to keep relatively small populations of seabirds (Ornis Consult unpubl. data). Effort was therefore focused on the shallow coastal areas along the Baltic south and east coasts and the banks in the central parts of the Baltic Sea (Fig. 1), for which the first estimates of the wintering seabird populations could now be made.

The survey formed part of an international feasibility study on marine protected areas entitled "Action Preparatory to the Establishment of a Protected Areas Network in the southern part of the North Sea and the Baltic Sea". It aims to identify which parts of the German Bight and the Baltic Sea that should be included in a network of protected areas, and to define guidelines of seabird protection for the conservation of important marine bird areas.

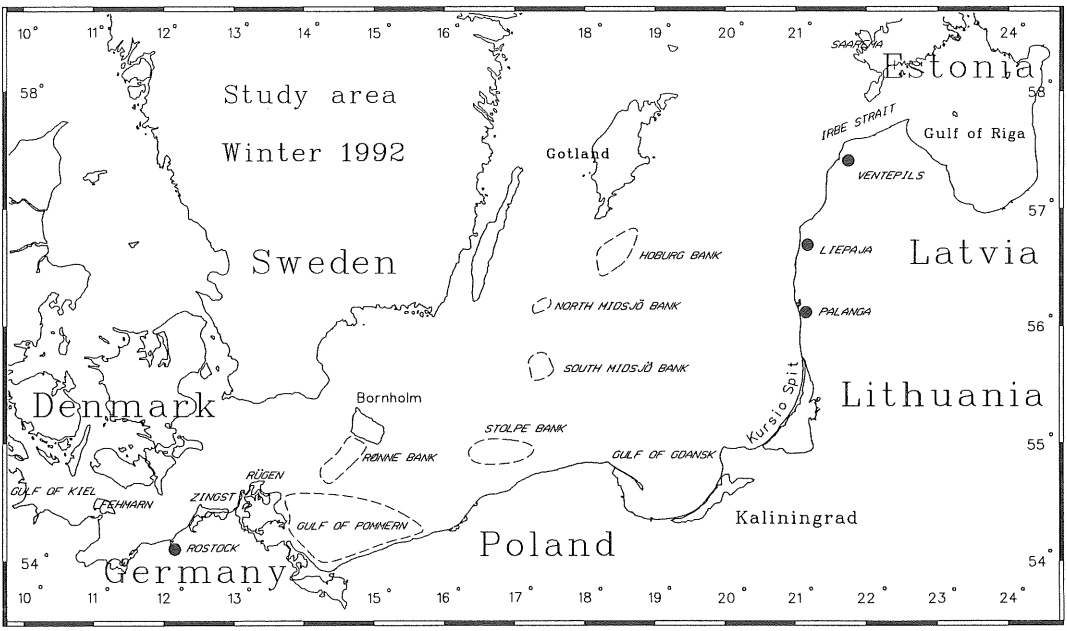


Fig. 1. The study area in the Baltic Sea with the main banks within the dashed lines.

Studieområdet i Östersjön med de viktigare grunden inom streckad linje.

Methods and material

Survey techniques and transects

Data were sampled from ships by the authors, using the standard observation method suggested by Tasker et al. (1984) with revisions suggested by Webb & Durinck (1993). Observations were carried out from a box, 7.5 m above sea level, and recorded in 10 minute intervals. Observations were divided into five bands (transects): (1) from the ship to 50 m; (2) 50 to 100 m; (3) 100 to 200 m, (4) 200 to 300 m and (5) further away than 300 m. Only observations closer than 300 m have been used to calculate relative densities.

The transect lines were planned to cover areas shallower than 30 m of water depth from the Gulf of Kiel to Saaremaa - including the Gulf of Riga but excluding the Swedish main coast and Öland.

The winter 1991-1992 was ice-free and mild, the temperature of the surface waters ranged between 1.0 °C and 4.7 °C. Observations were carried out in good weather conditions with windspeed less than 10 m/s and visibility over 1,000 m.

Population estimation

Observation efficiency (= the probability of a bird being detected) drops with distance from the ship especially for small and/or dark birds. It is calculated as: the sum of individuals seen in band 1 and 2 divided with the number of individuals in band 3 and band 4 respectively, times 100. For example, the effiency for Guillemots in bands 3 and 4 equaled 82% and 35% respectively of the birds recorded in bands 1+2. We have compensated for this bias, for the species that showed a decrease, by multiplying observed numbers with a correction factor bringing the observations in bands 3 and 4 up to the same level as in band 1+2.

For divers this has increased the number of birds estimated with 47.0%, Great Crested Grebe 105%, Red-necked Grebe 116%, Slavonian Grebe 127%, Common Scoter 37%, Velvet Scoter 17%, Eider 37%, Long-tailed Duck 23%, Guillemot 38% and Razorbill 72%. These correction factors are based on the assumption that distance measurements were correct. To enhance the precision of distance measurements we used a range finder (stick

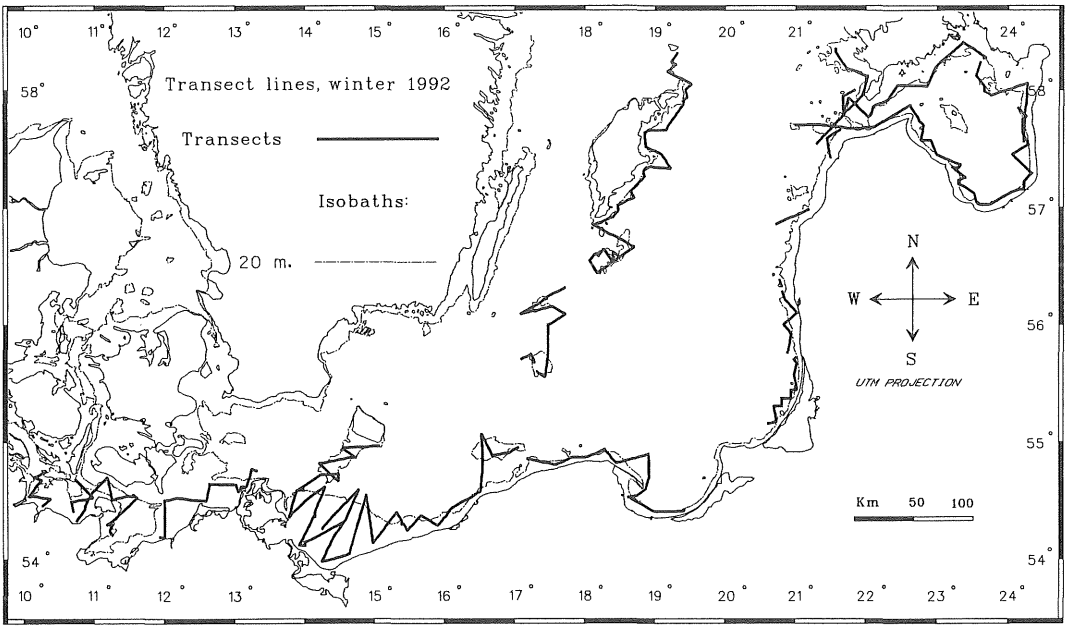


Fig. 2. The transect lines' position in the Baltic Sea, the winter 1992, shown by thick lines. Broken lines with dots show the 20 meter isobath.

Transekternas position i Östersjön under vintern 1992 visas med fet linje. Streck och punktlinje visar 20 meters djupkurva.

technique), and since most birds alight in front of the ship at different angles and distances an "angle/ distance corrector" was manufactured to find the correct distance to each band (Appendix 2). For example, a bird seen alighting at an angle of 18 degrees to the length axis of the ship and at a distance of 1000 meters, would be right on the outer edge of band 4.

The corrected densities were calculated as means for each 20 minute period and subsequently plotted on nautical maps at the position central to each period. Flying and sitting birds were included whereas birds following ships were not.

Lines were drawn closely around the outermost plotted densities when clusters of a species were observed in at least two consecutive 20 min. periods, while single observations were marked on the maps with an asterisk. For most species we fitted lines of approx. 7.5 km (= 20 minutes sailing at 12 knots) beyond the outermost plotted densities. As Gulls move around much we have fitted wider lines around their distributions. Simple arithmetic means were calculated for the densities inside each bordered area and estimates calculated by multiplication. When possible we divided each main area into subareas with different levels of densities (eg. Table 2, Gulf of Pommern).

The sailing lines were put in a zigzag fashion to enable crossing of isobaths and expected marine gradients in a time conserving way. The low densities of divers or diving ducks at the outer angles of the zigzags increased our confidence of the outer limits of their distributions. The ship used is a 340 Grt. former rescue ship, making around 11 knots when observations were made. The ship had a draught of 4 m and turned outward at approximately 8-10 m depth. Especially in the Gulf of Riga there were high numbers of ducks in the inshore direction - out of reach of the ship, and in the Gulf of Pommern the situation was the same for grebes. Thus we are confident that the estimates of these species are not overestimated. Another factor adding conservancy to the estimates is the diving habits of divers, grebes, diving ducks and auks, of which an unknown proportion is likely to be under the surface during a count.

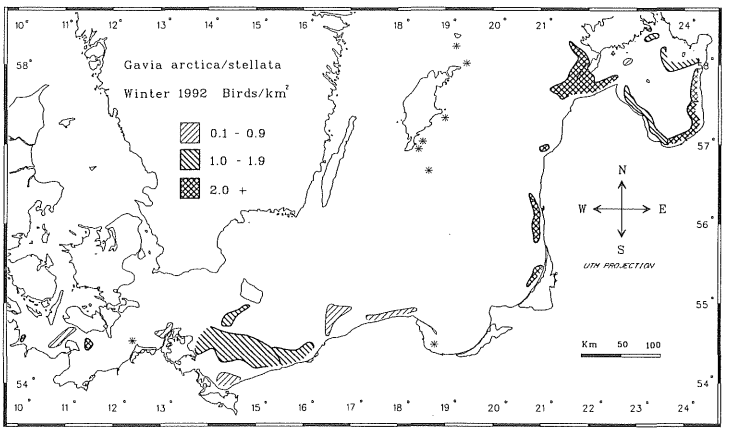


Fig. 3. The distribution and densities (birds/km²) of Black-throated-/Red-throated Divers in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined. Asterisks show scattered observations.

Utbredning och tätheter (fåglar/km²) hos stor-/smålom i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas. Asterisk visar enstaka observationer.

Results and Discussion

Black-throated & Red-throated Divers

Divers were found in most of the surveyed waters with less than 30 m water depth (Fig. 3) and only the Red-throated and Black-throated Divers were common (Appendix 1). The highest densities were found west of Saarema, in the Irbe Strait and the eastern Gulf of Riga (Table 1). With an estimated 26,000 divers, the offshore areas keep large populations, with the main concentrations in the Gulf of Pommern, the Gulf of Riga and around the Irbe Strait.

Only 14% of the divers were determined to species with approx. 6 % Black-throated Divers and 8% Red-throated (Appendix 1). The divers determined to species north of Kursio Spit were exclusively Red-throated Divers (n=71) with a total estimate of ca 18,500 birds. Twentyone Red-throated and 67 Black-throated Divers made up the rest of the divers determined to species (excluding Gotland). If this relation (21:67) is applied to the estimated 7,700 divers it gives 5,900 Black-throated Divers and 1,800 Red-throated. Black-throated Divers dominated in the northern part of the Gulf of Pommern, along the northenmost parts of the Polish coast and off Kursio Spit in Lithuania.

This complements the results of earlier surveys which point out the NW Kattegat as a main area of concentration. The Kattegat coast of SW Sweden, the Danish straits, Fehmarn Belt, Rønne Bank, the coast of Blekinge (Sweden) and southeast Gotland are also areas with high numbers of divers (Ornis Consult unpub. data). During the cold winter of 1987

Table 1. Mean densities and estimated populations of Black- and Red-throated Divers in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos stor- och smålom i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km² *Fåglar/km²*	Estimate *Uppskattning*
Gulf of Kiel	3.7	141
Fehmarn west	0.2	64
Fehmarn east	2.7	292
Rügen west	0.9	170
Rønne Bank	1.4	477
Gulf of Pommern north	1.2	3,781
Gulf of Pommern south	0.8	282
Gulf of Pommern east	1.6	1,208
Stolpe Bank	0.5	298
Poland north	0.9	356
Lithuania	3.0	618
Palanga	2.0	926
Liepaja	3.9	296
Irbe Strait west	2.0	3,758
Irbe Strait west (high)	43.6	4,186
Gulf of Riga southwest	1.0	638
Gulf of Riga southeast	11.0	6,787
Gulf of Riga east	2.6	733
Gulf of Riga northeast	1.8	923
Gulf of Riga north	1.3	150
Gulf of Riga northwest	0.9	67
Sum *Summa*		26,150

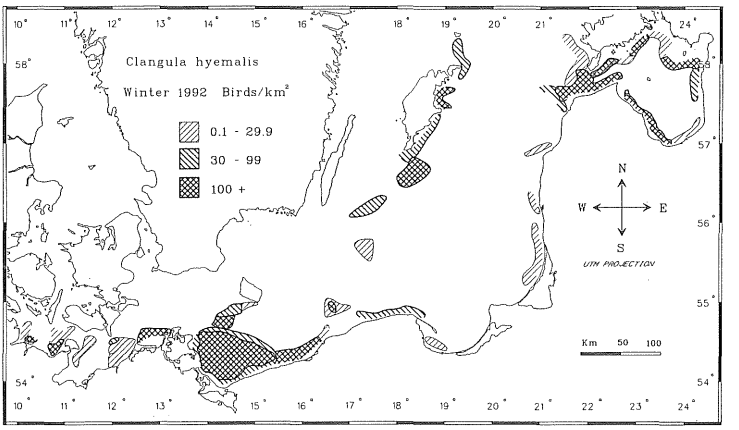


Fig. 4. The distribution and densities (birds/km²) of Long-tailed Duck in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined.

Utbredning och tätheter (fåglar/km²) hos alfågel i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas.

densities over 2 birds per km² were recorded in an area east of Bornholm (Skov et al. 1987).

Danielsen et al. (in press) reviews the populations of both species in NW Europe. Our present estimate makes up 44% of the grand estimate and the numbers in each of the three main areas (the Gulf of Pommern, the Gulf of Riga and the Irbe Strait) exceeded 10% of the grand estimate.

Great Crested Grebe

The Great Crested Grebe was mainly recorded in the near coastal areas of the western part of the Baltic Sea with an estimate of 1,250 birds, of which 75 % were found in the Gulf of Kiel. Only scattered observations were made in the eastern parts of the Baltic Sea. Due to its preference for coastal habitats, the survey did not cover the range of the species well.

During very cold winters (like in 1987) the offshore areas west of Bornholm house large numbers of Great Crested Grebe (Ornis Consult unpubl. data), which may have been dislocated from ice-covered fresh-water habitats, where the species is a numerous winter visitor (Cramp & Simmons 1977).

Laursen et al. (in prep.) estimated 9,500 birds in the western Baltic Sea during the cold winter 1986/87.

Red-necked Grebe

The distribution of the Red-necked Grebe resembles that of Great Crested Grebe, yet this species seemed to use areas further away from the coast. We found dispersed populations east of Rügen, and in the eastern German and Polish waters. The Gulf of Pommern was clearly the main area with at least 2/3 of the estimated total of 1,750 birds at a density of 0.5 birds/km². The highest density was found north of Fehmarn with 1.2 birds/km² giving an estimate of ca 450 birds. The main concentrations of Red-necked Grebe may have been covered by this survey due to the offshore habits of the species.

The older surveys indicated winter populations in offshore waters of Denmark and western Germany, which were dispersed in low densities (Laursen et. al. in prep.)

This species winters mainly in marine habitats (Cramp & Simmons 1977). Besides the Gulf of Pommern, the only other known winter concentration is in NW Kattegat with a maximum of 3,600 estimated birds (Laursen et al. in prep.).

Slavonian Grebe

Most of the Slavonian Grebes were found in the Gulf of Pommern, with densities dropping with distance from land. The estimated 1,800 birds in the Gulf of Pommern at a mean density of 0.8 birds/km², suggest an important wintering ground. It was also found at the southern part of Stolpe Bank with an estimate of 100 birds. During cold winters, birds have been recorded in the waters south of Bornholm (Ornis Consult unpubl. data). This species winters both in marine and fresh-water habitats (Cramp & Simmons 1977), and therefore the estimate may only concern a part of the population wintering in the Baltic region.

Table 2. Mean densities and estimated populations of Long-tailed Duck in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos alfågel i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km² *Fåglar/km²*	Estimate *Uppskattning*
Gulf of Kiel (low)	279.2	25,128
Gulf of Kiel (low)	11.0	2,904
Fehmarn west (high)	111.0	22,866
Fehmarn west (low)	26.0	10,062
Fehmarn east	9.4	3,732
Rostock south	20.8	9,464
Rostock mid.	1.9	395
Rostock north	74.0	4,884
Zingst	132.0	52,536
Rønne Bank north	2.0	266
Rønne Bank mid.	38.4	12,058
Rønne Bank south	376.0	127,840
Gulf of Pommern central	193.0	747,103
Gulf of Pommern periferal	30.5	38,918
Poland west	113.0	86,897
Stolpe Bank central	194.0	18,430
Stolpe Bank periferal	21.0	7,875
South of Stolpe Bank	25.0	3,650
Poland east	64.8	41,602
Gulf of Gdansk	8.7	2,071
Kursio Spit	16.0	13,104
Palanga	1.7	347
Liepaja	0.5	118
Saaremaa west	4.3	3,844
Irbe Strait west	62.4	22,526
Irbe Strait	170.0	213,520
Saaremaa east	1000.0	279,000
Gulf of Riga southwest	154.0	92,554
Gulf of Riga southeast	2.9	815
Gulf of Riga east	31.2	11,357
Gulf of Riga northeast	112.0	56,336
Gulf of Riga north	19.6	8,585
Gulf of Riga northwest	375.0	96,750
Gulf of Riga west-northwest	10.7	1,744
Gotland north	78.8	40,503
Gotland east	135.0	47,925
Gotland southeast	33.3	20,513
Hoburg Bank	375.0	364,500
North Midsjö Bank	87.5	51,363
South Midsjö Bank	22.3	10,593
Sum *Summa*		2,554,675

Common Eider

This species showed a westerly distribution with most of the birds seen west of 12° E. The Gulf of Kiel and neighbouring areas in the western Fehmarn Belt housed 99% of the total estimate of 205,000 birds. The highest mean density was found in Fehmarn Belt with 183 birds/km². We probably missed some concentrations in coastal habitats.

Earlier winter surveys stress the importance of the western Baltic Sea, the Danish Straits and Kattegat as wintering areas (Meissner unpubl. data, Laursen in prep, Ornis Consult unpubl. data).

Laursen (1989) estimated the Western Palearctic winter population at 3,000,000 birds.

Long-tailed Duck

The estimate of the wintering populations of Long-tailed Ducks in the Baltic Sea was one of the main results of the survey, and increased the total estimate for the Western Palearctic region considerably. The Long-tailed Duck comprised 64% of all birds seen (Appendix 1). Most (82%) were found within three areas (Fig. 4, Table 2): the Gulf of Pommern-Rønne Bank (925,000 birds), the eastern parts of the Gulf of Riga including the Irbe Strait (746,000 birds) and the Hoburg-Midsjö Banks (424,000 birds). Due to the dispersion of the species and its affinity to areas shallower than 40 m (this study), we anticipated that the majority of the population within the study area was found.

This estimate (2.5 mill.) mainly depends on the coverage of the earlier unsurveyed Gulf of Pommern and the Gulf of Riga. The Swedish east coast and Öland have a population of ca. 100,000 birds (Nilsson 1980). The unsurveyed northern part of the Baltic Sea most likely kept some populations of Long-tailed Duck. Thus our estimate is likely to be less than the grand total for the Baltic Sea. Earlier surveys (Ornis Consult unpubl. data, Laursen et al. in prep.) support the identification of Rønne Bank and Midsjö Bank as high-density areas. Laursen et al. (in prep) also reported Fehmarn Belt as a high-density area. During the present survey only small numbers were recorded in the Fehmarn Belt. This may in part be explained by the early timing of our survey as the highest densities are normally found in this area from mid-February to May. Former coastal counts along the continent, organised by the IWRB, contribute only little to the grand estimate for this species, since only fractions of the offshore populations can be seen from land.

Laursen (1989) estimated 865,000 Long-tailed Ducks in the Baltic Sea and assumed a total of one million birds. As Laursen (1989) estimated 566,000 Long-tailed Ducks in other regions than the Baltic

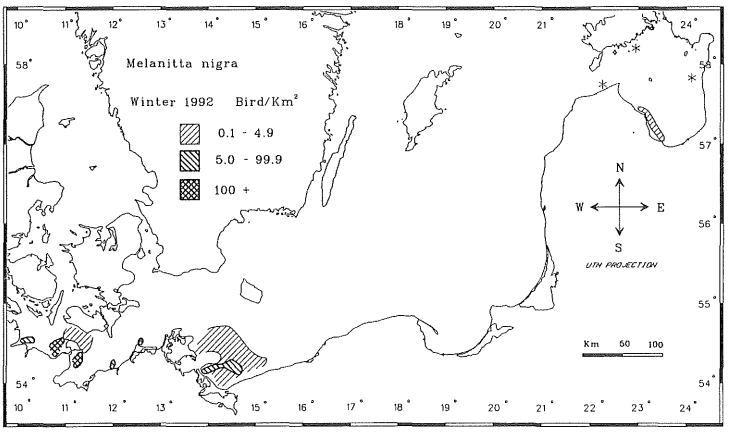


Fig. 5. The distribution and densities (birds/km^2) of Common Scoter in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined. Asterisks show scattered observations.

Utbredning och tätheter (fåglar/km^2) hos sjöorre i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas. Asterisk visar enstaka observationer.

Sea, then our study together with his has placed the Long-tailed Duck at the same numerical level as the Common Eider, 3,000,000 individuals, in the Western Palearctic.

Common Scoter

Our survey found 83% of the estimated 80,000 birds west of Rügen and the biggest concentration was found west of Fehmarn with 63% of the grand total (Table 3, Fig. 5).

Older winter surveys indicate large concentrations in Denmark, NW Kattegat being the main area with at least 400,000 birds (Laursen et al. in prep.). There is another important area in Germany (Bräger & Nehls 1987), who counted 13,000 birds east of Fehmarn, which correspond with our estimate for this area (Table 3).

Laursen (1989) estimated 800,000 Common Scoters in the Western Palearctic based on 419,000 counted birds. As the number of birds wintering in NW Kattegat in 1992 was estimated at 670,000 birds (Rose 1992), the total estimated number of Common Scoter within the Baltic-Kattegat Sea system was at least 750,000. The same winter Leopold (1992) counted 115,000 off the Danish and German Wadden Sea. Accordingly, the total estimate for the Western Palearctic may exceed 900,000 birds.

Velvet Scoter

Velvet Scoters were seen along most of the mainland coast in waters shallower than 35 m (Fig. 6). Most (93%) were estimated within two areas: the Gulf of Pommern and along the southwest coast of the Gulf of Riga, for which no earlier estimates were available (Table 4).

As for the Long-tailed Duck, the estimate of the winter population of Velvet Scoter in the Western Palearctic region was much increased by this survey. This species' dispersion and its affinity to shallow waters made us confident that we found most of the birds within the study area.

In previous surveys Laursen et. al. (in prep.) found a concentration of ca. 100,000 birds in NW

Table 3. Mean densities and estimated populations of Common Scoter in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos Sjöorre i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km^2 *Fåglar/km^2*	Estimate *Uppskattning*
Gulf of Kiel	16.1	918
Fehmarn west	193.6	48,787
Fehmarn Belt	0.8	563
Fehmarn east	211.0	14,770
Rostock	7.3	380
Zingst	201.0	7,437
Gulf of Pommern central	16.6	7,304
Gulf of Pommern periferal	1.0	2,970
Gulf of Riga southwest	2.1	601
Sum *Summa*		83,729

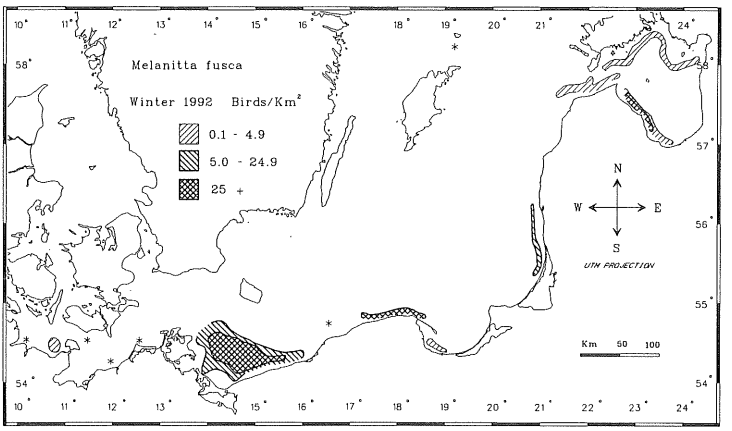


Fig. 6. The distribution and densities (birds/km²) of Velvet Scoter in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined. Asterisks show scattered observations.

Utbredning och tätheter (fåglar/km²) hos svärta i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas. Asterisk visar enstaka observationer.

Kattegat and Svazas & Vaitkus (1992) found a concentration off Lithuania of 18,000 birds. Population sizes were at the same level in these areas in 1992 (S. Svazas pers. comm., S. Pihl pers. comm.). Laursen (1989) estimated 250,000 Velvet Scoter in the Western Palearctic region based on 89,000 actual counts/estimates. Our estimates dramatically alter these figures, as 450,000 birds can be added to the counts in Kattegat and Lithuanian coastal waters. The total population of Velvet Scoters in the Western Palearctic most likely exceeds 550,000 birds.

Table 4. Mean densities and estimated populations of Velvet Scoter in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos svärta i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km² *Fåglar/km²*	Estimate *Uppskattning*
Fehmarn Belt	3.4	745
Rügen	0.6	20
Gulf of Pommern central	106.6	261,490
Gulf of Pommern periferal	10.5	24,665
Poland north	40.3	21,198
Gulf of Gdansk	2.0	348
Lithuania	5.2	2,075
Irbe Strait	2.9	2,250
Saaremaa west	0.5	40
Riga north	1.1	1,330
Gulf of Riga south central	379.0	134,166
Gulf of Riga south periferal	4.7	1,965
Sum *Summa*		450,290

Red-breasted Merganser

This species was widely distributed in small, offshore aggregations . The most important areas were Fehmarn Belt, an area near Rügen, the Gulf of Gdansk and the waters off southeastern parts of

Table 5. Mean densities and estimated populations of Red-breasted Merganser in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos småskrake i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km² *Fåglar/km²*	Estimate *Uppskattning*
Fehmarn west	0.8	26
Fehmarn Belt	4.3	2,253
Rügen west	15.1	1,027
Rügen east	6.7	214
Rønne Bank	0.6	104
Gulf of Pommern	2.2	658
Gulf of Gdansk	7.9	1,430
Gulf of Riga southwest	0.3	94
Gulf of Riga east	1.9	186
Gulf of Riga north	1.0	69
Saaremaa west	1.5	68
Gotland north	0.7	138
Gotland south	2.6	1,508
Sum *Summa*		7,775

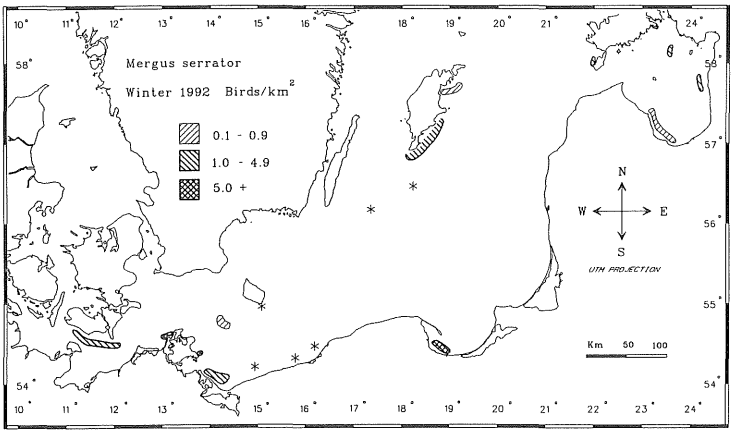


Fig. 7. The distribution and densities (birds/km^2) of Red-breasted Merganser in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined. Asterisks show scattered observations.

Utbredning och tätheter (fåglar/km^2) hos småskrake i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas. Asterisk visar enstaka observationer.

Gotland (Fig. 7, Table 5). Our estimates contribute only little new information since the main distribution of this species is found in more shallow waters (Monval & Pirot 1989) than we could cover. Probably the majority of the winter population in the Baltic Sea is scattered in small near coastal areas, especially in the western Baltic Sea (Monval & Pirot 1989). These authors estimate 150,000 birds for the Western Palearctic.

Little Gull

Scattered observations and a small concentration around the Irbe Strait, with an estimate of 860 birds, show a small winter population of Little Gull dispersed over much of the Baltic Sea. Older surveys have not indicated any concentrations during winter (Ornis Consult unpubl. data). Laursen et al. (in prep.) estimate 13,500 Little Gulls in the Danish sector of the Baltic Sea during late spring, probably coming from the North Sea.

Common Gull

The Gulf of Riga was a wintering area (Fig. 8), but outside this area, only scattered low densities were recorded (Table 6). Earlier surveys showed that birds were found over most of the Baltic Sea with higher densities off Gotland, off Bornholm, and in the eastern Kattegat (Ornis Consult unpubl. data).

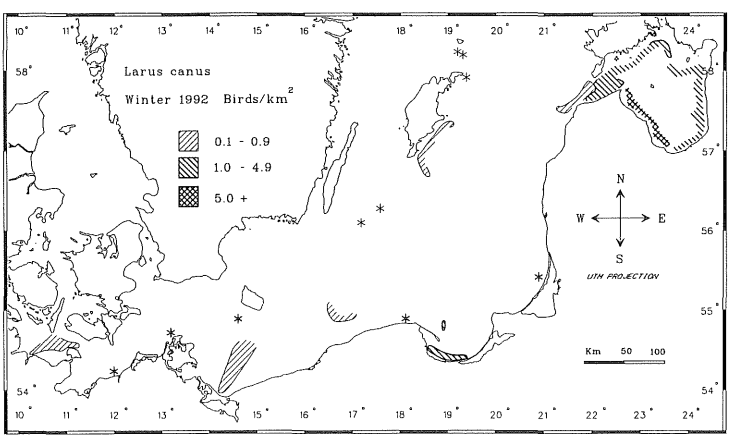


Fig. 8. The distribution and densities (birds/km^2) of Common Gull in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined. Asterisks show scattered observations.

Utbredning och tätheter (fåglar/km^2) hos fiskmås i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas. Asterisk visar enstaka observationer.

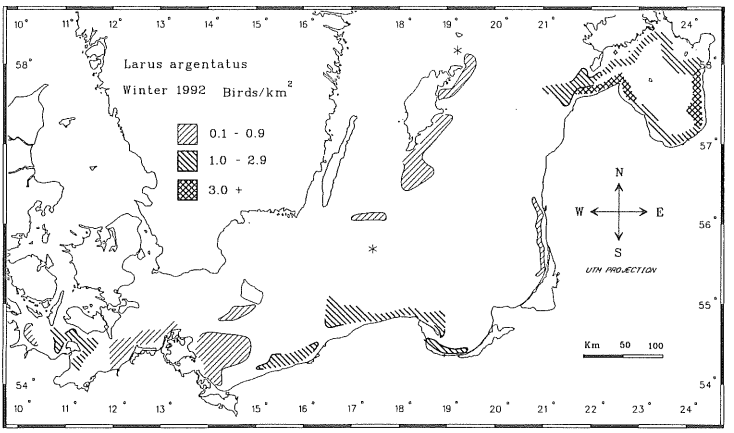


Fig. 9. The distribution and densities (birds/km²) of Herring Gull in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined. Asterisks show scattered observations.

Utbredning och tätheter (fåglar/km²) hos gråtrut i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas. Asterisk visar enstaka observationer.

Herring Gull

With no winter concentrations, Herring Gulls were relatively common in all areas, especially where high densities of seaducks were recorded (Fig. 9, table 7).

The largest concentrations of the species in offshore areas in winter are probably in fishing areas in the eastern Kattegat and the deeper parts of the Baltic (Ornis Consult unpubl. data).

Table 6. Mean densities and estimated populations of Common Gull in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos fiskmås i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km² *Fåglar/km²*	Estimate *Uppskattning*
Fehmarn Belt	0.6	422
Gulf of Pommern	0.2	262
Stolpe Bank	0.2	74
Poland north	3.6	148
Gulf of Gdansk	3.3	1,201
Irbe Strait west	0.3	160
Gulf of Riga northwest	2.3	3,537
Gulf of Riga southwest	5.0	3,230
Gulf of Riga east	2.7	3,702
Gotland east	0.4	238
Sum *Summa*		12,974

Great Black-backed Gull

A total of 1,400 Great Black-backed Gulls were estimated within the study area with 1,300 in the Gulf of Pommern. The average density in shallow areas of the Baltic Sea were found to be below 0.5 birds per km². This survey did probably not cover the main winter range of the species (see below), but our estimates add to the knowledge of numbers in the shallow areas.

The highest winter densities in offshore waters are probably found in areas north and east of Bornholm, southeast of Gotland and in the eastern part of the Kattegat (Ornis Consult unpubl. data).

Guillemot

The majority of the observations were made south of Bornholm and Gotland, with estimates of 700 and 300 respectively. Densities were low, generally less than 1 per km². The reason for the relatively few Guillemot observations was probably the late timing of the survey regarding Guillemot breeding cycle and most of the sightings may represent immature birds.

The principal wintering areas of Guillemots are probably the deep water areas (> 50 m) near the colonies on Ertholmene, east of Bornholm and St. Karlsö and L. Karlsö, west of Gotland (Ornis Consult unpubl. data). During the cold winter of 1987 densities of more than 1 per km² were recorded southeast of Gotland (Skov et al. 1987). Lyngs (1992) estimated a total breeding population of 13,000 pairs in the Baltic Sea.

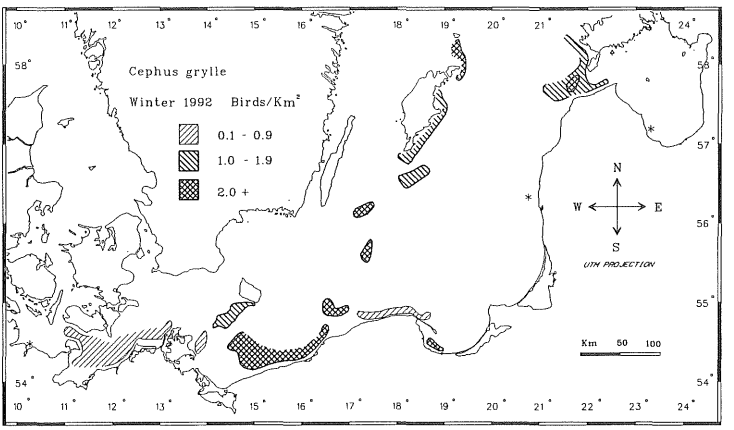


Fig. 10. The distribution and densities (birds/km^2) of Black Guillemot in selected parts of the Baltic Sea in the winter 1992. Open borders in the distribution areas show directions where the distribution limit was not determined. Asterisks show scattered observations.

Utbredning och tätheter (fåglar/km^2) hos tobisgrissla i utvalda delar av Östersjön under vintern 1992. Öppna gränser i utbredningsområdena visar riktningar där utbredningsgränsen inte kunde fastställas. Asterisk visar enstaka observationer.

Razorbill

We found most of the Razorbills in the waters off Lithuania (1,400) and west of the Irbe Strait (1,250). The maximun density was 1.4 per km^2 (Lithuania) but three areas in the Gulf of Riga had densities below 1 per km^2. As for the Guillemot, the survey did not cover the main wintering range, but the concentrations found in the waters off the Baltic States add new information.

The main wintering areas for Razorbills are in the vicinities of the colonies on St. Karlsö and Ertholmene, where they seem to prefer the deep water (>50 m) areas. Compared to the Guillemot, the winter range of Razorbill seems to involve areas further away from the colonies (Ornis Consult unpubl. data). During the cold winter of 1987 densities of more than 2 per km^2 were recorded southwest of Gotland (Skov et al. 1987). Lyngs (1992) mentions 425 pairs on Ertholmene, whereas no safe estimate of the current population of St. Karlsö is available.

Black Guillemot

These are the first estimates of the winter population in the Baltic Sea. The majority of the birds were recorded east of Rügen, with the largest concentrations on Rønne Bank, in offshore waters off western Poland incl. Stolpe Bank, in the Irbe Strait, inshore and offshore waters north, east and south of Gotland and on the Midsjö Banks (Fig.10, Table 8). We may not have found all concentrations within the studied parts of the Baltic Sea, especially in areas west of the Irbe Strait, where the concentration seemed to extend into areas further away from land.

Table 7. Mean densities and estimated populations of Herring Gull in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos gråtrut i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km^2 *Fåglar/km^2*	Estimate *Uppskattning*
Gulf of Kiel	0.8	198
Fehmarn Belt	1.1	1.277
Zingst	0.8	1,230
Rønne Bank	0.4	188
Gulf of Pommern	0.9	2,613
Poland west	1.9	1,773
Poland north	1.1	2,650
Gulf of Gdansk	1.7	622
Lithuania	0.9	484
Irbe Strait west	1.5	1,829
Irbe Strait central	3.4	1,829
Gulf of Riga west	11.8	3,092
Gulf of Riga southwest	1.8	2,005
Gulf of Riga east	3.4	2,778
Gulf of Riga north	1.1	2,168
Gotland northeast	1.0	780
Gotland southeast	0.6	1,285
North Midsjö Bank	0.4	145
Sum *Summa*		26,945

Table 8. Mean densities and estimated populations of Black Guillemots in selected parts of the Baltic Sea, January-March 1992.

Medeltätheter och uppskattade populationsstorlekar hos tobisgrissla i utvalda delar av Östersjön, januari-mars 1992.

Area *Område*	Birds/km² *Fåglar/km²*	Estimate *Uppskattning*
Fehmarn Belt	0.3	919
Rønne Bank	1.6	1,098
Rügen east	0.8	210
Poland west	3.9	10,156
Stolpe Bank	4.5	1,944
Poland northeast	0.8	595
Gulf of Gdansk	4.4	660
Irbe Strait central	11.8	2,454
Irbe Strait peripheral	2.0	3,952
Gotland north	2.3	1,007
Gotland east	1.2	1,084
Hoburg Bank	1.1	645
North Midsjö Bank	3.3	660
South Midsjö Bank	4.3	1,101
Sum *Summa*		26,483

The older line transect surveys (Ornis Consult unpubl. data) indicated a depth limit to the species around 40 m. They further indicated the coast of Blekinge, in southern Sweden, as an important winter area of Black Guillemot, and stress the importance of Rønne and Midsjö Banks.

The size of the breeding population is highly uncertain, but may be in the range of 10-20,000 pairs (Koskimies 1992). The estimated winter population of 26,000 birds is probably a minimum estimate.

Acknowledgements

We wish to thank Andrus Aumees, Agris Celmins, Juris Kazubiernis, Andrus Kuus, Vitautas Pareigis and Gedeminas Vaitkus for participating in the survey. We thank Dr. Saulius Svazas, Dr Andres Kureso and Dr Antra Stipniele for help with sailing permits. This survey was partly funded by the Commission of the European Communities (ACE Project no. 2242/90/09-1) and the Danish National Environmental Institute.

References

Bräger, S. & Nehls, G. 1987. Die Bedeutung Der Schleswig-Holsteinischen Ostsee-Flachgründe für überwinternde Meeresenten. *Corax* 12 (3):234-254

Cramp, S. & Simmons, K. E. L. (eds). 1985. *The birds of the western Palearctic.* Vol. 4. Oxford Univ. Press.

Danielsen, F., Skov, H. & Durinck, J. in press. Mid-winter populations of Red-throated Diver Gavia stellata and Black-throated Diver Gavia arctica in Northwest Europe. In Madsen, J. & Fjeldså, J. (eds): *Proceed. Seventh Nordic Congress of Ornithology.* København.

Koskimies, P. 1992. *Population sizes and recent trends of the breeding birds in the Nordic countries.* Report to the Nordic Council of Ministers. University of Helsinki.

Laursen, K. 1989. Estimates of Sea Duck Winter Populations of the Western Palearctic. *Dan. Rev. Game Biol.* Vol. 13, no. 6.

Laursen, K., Pihl, S., Durinck, J., Hansen, M., Skov, H., Frikke, J. & Danielsen, F. In prep. The numbers and distribution of waterfowl in Denmark 1987-1989. *Dan. Rev. Game. Biol.*

Leopold, M.F. 1992. Seabirds at sea, November 1991 - February 1992. *Sula* 6 (1): 38-39.

Lyngs, P. 1992. Ynglefuglene på Græsholmen 1925-90. *Dansk Orn. Foren. Tidsskr.* 86 (1): 1-93.

Monval, J-Y. & Pirot, J-Y. 1989. Results of the IWRB International Waterfowl Census 1967-1986. *IWRB Special Publication No. 8.* Slimbridge.

Nilsson, L. 1980. De övervintrande alfåglarnas *Clangula hyemalis* antal och utbredning längs den svenska kusten. *Vår Fågelvärld* 39: 1-14.

Rose, P.M. 1992. *Western Palearctic Waterfowl Census 1992.* IWRB. Slimbridge.

Skov, H., Danielsen, F. & Durinck, J. 1987. Kortlægning af havfugle i danske farvande: Indledende undersøgelser 1986-87. *Dansk. Orn. Foren. Tidskr.* 81(3-4):174

Svasaz, S. & Vaitkus, G. 1992. Lithuania as a wintering area for sea ducks. *IWRB Seaduck Bulletin* No. 2, 1992.

Tasker, Mark, L., Jones, P. H., Dixon, T. J. & Blake B. F. 1984. Counting seabirds at sea from ships: A review of methods employed and a suggestion for a standardized approach. *Auk* 101: 567-577.

Webb, A. & Durinck, J. 1993. Counting seabirds from ships. In: Komdeur, J., Bertelsen, J. & Cracknell, J. (eds.). Manual in seabird counting using aeroplane and ship surveys. *IWRB Spec. Publ. 16.*

Appendix 1

Birds observed in selected parts of the Baltic Sea, January-March 1992.

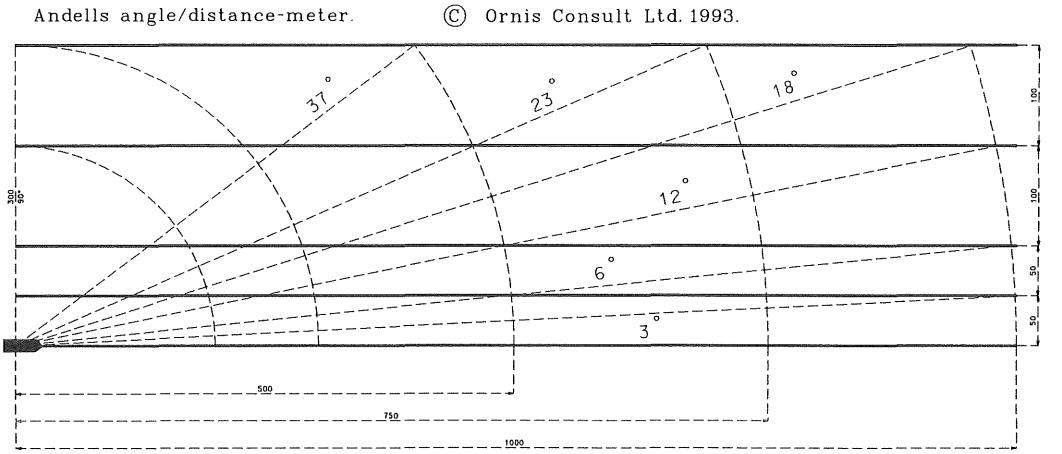
Fåglar observerade i utvalda delar av Östersjön, januari-mars 1992.

	Total	Within transect *Inom transekten*
Red-throated Diver *Gavia stellata*	92	73
Black-throated Diver *Gavia arctica*	68	53
Great North./White-bil. Diver *Gavia immer/adamsii*	3	3
Undet. Diver *Gavia arctica/stellata*	1,717	797
Great Crested Grebe *Podiceps cristatus*	41	39
Red-necked Grebe *Podiceps grisegena*	41	35
Slavonian Grebe *Podiceps auritus*	36	35
Undet. Grebe *Podiceps spp.*	32	25
Cormorant *Phalacrocorax carbo*	18	11
Whooper Swan *Cygnus cygnus*	18	4
Mute Swan *Cygnus olor*	4	
Undet. Swan *Cygnus spp.*	47	5
Greylag Goose *Anser anser*	5	
Bean Goose *Anser fabalis*	5	5
Shelduck *Tadorna tadorna*	3	
Wigeon *Anas penelope*	2	
Mallard *Anas platyrhynchos*	10	6
Teal *Anas crecca*	1	
Tufted Duck *Aythya fuligula*	81	1
Scaup *Aythya marila*	86	41
Goldeneye *Bucephala clangula*	6	
King Eider *Somateria spectabilis*	1	
Eider *Somateria mollissima*	39,563	10,765
Long-tailed Duck *Clangula hyemalis*	155,422	86,334
Common Scoter *Melanitta nigra*	7,116	4,655
Velvet Scoter *Melanitta fusca*	32,513	19,581
Red-breasted Merganser *Mergus serrator*	556	449
Goosander *Mergus merganser*	22	3
White-tailed Eagle *Haliaeetus albicilla*	1	1
Great Skua *Stercorarius skua*	1	
Little Gull *Larus minutus*	75	61
Black-headed Gull *Larus ridibundus*	10	8
Common Gull *Larus canus*	975	878
Herring Gull *Larus argentatus*	2,006	1,886
Great Black-backed Gull *Larus marinus*	64	55
Glaucous Gull *Larus hyperboreus*	1	1
Undet. Gull *Larus spp.*	1,971	443
Guillemot *Uria aalge*	55	37
Razorbill *Alca torda*	147	106
Guillemot/Razorbill *Uria aalge/Alca torda*	19	
Black Guillemot *Cepphus grylle*	918	799
Sum *Summa*	243,592	127,069

Appendix 2

The angle/distance corrector shows the different bands and distances to each band at different observation angles from the ship, in the lower left corner.

Vinkel/avstånds-korrigeraren visar de olika banden och avstånden till varje band vid olika observationsvinklar från fartyget, i nedre vänstra hörnet.



Sammanfattning

Havsfåglars utbredning och antal i valda delar av Östersjön, vintern 1992

I denna uppsats presenteras huvudresultaten från en skeppsbaserad inventering av utvalda delar av Östersjön från den 27 januari - 10 mars 1992. Tidigare har främst kustnära områden inventerats via räkningar från land och lågskaliga flyginventeringar i kustnära områden, organiserade av IWRB (International Waterfowl and Wetlands Research Bureau). Även om en del av dessa inventeringar täckte större delar av de grundare havsområdena (främst i Danmark, Sverige och västra Tyskland) var stora och väsentliga delar av Östersjön oinventerade. På grund av detta har flera arter misstänkts vara klart underskattade i antal (eg. Laursen 1989).

Metoder och undersökningsområde

Data insamlades från skepp, med hjälp av en standardmetod som inkluderar "snapshots" (frusna ögonblicksbilder), för att minska feluppskattningar orsakade av flygande fåglar (Webb & Durinck 1993). Fåglar räknades i 10 minuters intervaller och observationerna delades in i 5 band (transekter) parallellt med båtens färdriktning, 1: från skeppet till 50 meter ut, 2: 50 m - 100 m, 3: 100 m - 200 m, 4: 200 m - 300 m och 5: > 300 m. Endast fåglar innanför 300 m har använts vid täthetsberäkningarna (fåglar/km^2). Fåglar som följt båtar har uteslutits från beräkningarna. För att tydligt kunna avgränsa de olika populationerna har vi i hela undersökningsområdet seglat i sicksack, vanligtvis förbi 30 meters djupkurva och därmed har vi oftast funnit de yttre gränserna. De inre gränserna kan vi för vissa arter inte ange då vi sällan kunde segla på grundare vatten än 6-7 meter. Detta i kombination med att vissa fåglar dyker vid räkningstillfället gör att samtliga populationsuppskattningar skall betraktas som försiktiga. Vi använde ett 340 bruttoregistertons räddningsskepp för denna undersökning.

Observationseffektiviteten avtar med avståndet till skeppet olika mycket för olika arter, speciellt mycket för små och/eller mörka fåglar. Detta kan beräknas genom att jämföra antalet observerade fåglar i band 1+2 med antalet observerade fåglar i band 3 respektive 4. Exempelvis var antalet sillgrisslor i band 3 och band 4, 82% respektive 35% av antalet observerade fåglar i band 1+2. Vi har kompenserat för denna effekt. I täthetsberäkningarna antages att observatörerna bedömt avstånden kor-

rekt. Vi använde en "range finder" (pinnmetoden) för regelbunden avståndskontroll. De flesta fåglarna observeras framför och vid olika vinklar från båten. Avståndet till respektive band är därför beroende av observationsvinkeln i förhållande till båtens längsaxel. Vi använde därför en för ändamålet tillverkad vinkel-avståndskorrigerare, (Appendix 2). Exempelvis befinner sig en fågel på den yttre gränsen av band 4 om den observeras med en vinkel av 18° och ett avstånd på 1000 m.

Endast ett förhållandevis litet antal havsfåglar nyttjar de djupare delarna av Östersjöns områden (Ornis Consult, opubl. data). På grund av detta lade vi våra huvudinventeringsområden i de grundare kustområdena utmed det europeiska fastlandet och samtliga bankar upp till 59° N (Gotska Sandön - Saaremaa). Transektlinjerna var planerade i förväg (Fig. 2).

Resultat och diskussion

Smålom/Storlom: Totalt uppskattades drygt 26.000 lommar i studieområdet (Tab. 1). De högsta tätheterna uppskattades i estniska vatten väst om Saaremaa, i Irbesundet och i de östliga delarna av Rigabukten. 14% av lommarna artbestämdes och det var uteslutande smålommar som noterades norr om Kursioreveln, de södra delarna av Pommernbukten, området väst om Rügen samt i Kielbukten. Den totala uppskattningen för smålom i dessa områden blev drygt 19.000 individer. Storlommar dominerade på Rönne Banke, Stolpe Banke och de östliga delarna av Pommernbukten. Storlommarna verkar förekomma längre ut från kusterna än smålommarna. Dessa mängder lommar under vintern i Östersjön är helt ny kunskap. Tidigare inventeringar har visat på norra delen av Tyska Bukten, med maximalt 25.000 lommar, och Kattegatt, med ca 5.000 individer, som de viktigaste områdena för lommar i nordvästra Europa (Laursen et al. in prep.). Tillsammans med vår uppskattning blir nu det nordvästeuropeiska beståndet 43.500 smålommar och 15.500 storlommar (Danielsen et al. in press). Det baltiska beståndet utgör då 44% av totalantalet och de tre viktigaste områdena (Pommernbukten, Rigabukten och Irbesundet) har vart och ett mer än 10% av det nordvästeuropeiska beståndet.

Skäggdopping: Uppträdde främst på grunt vatten och nära kusterna. Vi uppskattade 1250 individer, med Kielbukten som det viktigaste området. På grund av skäggdoppingens dragning till kustnära och grunda områden, är vår inventering inte representativ för den verkliga vinterutbredningen. Den övervintrar även i sötvatten under milda vintrar. Under den kalla vintern 1986/87 uppskattades 9.500 individer i västra Östersjön (Laursen et al. in prep.).

Gråhakedopping: Dess utbredningsområden påminner om skäggdoppingens, dock verkade de ligga längre ut från land, varför vi anser att vår uppskattning på knappt 1.800 individer representerar det verkliga beståndet. Pommernbukten var det klart viktigaste området med 2/3 av samtliga individer. Gråhakedoppingen övervintrar främst i marina habitat (Laursen et. al. in prep.). Förutom Pommernbukten är den enda kända vinterkoncentrationen i nordvästra Kattegatt, med ett maximum på 3.600 individer (Laursen et al. in prep.).

Svarthakedopping: Likt gråhakedoppingen uppskattades en mycket stor majoritet av individerna i Pommernbukten, ca 95% av knappt 2.000 individer. Kanske har vi täckt huvudkoncentrationerna i undersökningsområdet, men tätheterna avtog med avståndet från land. Svarthakedoppingen övervintrar också i sötvatten och i grunda kustnära områden (Cramp & Simmons 1977), varför vår uppskattning sannolikt endast utgör en del av den totala populationen i Östersjön.

Ejder: Kielbukten och angränsande delar i västra Fehmarn Bält var de viktigaste områdena med ca 200.000 individer. De kustnära områdena har inte täckts väl av denna inventering. Äldre inventeringar framhäver västra delarna av Östersjön, de danska Bälten och Kattegatt som huvudutbredningsområden (Meissner opubl. data, Laursen in prep. och Ornis Consult opubl. data). Den danska delen av Kielbukten, vilken inte täcktes av vår inventering, innehåller minst 100.000 individer (Laursen et al. in prep.) Den Västra Palearktiska populationen har nyligen uppskattats till 3 miljoner fåglar (Laursen 1989).

Alfågel: Uppskattningen av den övervintrande populationen i Östersjön var ett av huvudresultaten från vår inventering, och ökade den totala uppskattade populationen för hela Västra Palearktis med ca 1,5 miljoner individer. I vårt undersökningsområde uppskattades ca 2,5 miljoner individer. Vi kunde urskilja tre stora huvudområden som tillsammans innefattade 82% av det totala beståndet: Pommernbukten - Rönne Banke (925.000 individer), de östliga delarna av Rigabukten med Irbesundet (746.000 individer) och Hoburg - Midsjöbankarna (426.000 individer). Den svenska östkusten inklusive Öland, vilka inte inventerades i denna undersökning, har en vinterpopulation på ca 100.000 individer (Nilsson 1980). De isfria områdena i den

oinventerade nordligaste delen av Östersjön, Finska viken och Bottenhavet höll sannolikt också en del alfåglar, vilket gör det troligt att vår totaluppskattning är lägre än den sanna för hela innanhavet.

Sjöorre: Den största koncentrationen uppskattades väst om Fehmarn med ca 50.000 av totalt 80.000 uppskattade individer. Vi kunde konstatera en tydlig västlig utbredning med 83% av individerna väster om Rügen. I Pommernbukten fanns ca 10.000 individer och utöver detta noterades den endast i Rigabukten, med ca 600 individer. I de flesta områdena fanns det fler individer på grundare vatten än vi kunde segla i (<8 meter) varför vår uppskattning är en minimisiffra. Det viktigaste vinterområdet för sjöorre i Nordvästeuropa är nordvästra Kattegatt, med 670.000 individer 1992 (Rose 1992). Samtidigt uppskattades 115.000 individer utanför danska och tyska Waddensee, varför beståndet i Västra Palearktis bör överstiga 900.000 individer.

Svärta: Liksom för alfågel kom vår inventering att mycket kraftigt öka uppskattningen av antalet övervintrande svärtor i Västra Palearktis. Fåglar sågs utmed hela den kontinentala kusten och ut till ett djup på ca 35 meter. Nästan samtliga individer (93%) uppskattades inom Pommernbukten (ca 285.000) och västra Rigabukten (ca 140.000). Från dessa områden har tidigare inga uppskattningar existerat. Laursen et. al. (in prep.) har tidigare påvisat en vinterkoncentration på ca 100.000 individer i nordvästra Kattegatt och i kustnära områden utanför Litauen har man funnit en population på ca 18.000 individer (Svazas & Vaitkus 1992). Den totala populationen i Västra Palearktis överstiger säkerligen 550.000 individer.

Småskrake: Var spridd i undersökningsområdet med flest individer i Fehmarn Bält, söder om Gotland, Gdanskbukten och väst om Rügen i nämnd ordning. Tidigare inventeringar visar att majoriteten av Östersjöns vinterbestånd finns spridd i små kustnära områden, framförallt i västra delen av Östersjön (Monval & Pirot 1989). Den Västpalearktiska populationen uppskattas till 150.000 individer (Monval & Pirot 1989).

Dvärgmås: Spridda förekomster och en liten koncentration runt Irbesundet visar på en liten vinterpopulation spridd över stora delar av Östersjön. Inom inventeringsområdet uppskattades ca 850 individer och förmodligen finns fler individer i de icke inventerade delarna av Östersjön.

Fiskmås: Rigabukten var ett tydligt vinterområde, med ca 10.500 av totalt ca 13.000 individer. Utanför detta område fann vi endast spridda och låga tätheter.

Gråtrut: Utan speciella koncentrationer var gråtruten relativt vanlig i alla områden med höga tätheter av andra arter (speciellt havsdykänder). Totalt uppskattade vi knappt 27.000 individer. Tätheterna varierade mellan 0,4 och 3,4 individer/km^2 med västra Rigabukten som undantag med 11,8 individer/km^2.

Havstrut: Totalt uppskattades ca 1.400 individer i undersökningsområdet, varav ca 1.300 i Pommernbukten. Vi fann en täthet på ca 0,5 individer/km i de grundare delarna av Östersjön.

Sillgrissla: Huvuddelen av observationerna gjordes söder om Bornholm och söder om Gotland. Tätheterna var låga, oftast under 1 individ/km^2. Anledningen till de relativt fåtaliga observationerna (ca 1.100 uppskattade) beror troligtvis på att inventerandet utfördes vid en tid på säsongen då många grisslor uppsökt sina häckningslokaler. Antagligen räknade vi endast ungfåglar. Huvudutbredningsområdena tycks ligga i djupare (> 50 meter) områden i närheten av häckningsområdena vid Ertholmene, öst om Bornholm och vid Stora och Lilla Karlsö, väst om Gotland (Ornis Consult, opubl. data). Lyngs (1992) uppskattade Östersjöns totala häckande bestånd till 13.000 par.

Tordmule: Nästan uteslutande observerad i de baltiska staternas vatten, där vi uppskattade knappt 3.400 individer. Utanför Lithauen var tätheten 1,4 fåglar per km^2. Höga tätheter finns i vatten nära häckningsområdena, Ertholmene och St. Karlsö (Ornis Consult opubl. data). Det verkar som om tordmulen övervintrar längre från häckningsplatserna än sillgrisslan. Lyngs (1992) nämner 425 par på Ertholmene, medan det inte existerar någon sentida uppskattning av populationen på St. Karlsö.

Tobisgrissla: Detta är den första uppskattningen av vinterpopulationen i Östersjön. Majoriteten av individerna fanns i vatten öster om Rügen med den högsta tätheten i Irbesundet. Den största populationen fanns i vatten utanför västra Polen med Stolpe Banke. Totalt uppskattades 26.300 tobisgrisslor i undersökningsområdet. Vissa delpopulationer kan ha missats. Den häckande populationens storlek är högst osäker, men kan ligga inom intervallet 10-20.000 par (Koskimies 1992). Vår uppskattning av vinterpopulationen till ca 26.000 individer är troligen ett minimum.