

Breeding gulls and terns in The Netherlands in 1992

Broedende meeuwen en sterns in Nederland in 1992

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Introduction

In 1992 a complete census of breeding gulls and terns in The Netherlands was attempted as part of the national breeding bird survey by 'Co-operating Organizations on Bird-census work in The Netherlands' (SOVON). Hundreds of volunteer observers and tens of professionals, employed by various institutions, were involved. After censuses in 1973-77 (Teixeira 1979) and 1979-85 (SOVON 1987), this was the third complete nationwide census of all gull and tern species. The census was supported by the Ministry of Agriculture, Nature Management and Fisheries and Central Statistics, The Netherlands (CBS). The census in the southwest Netherlands was also carried out as a part of the biological monitoring programme of the National Institute for Coastal and Marine Management (RIKZ). This paper summarises the 1992 census results on gulls and terns. Distribution and numbers are briefly compared with previous data. Full details are given in Van Dijk *et al.* (1994). Information on colonies in the Wadden Sea was taken from Dijkse (1993) and in the Delta area, SW-Netherlands from Meininger *et al.* (1993). For geographical position of localities mentioned in the text see figure 1.

Methods

The census was part of the 'Rare and Scarce Breeding Bird Census' (Bijzondere Soorten Project; BSP) and followed standardised methods (SOVON/CBS 1986). All potential breeding sites, often already known from census work

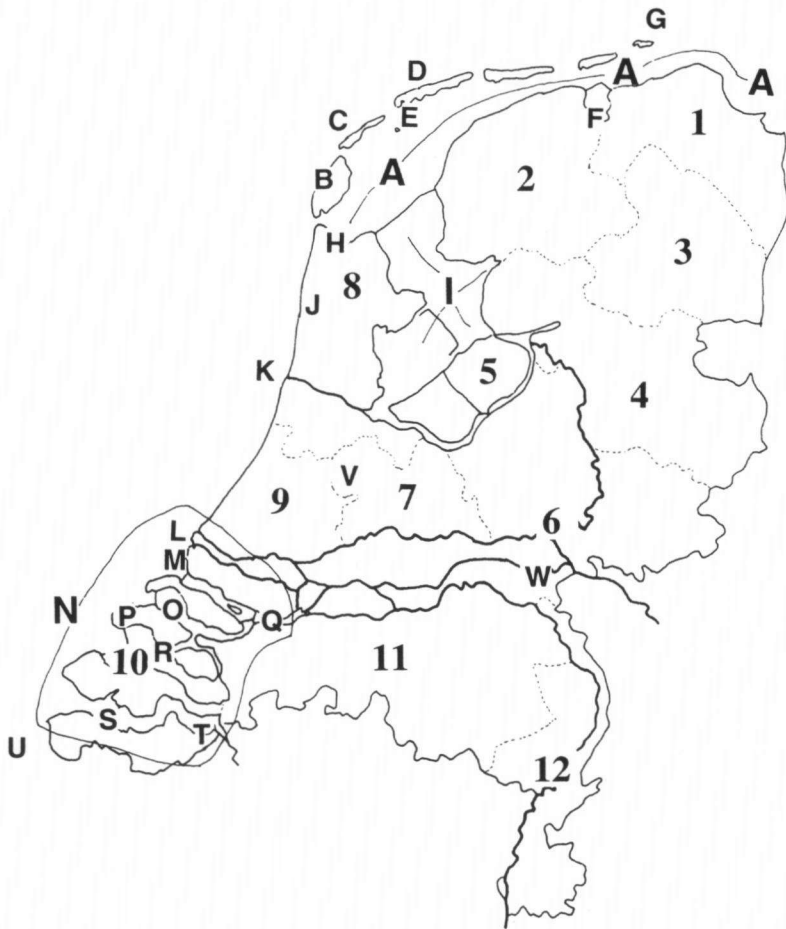


Figure 1. The Netherlands with twelve provinces and locations mentioned in the text. 1 Groningen, 2 Friesland, 3 Drenthe, 4 Overijssel, 5 Flevoland, 6 Gelderland, 7 Utrecht, 8 Noord-Holland, 9 Zuid-Holland, 10 Zeeland, 11 Noord-Brabant, 12 Limburg, A Wadden Sea, B Texel, C Vlieland, D Terschelling, E Griend, F Lauwersmeer, G Rottumerplaat, H Balgzand, I IJsselmeer, J Schoorl, K IJmuiden, L Europoort, M Voorne, N Delta area, O Grevelingen, P Schouwen, Q Krammer-Volkerak, R Oosterschelde, S Westerschelde, T Saefinge, U Zeebrugge, V Nieuwkoop and W Nijmegen.

Table 1. The number of breeding pairs of gulls and terns in The Netherlands counted in 1992 and estimates of the population in The Netherlands in 1992, 1979-85 (SOVON 1987) and 1973-77 (Teixeira 1979).

Tabel 1. Aantal broedparen van meeuwen en sterns in Nederland geteld in 1992 en schattingen van de Nederlandse populatie voor 1992, 1979-85 (SOVON 1988) en 1973-77 (Teixeira 1979).

Species	Counted 1992	Estimate 1992	Estimate 1979-85	Estimate 1973-77
Mediterranean Gull				
<i>Larus melanocephalus</i>	75	75	3-10	2-8
Little Gull				
<i>L. minutus</i>	1	1	30-45	7-61
Black-headed Gull				
<i>L. ridibundus</i>	155 667	170 000	225-275 000	>200 000
Common Gull				
<i>L. canus</i>	7856	7900	7000-12 500	7000
Lesser Black-backed Gull				
<i>L. fuscus</i>	34 181	34 200	19 000	9700
Yellow-legged Gull				
<i>L. cachinnans</i>	1	1-3	-	-
Herring Gull				
<i>L. argentatus</i>	88 740	90 000	90 000	53 000
Sandwich Tern				
<i>Sterna sandvicensis</i>	9379	9380	9100-10 000	4350-6100
Common Tern				
<i>S. hirundo</i>	15 456	17-18 000	15-19 000	> 10 000
Arctic Tern				
<i>S. paradisaea</i>	1816	1820	1000-1600	1200-1500
Little Tern				
<i>S. albifrons</i>	337	340	400-500	320
Black Tern				
<i>Chlidonias niger</i>	1123	1200-1400	1000-2000	2000-3000

in previous years, were visited at least once during a species-specific fixed period, at a moment when most pairs were expected to have eggs or recently hatched chicks. Usually, occupied nests were counted. If this was not possible, the number of breeding pairs was estimated (number of potential breeding birds present at the location, divided by two). In that case, the count was generally performed twice (or more) during a 10-20 days time span, and maximum numbers were used for the estimate. Counting errors through exchange of breeding birds between different colonies were minimised by counting only during the fixed period. Probably errors occurred at a small scale

due to flooding of nests, predation and human disturbance. In these cases double counts were generally avoided by best professional judgement, using earlier experiences.

Numbers of breeding pairs/nests were given per 2.5 x 2.5 km squares or sometimes for larger areas (e.g. an island). The information was checked and completed by regional organisers and SOVON staff members. Data-handling was done by SOVON and Central Statistics, in co-operation with RIKZ. In most species, coverage of colonies is expected to have been 90-100%. Some scattered inland colonies, holding per site up to some hundreds pairs of Black-headed Gull *Larus ridibundus*, tens of Common Tern *Sterna hirundo* and perhaps some tens of Black Tern *Chlidonias niger* as well, have been missed. For colonies likely to have existed in 1992, but which were not surveyed that year, estimates were made based on information gathered in 1990-91 or 1993.

Species accounts

The population size of gulls and terns in The Netherlands in 1992 and in 1973-85 is given in table 1.

Mediterranean Gull *Larus melanocephalus*

The Mediterranean Gull's stronghold in The Netherlands is the Delta area, with 61 pairs in 1992; an additional 45 pairs were present just across the border in Belgium (Meininger *et al.* 1993). Elsewhere 14-16 pairs were found, mainly along the IJsselmeer, in the Wadden Sea area and more inland (Nijmegen, SE-Brabant). The species has bred annually in the country since 1970. In the 1980s the population increased markedly from approximately ten to 90 pairs and in 1991 112 pairs were counted (Meininger & Bekhuis 1990, Meininger *et al.* 1993).

Little Gull *Larus minutus*

One nest was found in the Delta area, but no chicks hatched (Meininger 1992, 1995). In 1989-91 only single breeding attempts were recorded in the Wadden Sea area (Dijksen 1992). In the 1970s and 1980s, however, a colony of up to at least 60 pairs was found in the Lauwersmeer, Groningen (Veen 1980, SOVON 1987).

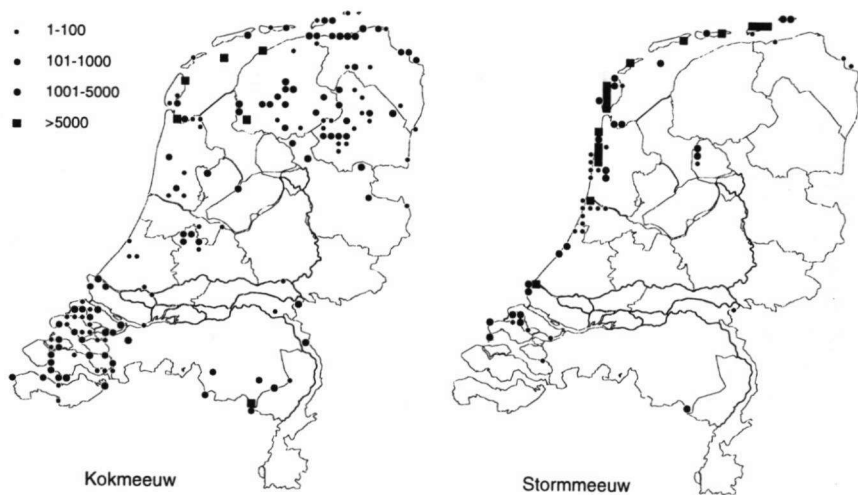


Figure 2. Breeding distribution per 2.5 x 2.5 km square of Black-headed Gull *Larus ridibundus* and Common Gull *L. canus* in 1992 in The Netherlands.

Figuur 2. Verspreiding per 2.5 x 2.5 km² hok van broedende Kok- en Stormmeeuwen in 1992 in Nederland.

Black-headed Gull *Larus ridibundus*

The Black-headed Gull is the most widely distributed and least marine gull species in The Netherlands (figure 2) and by far the most numerous one too. In 1992 the distribution was relatively dense in the north and southwest of the country. Six colonies held more than 5000 pairs, with a maximum number of 21 000 on the islet of Griend in the Wadden Sea. In parts of Noord- and Zuid-Holland, Flevoland, Friesland and Noord-Brabant some colonies have been missed or were not counted (approximately 10% of the population). In comparison with 1973-85 (Teixeira 1979, SOVON 1987) a contraction of the breeding distribution is obvious. Along the coast of Noord- and Zuid-Holland and along the IJsselmeer the species has nearly disappeared, whereas a lot of inland colonies (Drenthe) have been abandoned as well.

The estimated total of 170 000 pairs in 1992 is well below the maximum population size of 225 000-275 000 in 1979-85. By 1990 the number had al-

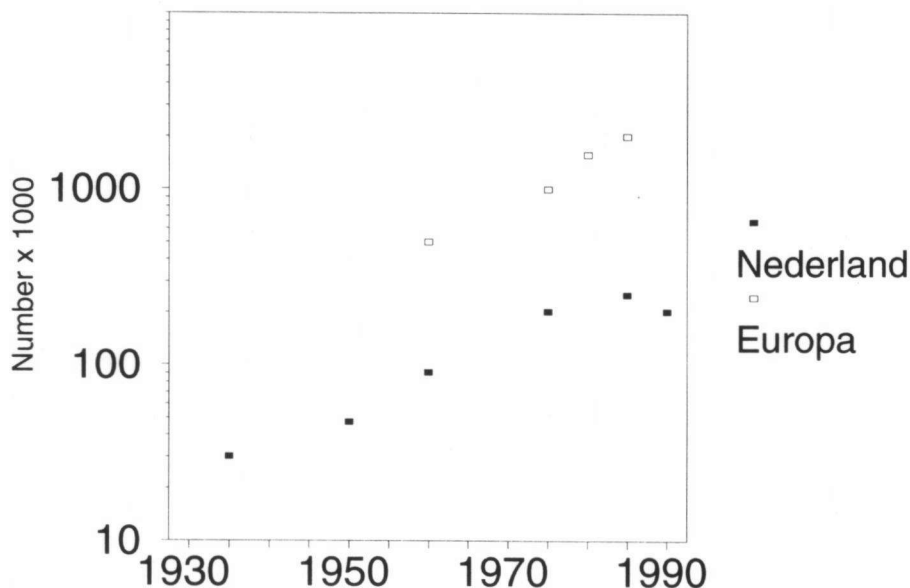


Figure 3. Breeding population of Black-headed Gull *Larus ridibundus* in The Netherlands (Higler 1962, Teixeira 1979, SOVON 1987) and in Europe (Isenmann et al. 1991).

Figuur 3. De ontwikkeling van de broedvogelpopulatie van de Kokmeeuw in Nederland (Higler 1962, Teixeira 1979, SOVON 1987) en in Europa (Isenmann et al. 1991).

ready dropped to approximately 200 000 pairs (SOVON unpubl.). In the 20th century, the population of the Black-headed Gull increased considerably in The Netherlands, as well as elsewhere in Europe (figure 3).

Common Gull *Larus canus*

The Netherlands are situated at the southern limit of the species' breeding range. Since its appearance as a breeding bird in the early part of the 20th century, the distribution has been mainly restricted to the North Sea coast (figure 2). About 50% of the population in 1992 bred in the Wadden Sea, 38% along the coast of Noord- and Zuid-Holland and 11% in the Delta area. Small numbers (c. 50 pairs) were recorded at a few inland sites. The largest colony in the dunes near Schoorl (Noord-Holland) only held 800 pairs in

1992, compared to 6000 in 1985. In recent years the Common Gull has become more widespread in the hinterland of the North Sea coast, due to predation by Red Fox *Vulpes vulpes* in the dunes (Costers 1992, Woutersen 1992, Woutersen & Roobeek 1992). At the newly occupied (fox-free) sites, nests are found on buildings, within fenced areas and on agricultural land. The total population has dropped from a maximum of 12 500 pairs in 1985 to 7900 in 1992.

Lesser Black-backed Gull *Larus fuscus*

The distribution of the Lesser Black-backed Gull is almost entirely restricted to coastal areas (figure 4). For many years the largest colony has been on the island of Terschelling in the Wadden Sea; in 1992 11 500 pairs were counted here. Almost half of the Dutch population breeds in the Wadden Sea and the other half in the Delta area. The coastal dunes in-between these areas held only 500 pairs, much less than in the 1980s, when up to 3000 pairs were counted here. The sharp decline in the latter area was caused by predation by Red Fox. In some areas in or near the dunes Lesser Black-backed Gulls have started to breed on buildings and within fenced areas. Inland breeding is rare. The species has colonised The Netherlands in the 1920s. Since the 1960s the population increase has accelerated from 1500 pairs in 1970 and 12 000 in 1980 to 34 000 in 1992. In the Wadden Sea numbers have stabilised since the mid-1980s, whereas in the Delta area the increase continues (figure 5). It has been suggested that in the competition for food the Lesser Black-backed Gull is more successful than the Herring Gull (Spaans & Noordhuis 1989), but observations by Camphuysen (1994) did not support this conclusion.

Yellow-legged Gull *Larus cachinnans*

As the Mediterranean population of the Yellow-legged Gull has expanded northwards, breeding in The Netherlands was expected. Since 1987 mixed pairs with Lesser Black-backed Gull have been reported at IJmuiden. In 1992 a mixed pair raised two young there (Cottaar & Verbeek 1994).

Herring Gull *Larus argentatus* (Fig. 2)

The distribution map of the Herring Gull shows a concentration along the North Sea coast (figure 2). In 1992, approximately 57% of the population was found in the Wadden Sea, 33% in the Delta area and 10% in Noord- and

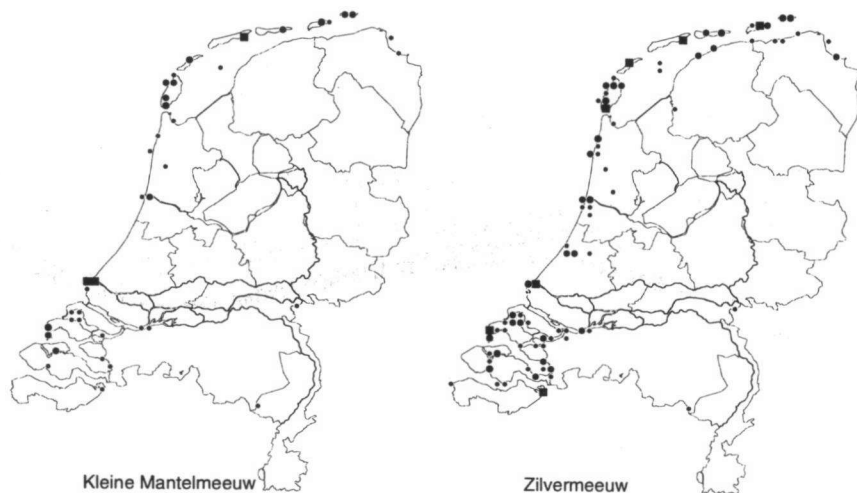


Figure 4. Breeding distribution per 2.5 x 2.5 km square of Lesser Black-backed Gull *Larus fuscus* and Herring Gull *L. argentatus* in 1992 in The Netherlands.

Figuur 4. Verspreiding per 2.5 x 2.5 km² hok van broedende Kleine Mantel- en Zilvermeeuwen in 1992 in Nederland.

Zuid-Holland. Six colonies held over 5000 pairs: Terschelling (largest with 13 800 pairs), Texel, Vlieland, Saeftinge, Schouwen and Europoort. Inland breeding was reported near Nijmegen (4 pairs) and in SE-Brabant (11). Since the mid 1980s colonies in the dunes along the coast of Noord- and Zuid-Holland have become virtually deserted due to predation by Red Fox (figure 5). The 1992 distribution in this area was largely restricted to rooftops of buildings in cities and fenced areas, such as IJmuiden (2000 pairs) and Leiden (hundreds). These urban colonies often cause problems for the human population and sometimes persecution is implemented. The total number of 90 000 pairs in 1992 demonstrates the stabilisation of the population after a long period of increase. In 1985 (90 000 pairs) and 1990 (85 000) about the same numbers were counted. In the past ten years marked regional differences appeared. In the Wadden Sea numbers stabilised or dropped slightly, in the Delta area numbers nearly doubled, while along the coast of Noord- and Zuid-Holland the population collapsed.

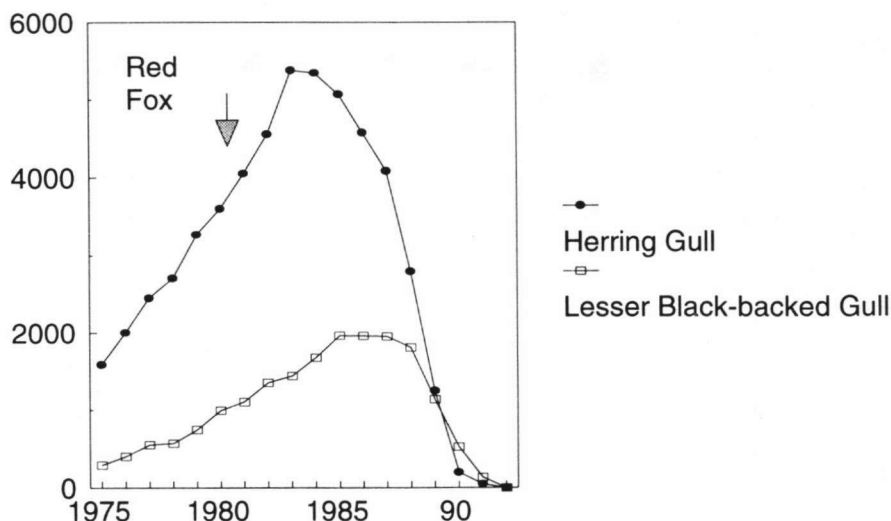


Figure 5. Number of breeding pairs of Lesser Black-backed Gull *Larus fuscus* and Herring Gull *L. argentatus* in the colony Meijndel near The Hague, showing the influence of the invading Red Fox *Vulpes vulpes* (after Bouman et al. 1991).

Figuur 5. Aantal broedparen Kleine Mantel- en Zilvermeeuw in Meijndel, en het effect van de komst van de Vos in het gebied (naar Bouman et al. 1991).

Sandwich Tern *Sterna sandvicensis*

In 1992 9380 pairs were counted at five sites in the Wadden Sea and Delta areas: Griend (6600 pairs), Balgzand (1), Vooorne (3), Grevelingen (1575) and Hooe Platen, Westerschelde (1200). Since the 1980s there has been a shift of breeding pairs from the Delta area to nearby Belgium; in 1992 1100 pairs were found at Zeebrugge (De Scheemaeker & Defoort 1992, Meininger et al. 1993). This largely explains why the 1992 total in The Netherlands was smaller than the totals of 10 000-12 500 in 1989-91.

In 1955-56 the population in The Netherlands consisted of 30 000-35 500 pairs. After an all-time low of 875 pairs in 1965, the population recovered only slowly, but never reached its previous level (Brenninkmeijer & Stienen 1992).

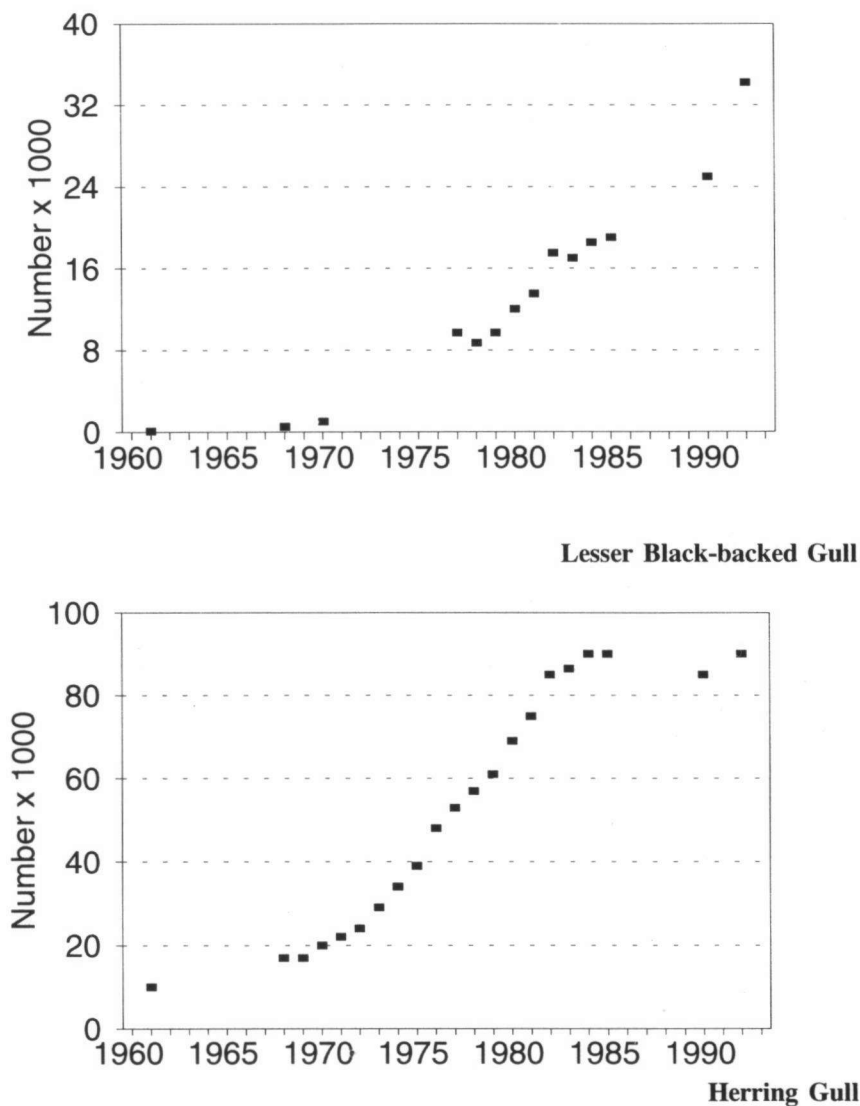
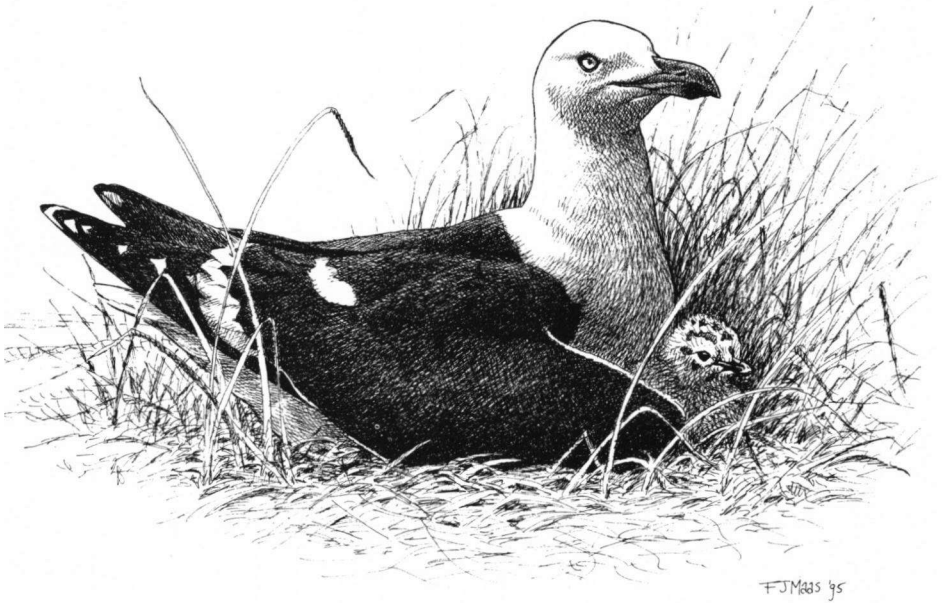


Figure 6. Breeding population of Lesser Black-backed Gull *Larus fuscus* and Herring Gull *L. argentatus* in The Netherlands (Spaans & Noordhuis 1989, SOVON 1992).
 Figuur 6. Broedvogelpopulatie van Kleine Mantel- en Zilvermeeuw in Nederland (Spaans & Noordhuis 1989, SOVON 1992).



Kleine Mantelmeeuw *Lesser Black-backed Gull*

F.J. Maas

Common Tern *Sterna hirundo*

The Common Tern is well distributed over the coastal areas and also occurs at some inland lakes and along rivers (figure 7). Most of the population in 1992 was found in the Wadden Sea (38%) and Delta area (35%). The largest colony was located on Griend (2200 pairs), whereas five colonies held 900 to 1275 pairs. In 1992 15 500 pairs were counted, but the census was incomplete. In parts of Noord- and Zuid-Holland, Flevoland, Friesland and Over-

ijssel some colonies or isolated breeding pairs were missed or not counted. The estimated total for 1992 is 17 000-18 000 pairs. In comparison with the distribution as shown by Teixeira (1979), a withdrawal from inland sites such as Drenthe, Noord-Brabant and along the rivers is obvious.

In the 1980s the population was estimated at between 11 000-19 000 pairs, while in the 1950s some 40 000 pairs must have bred in the country. Within ten years the population sharply dropped to a minimum of 5000 in 1965, after which the population at least partly recovered (Stienen & Brenninkmeijer 1992).

Arctic Tern *Sterna paradisaea*

As The Netherlands are situated at the southern limit of the species' breeding range, it holds a relatively small population. In 1992 nearly all Arctic Terns bred in the Wadden Sea (figure 7), with the largest colonies on Griend (800 pairs), along the mainland coast of Friesland (400) and on Rottumerplaat (237). The Delta area held only 41 pairs.

The total of 1820 pairs in 1992 exceeds population estimates in the past twenty years. In 1973-85 population estimations varied between 1000 and 1600 pairs. In 1989-91, however, numbers dropped to 850-1200 (Osieck & Hustings 1994). Fluctuations are partly due to the erratic distribution and changing numbers between years, but are also related to identification problems in mixed colonies of Arctic and Common Tern. In 1992 these identification problems were largely tackled.

Little Tern *Sterna albifrons*

The distribution of the Little Tern is restricted to the Wadden Sea (32%) and Delta areas (68%) (figure 8). Most colonies held less than 20 pairs while five held more than 25 pairs, with the largest in the Westerschelde and Krammer-Volkerak (both 80 pairs).

The total population of 340 pairs in 1992 was slightly smaller than the 400 pairs in the 1980s (Arts & Meininger 1993), but higher than the 253 pairs counted in 1991. According to Arts & Meininger (1993), it is likely that the breeding population in The Netherlands in 1900-55 never exceeded 1000 pairs. This is in contradiction with the estimates of 2000-4000 pairs in 1900-10 and 1000-2500 in 1955 mentioned in Cramp (1985). It is clear that, as in other terns, a sharp decrease took place in the 1950s and 1960s, leading to a reduced population of only 100 pairs in 1967.

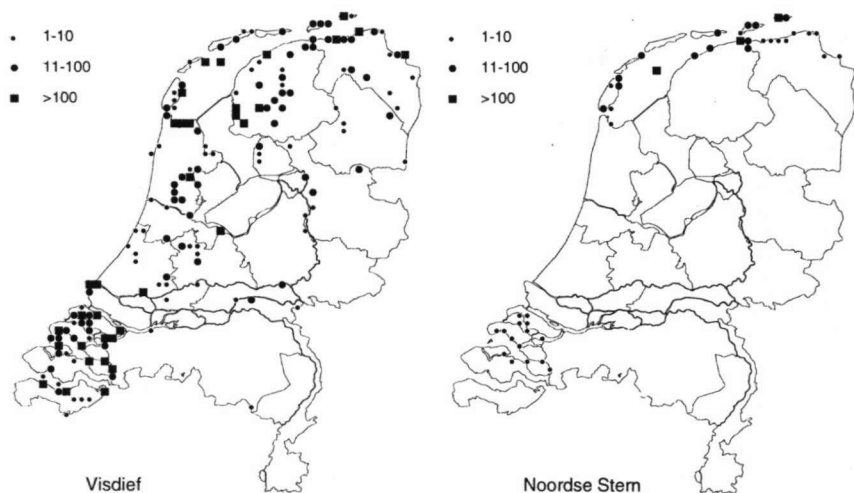


Figure 7. Breeding distribution per 2.5 x 2.5 km square of Common Tern *Sterna hirundo* and Arctic Tern *S. paradisaea* in 1992 in The Netherlands.

Figuur 7. Verspreiding per 2.5 x 2.5 km² hok van broedende Visdieven en Noordse Sterns in 1992 in Nederland.

Black Tern *Chlidonias niger*

The distribution of the Black Tern is restricted to inland marshes (figure 8), where often well-spread colonies are found in peat bogs, pools and fens. While most colonies held less than 20 pairs, seven held 40-65 pairs and the largest one, near Nieuwkoop, 130 pairs. In 1992 1123 pairs were counted, but when insufficient coverage in parts of Friesland and probably some other areas is taken into account, the population must have been somewhat larger, probably 1200-1400 pairs.

This century the Black Tern has shown a considerable decrease. In the *Atlas of Breeding Birds* the species was shown to be more widely distributed and the population was estimated at 2000-3000 pairs (Teixeira 1979). This number perhaps represents only about 10% of the population at the beginning of the 20th century.

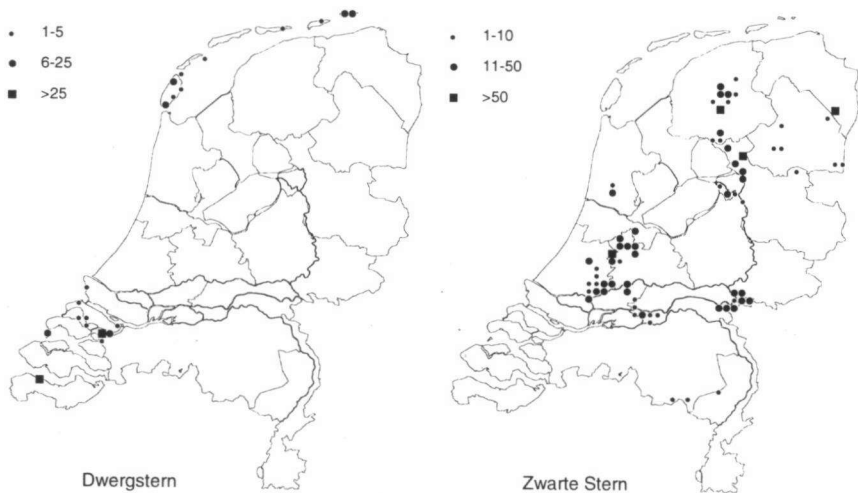


Figure 8. Breeding distribution per 2.5 x 2.5 km square of Little Tern *Sterna albifrons* and Black Tern *Chlidonias niger* in 1992 in The Netherlands.

Figuur 8. Verspreiding per 2.5 x 2.5 km² hok van broedende Dwergsternen en Zwarte Sterns in 1992 in Nederland.

Discussion

Localising colonies of gulls and terns is usually not the biggest problem that birdwatchers in The Netherlands have to cope with. However, in some remote areas that are difficult to reach (islets and marshes in tidal areas, some large polders) problems may occur. The recent colonisation by gulls of built-up areas has been poorly documented in several regions. A serious source of inaccuracy is connected with counting of huge, often mixed-species colonies, sometimes distributed over large areas. In recent years, standardisation of counting methods has improved, and some colonies were counted by aerial surveys, but still estimates of a few colonies are subject to discussion. Nevertheless, it is without doubt that the census in 1992 was one of the most accurate and complete ever in The Netherlands.

The census provides a good starting point for annual nationwide monito-

ring of all gull and tern species. For Herring Gull, Lesser Black-backed Gull, Common Gull and Sandwich Tern such censuses have already been in practice for some tens of years (e.g. Spaans & Noordhuis 1989, Rooth 1989). In some other species an attempt at reconstructing population changes in the period of 1950-1990 is undertaken by collecting all available census data from various sources. In Little Tern, Sandwich Tern and Common Tern this proved to be successful, providing fairly precise patterns of population changes (Arts & Meininger 1993, Brenninkmeijer & Stienen 1992, Stienen & Brenninkmeijer 1992).

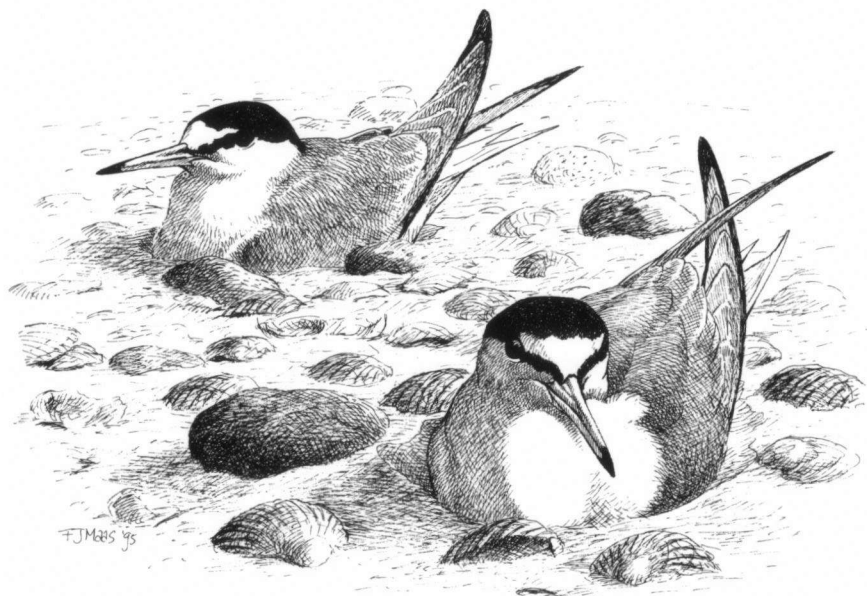
Long term census work is important to clarify the causes behind population changes. A well known example is the enormous decline of tern populations in The Netherlands in the 1950s and 1960s, caused by chemical pollution of surface waters (Koeman 1971, Veen & Faber 1989). On the other hand it has been suggested that the dramatic population increase of most gull species during this century has been made possible by conservation measures (Croxall *et al.* 1984). The recent stabilisation of several gull populations in The Netherlands is not yet completely understood or is subject to speculation. The Herring Gull's decline is perhaps related to the competition for food with the Lesser Black-backed Gull (Spaans & Noordhuis 1989), although recent investigations do not yet confirm this view (Camphuysen 1994). Strong and persistent predation by Red Fox explains the disappearance of large gull colonies in the dunes of Noord- and Zuid-Holland (Bouwman *et al.* 1991, Woutersen 1992). The decrease of inland populations of Black-headed Gull, Common Tern and Black Tern is probably partially related to modern agricultural practices (less food supply, desiccation, topdressing).

Acknowledgements

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Samenvatting

In 1992 werd door SOVON getracht om een volledige inventarisatie uit te voeren van de in Nederland broedende meeuwen en sterns. Honderden vrijwilligers en enkele



Dwergsterms *Little Terns*

F.J. Maas

tientallen professionele ornithologen waren bij deze tellingen betrokken. Na de inventarisaties in 1973-77 (Teixeira 1979) en 1979-85 (SOVON 1987) was dit de derde landelijke inventarisatie van alle soorten meeuwen en sterns. De verspreiding van de kolonies en de getelde aantallen worden in het kort vergeleken met de oudere gegevens. Meer details worden gegeven in het door SOVON in 1994 uitgebrachte verslag (Van Dijk et al. 1994). De getelde en geschatte aantallen meeuwen en sterns voor 1992 zijn weergegeven in tabel 1, waarin tevens de schattingen van de beide eerdere surveys zijn afgedrukt. Spectaculair is de toename van de populatie Zwartkopmeeuwen in Nederland (2-8 paren in 1973-77, 3-10 paren in 1979-85, 75 paren in 1992). De Dwergmeeuw, daarentegen, is verdwenen als broedvogel (respectievelijk 7-61 paren, 30-45 paren, 1 paar). De Kokmeeuw stabiliseerde of nam zelfs iets af en ook de Stormmeeuw heeft zijn hoogtepunt kennelijk in de jaren tachtig gehad. De

Kleine Mantelmeeuw nam sterk toe (9700 paren, 19 000 paren, 34 000 paren), terwijl de Zilvermeeuw min of meer op het halverwege de jaren tachtig vastgestelde niveau stabiliseerde (53 000 paren, 90 000 paren, 90 000 paren). De Grote Stern is sinds het midden van de jaren tachtig niet verder toegenomen en overschreed daardoor de grens van 10 000 paren niet, de populatie van de Visdief stabiliseerde op ongeveer 17 500 paren. Het aantal Dwergsterns was met 340 paren iets kleiner dan in de jaren tachtig, toen naar schatting 400 paren tot broeden kwamen. In vergelijking met 1991, toen slechts 253 paren werden geteld, is het evenwel een goed herstel. De Zwarte Stern is in de loop van de twintigste eeuw sterk afgenomen. In 1992 kwamen nog slechts 1200-1400 paren tot broeden in ons land.

Vermoed wordt dat de meeste kolonies meeuwen en sterns wel bekend zijn, maar in enkele afgelegen gebieden kunnen nog onontdekte vestigingen te vinden zijn. De recente kolonisatie van dorpen en steden door dakenbroedende meeuwen is nog onvoldoende gedocumenteerd en de ontwikkelingen gaan razendsnel. De inventarisatie van 1992 was vermoedelijk de meest complete telling die in Nederland ooit werd uitgevoerd en de telling kan als een beginpunt worden gezien van een monitoringprogramma. Het belang van lange-termijn series werd duidelijk in de jaren zestig, toen de populaties van de meeste meeuwen en sterns enorm terugliepen na vergiftiging van het milieu met in de Rijn geloosde pesticiden.

Literature

- Arts F. & Meininger P.L. 1993. De broedpopulatie van de Dwergstern in Nederland in de 20e eeuw: een reconstructie. In: Boer T.E. den, Arts F., Beijersbergen R.B. & Meininger P.L. (eds) Actieplan Dwergstern: 7-16. Actierapport 8, Vogelbescherming Nederland, Zeist.
- Bouman A.E., Bruijn G.J. de, Hinsberg A. van, Sevenster P., Wanders E.A.J. & Wanders R.M. 1991. Meeuwen, opkomst en ondergang van een meeuwenkolonie. Wet. Med. 204, Kon. Ned. Natuurhist. Ver., Utrecht.
- Brenninkmeijer A. & Stienen E.W.M. 1992. Ecologisch profiel van de Grote Stern (*Sterna sandvicensis*). RIN-rapport 92/17. DLO-Instituut voor Bos- en Natuuronderzoek, Arnhem.
- Camphuysen C.J. 1994. Flatfish selection by Herring Gull *Larus argentatus* and Lesser Black-backed Gull *L. fuscus* at commercial beamtrawlers in the southern North Sea. Neth. J. Sea Res. 32: 91-98.
- Costers R. 1992. Hoe vergaat het de Stormmeeuw *Larus canus* bij Petten? Sula 6: 93-99.
- Cottaar F. & Verbeek K. 1994. Geelpootmeeuw met Kleine Mantelmeeuw broedend te IJmuiden. Dutch Birding 16: 231-239.
- Cramp S. (ed.) 1985. The birds of the Western Palearctic, IV. Oxford Univ. Press, Oxford.
- Croxall J.P., Evans P.G.H. & Schreiber R.W. (eds.) 1984. Status and conservation of the world's seabirds. ICBP Tech. Publ. 2. International Council for Bird Preservation, Cambridge.
- De Scheemaeker F. & Defoort T. 1992. Broedvogels in Noordwest-Vlaanderen in 1992. Mergus 6: 213-228.
- Dijk A.J. van, Hustings F. & Verstraal T. 1994. SOVON Broedvogelverslag 1992. SOVON-monitoringrapport 1994/03. SOVON, Beek-Ubbergen.
- Dijkens L.J. 1993. Broedvogelmonitoring in het Nederlandse Waddengebied in 1992. SOVON-rapport 1993/05. SOVON, Beek-Ubbergen.
- Higler L.W.G. 1962. De census van de Kokmeeuw (*Larus ridibundus* L.) in Nederland, België en Luxemburg in 1961. Limosa 35: 260-265.
- Isenmann P., Lebreton J.D. & Brandl R. 1991. The Black-headed Gull in Europe. Acta XX Congr. Internat. Ornith. pp 2384-2389.
- Koeman J.H. 1971. Het voorkomen en de toxicologische betekenis van enkele

- chloorkoolwaterstoffen aan de Nederlandse kust in de periode van 1965 tot 1970. Thesis, Rijksuniversiteit Utrecht, Utrecht.
- Meininger P.L. 1992. Broedpoging van de Dwergmeeuw *Larus minutus* in het Krammer-Volkerak in 1992. *Limosa* 65: 170-171.
- Meininger P.L. 1995. Little Gulls breeding in south-western Netherlands. *Dutch Birding* 17: 152-154.
- Meininger P.L. & Bekhuis J.F. 1990. De Zwartkopmeeuw *Larus melanocephalus* als broedvogel in Nederland en Europa. *Limosa* 63: 121-134.
- Meininger P.L., Berrevoets C.M. & Strucker R.C.W. 1993. Kustbroedvogels in het Deltagebied in 1992 met een samenvatting van veertien jaar monitoring 1979-1992. Werkdocument GWAO-93.829X. Rijkswaterstaat Dienst Getijdewateren, Middelburg.
- Osieck E.R. & Hustings F. 1994. Rode lijst van bedreigde soorten en blauwe lijst van belangrijke soorten in Nederland. Techn. Rapport Vogelbescherming Nederland 12. Vogelbescherming Nederland, Zeist.
- Rooth J. 1989. De Nederlandse broedpopulatie van de Grote Stern *Sterna sandvicensis* in 1961-88. *Limosa* 62: 121-124.
- SOVON 1987. Atlas van de Nederlandse vogels. SOVON, Arnhem.
- SOVON/CBS 1986. Handleiding Bijzondere Soorten Project (broedvogels). Herziene versie. SOVON, Arnhem.
- Spaans A.L. & Noordhuis R. 1989. Voedselconcurrentie tussen Kleine Mantelmeeuwen en Zilvermeeuwen. In: Spaans A.L. (ed.) *Wetlands and watervogels*: 35-47. Pudoc, Wageningen.
- Stienen E.W.M. & Brennkmeijer A. 1992. Ecologisch profiel van de Visdief (*Sterna hirundo*). RIN-rapport 92/18. Rijksinstituut voor Natuurbeheer, Arnhem.
- Teixeira R.M. 1979. Atlas van de Nederlandse broedvogels. Natuurmonumenten, 's-Graveland.
- Veen J. 1980. Breeding behaviour and breeding success of a colony of Little Gulls *Larus minutus* in The Netherlands. *Limosa* 53: 73-83.
- Veen J. & Faber J. 1989. Sterns: een bedreigde vogelgroep? In: Spaans A.L. (ed.) *Wetlands and watervogels*: 19-33. Pudoc, Wageningen.
- Woutersen K. 1992. De Stormmeeuw *Larus canus* als broedvogel in de Schoorlse Duinen. *Sula* 6: 81-92.
- Woutersen K. & Roobeek C.F. 1992. Broedgevallen van de Stormmeeuw *Larus canus* in het binnenland van Noord-Holland. *Sula* 6: 51-55.

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