

THE HERRING GULL *LARUS ARGENTATUS* AS A BREEDING BIRD IN THE NETHERLANDS DURING THE 20TH CENTURY

DE ZILVERMEEUW ALS BROEDVOGEL IN NEDERLAND GEDURENDE DE TWINTIGSTE EEUW

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In The Netherlands, the number of Herring Gulls *Larus argentatus* increased from a few thousand breeding pairs in the beginning of the 20th century to a maximum of 89,000 pairs during the mid 1980s. Since then, numbers declined to 68,000 pairs in 1996. The increase took place with two spurts of growth, between the mid 1910s and the late 1930s (12.2% per annum), and between the late 1960s and the mid 1980s (11.5% per annum). The period in between is marked by a period of heavy persecution during the Second World War, large-scale culls of adults and extensive egg collecting between the mid 1940s and mid 1960s, and poisoning of gulls resulting from pollution of the Dutch coastal waters with organochlorine pesticides during the 1960s. Since the 1980s, numbers have developed differently between regions. In the Delta area, the number of breeding pairs stabilised in the 1980s, but then increased by 41% (2.8% per annum) to 31,000 pairs in 1996. In the Wadden Sea area, numbers also stabilised during the 1980s, but then declined by 40% (4.2% per annum) to 34,000 pairs in 1996, whereas those on the mainland North Sea coast increased until the mid 1980s and then decreased by 79% (12.3% per annum) to 2100 pairs in 1996. In the Wadden Sea, the underlying cause of the decline is a shortage of food. The numerical decline along the mainland North Sea coast resulted from a heavy and persistent predation by Red Foxes *Vulpes vulpes*. In 1997 and 1998, the largest colony in the country (Saefinghe, southwest Netherlands) numbered 10,000 and 9500 breeding pairs, respectively. Herring Gulls temporarily nested inland during the 1940s and have regularly done so from the 1960s onwards, with an average of 530 breeding pairs during the mid 1990s. Since the 1970s, the species has regularly nested on buildings in towns up to 25 km from the coast. In 1995-96, 1500 pairs nested on roofs of buildings. The food of coastal Herring Gulls consists predominantly of tidal invertebrates and marine fish (mainly discards), but terrestrial and dump feeding also frequently occurs. Inland colonies are completely terrestrial in their feeding habits. Colonies increasing in numbers show a higher reproductive output than colonies with stabilising or decreasing numbers.

INTRODUCTION

The Herring Gull *Larus argentatus* is an abundant and widespread breeding bird in north-west Europe. The total breeding population was recently estimated at

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900,000 breeding pairs (Rose & Scott 1997). In The Netherlands, at present, the Herring Gull is a common breeding bird, with the Wadden Sea and Delta areas as the main breeding areas. The present situation is very different from that in the beginning of the century, when the species was a scarce breeding bird, mainly of the Wadden Sea area. This paper deals with the changes in distribution and numbers of Herring Gulls breeding in The Netherlands during the 20th century, and with the underlying causes for these changes. For earlier reviews, the reader is referred to *e.g.* Haverschmidt (1942), Mörzner Bruijns (1958), Teixeira (1979) and Spaans *et al.* (1996).

METHODS

Unless otherwise stated, the data in this paper have been derived from the database on coastal breeding birds compiled by Arts (1993) for SOVON Vogelonderzoek Nederland and the Rijksinstituut voor Kust en Zee (RIKZ). This database is based on literature, unpublished reports and the annual censuses conducted during the present century. Before the 1920s, Herring Gull numbers were estimated only irregularly and locally. National censuses of Herring Gull colonies were carried out for the first time in the mid 1920s (Brouwer & Haverschmidt 1928), followed by some counts in the 1930s (Brouwer 1938). Since the mid 1940s, most colonies have been censused at an annual basis, first under the auspices of Staatsbosbeheer, in later years under the auspices of what is now the Instituut voor Bos- en Natuuronderzoek (IBN-DLO). Since 1990, data on colonial nesting species are collected by RIKZ and SOVON Vogelonderzoek Nederland. The data are presented in the same way as in the Lesser Black-backed Gull *L. graellsii* (see Spaans 1998b for details, and Fig. 1 in Spaans 1998a - page 122 of this issue - for a division of the country into regions).

RESULTS

Breeding numbers Early in the 20th century, Herring Gulls were anything but numerous in The Netherlands, with a total of 2300 breeding pairs. Numbers went even further down to an average of 1600 pairs during 1905-15. Since then, they increased to a maximum of 89,000 pairs during the mid 1980s (Fig. 1). The increase took place with two spurts of growth, between 1915 (1530 pairs) and 1939 (24,000 pairs), and between 1969 (17,000 pairs) and 1984 (89,000 pairs), which gives an annual increase in numbers of 12.2% and 11.5%, respectively. Between 1940 and 1969, numbers remained relatively stable, fluctuating between 13,000 and 24,000 pairs, with lowest numbers in 1943-44 and 1959, and highest numbers in 1954 and 1964. Since 1984, numbers decreased by

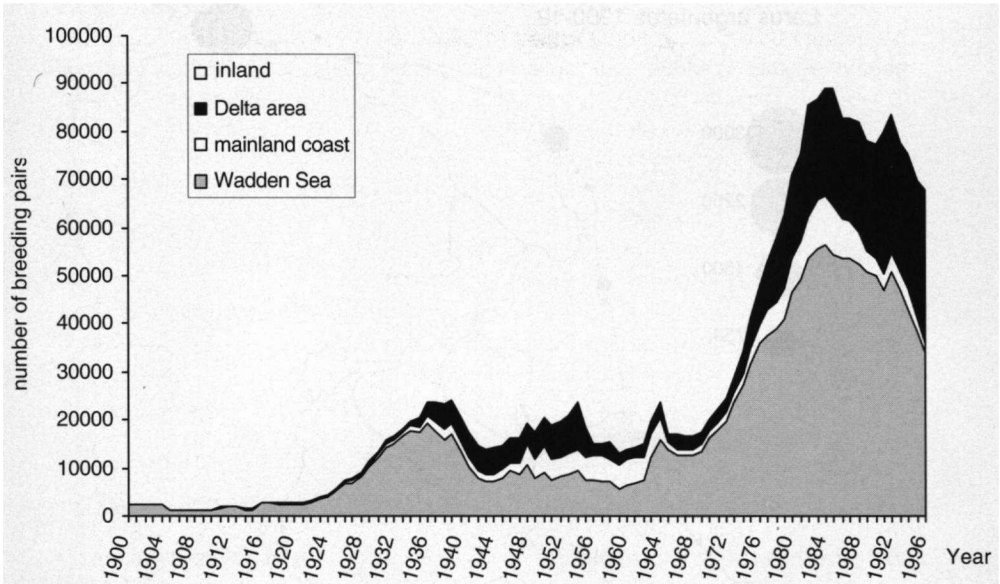


Figure 1. Population trend of Herring Gulls (pairs) breeding in four areas in The Netherlands, 1900-96.

Figuur 1. Populatieontwikkeling van de Zilvermeeuw (broedparen) in vier deelgebieden in Nederland, 1900-96.

24.0% (2.3% per annum) to 68,000 pairs in 1996. Until 1995, the largest number of Herring Gulls bred on the Wadden Sea island of Terschelling (22,000 pairs in 1983, 12,000 pairs in 1995). In 1996, the Port of Rotterdam (Europoort-Maasvlakte) colony, opposite Hoek van Holland, had the largest number (10,000 pairs). In 1997 and 1998, the largest number bred at Saeftinghe (10,000 and 9500 pairs, respectively).

Until the mid 1980s, the regional patterns roughly followed the general trend, with minor differences between the main regions (Fig. 1). Thus, in the Wadden Sea area, along the mainland North Sea coast and in the Delta area, the first increase in numbers started in 1916, 1911 and 1915, respectively, while numbers stabilised or decreased for the first time in 1937, 1939 and 1939, respectively. The annual increase in numbers, however, differed a little between regions. In the Wadden Sea area, the annual increase was 13.6%, while along the rest of the coast numbers increased with 21.2% per annum, with no differences between the mainland North Sea coast and the Delta area.

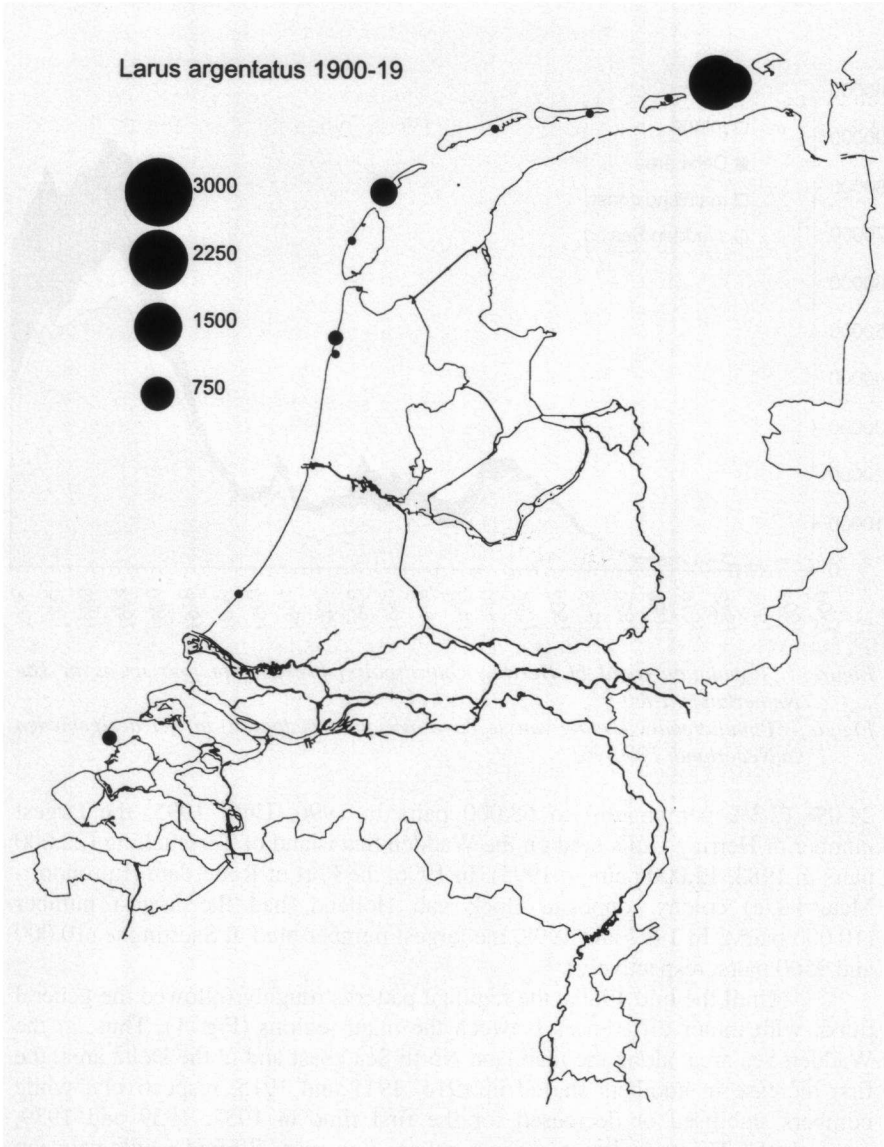


Figure 2. Distribution of breeding Herring Gulls in The Netherlands, 1900-19.
 Figuur 2. Verspreiding van de Zilvermeeuw als broedvogel in Nederland, 1900-19.

From the early 1940s to the early 1960s, numbers in the Wadden Sea area remained low after their fall to half the level of the 1930s (Fig. 1). Numbers on the mainland North Sea coast, however, temporarily increased during the late 1940s and remained high until the mid 1960s, when numbers fell to the low level of the 1940s. In the Delta area, numbers remained rather stable during the 1940s, temporarily increased during the first half of the 1950s and then decreased until the early 1960s. Between 1969 and 1984, the annual increase in numbers in the three regions was from north to south 10.0%, 13.9% and 15.9%, respectively, compared with 13.6%, 21.2% and 21.2%, respectively, during the first spurt of growth.

After the early 1980s, in contrast to the periods before, the populations in the three regions developed in a strongly different way. In the Delta area, numbers remained relatively stable during the 1980s (on average 22,000 pairs) and then increased to 31,000 pairs in 1996, an increase of 41.3% (2.8% per annum). In the Wadden Sea area, numbers slowly increased during the early 1980s to 56,000 pairs in 1984, but then fell to a low of 34,000 pairs in 1996, a decrease of 40.1% (4.2% per annum). On the mainland North Sea coast, however, numbers increased to 10,000 pairs in the mid 1980s, and then rapidly decreased to a low of 2100 pairs in 1996, a decline of 79.4% (12.3% per annum). The inland population has strongly fluctuated in numbers since the Second World War, when birds started to nest in inland areas (Fig. 1). Peak numbers amounted to 300 pairs in the 1940s, over 200 pairs in the late 1970s and 1980s, and over 600 pairs in the 1990s. During 1993-96, an average of 530 pairs nested inland (van Dijk *et al.* 1998; SOVON *pers. comm.*).

Herring Gulls now and then interbreed with the Lesser Black-backed Gull and the Yellow-legged Gull *L. michahellis* (see for discussion on this subject Spaans 1998b and van Swelm 1998).

Breeding distribution During the beginning of the 20th century, Herring Gulls had a strictly coastal breeding distribution, with breeding colonies on all main Wadden Sea islands, at three sites on the mainland coast and at one site in the Delta area (Fig. 2). Numbers were, however, small, except on the island of Rottumeroog, where a few thousand pairs may have bred at that time (Leege 1907). Although several new colonies were established in the 1920s and 1930s, the distribution remained strictly coastal until the 1940s (Spaans *et al.* 1996). During the Second World War, some gulls temporarily nested on roofs of buildings in towns (Den Helder, Amsterdam, Den Haag) and in agricultural fields, even far inland (Spaans *et al.* 1996; van Ee 1998). The largest number of inland nesting gulls was found in the Noordoostpolder (up to 300 pairs). This colony remained occupied until the late 1940s. In the early 1950s, the breeding

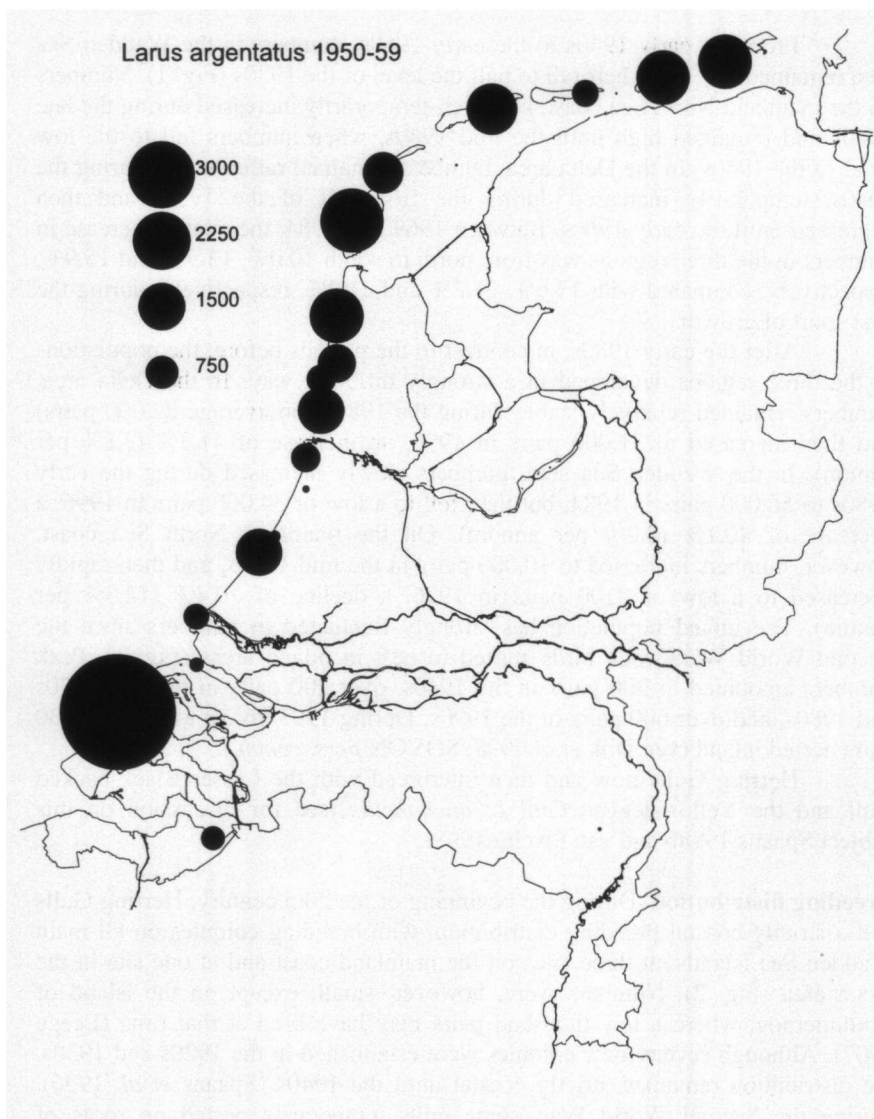


Figure 3. Distribution of breeding Herring Gulls in The Netherlands, 1950-59.

Figuur 3. Verspreiding van de Zilvermeeuw als broedvogel in Nederland, 1950-59.

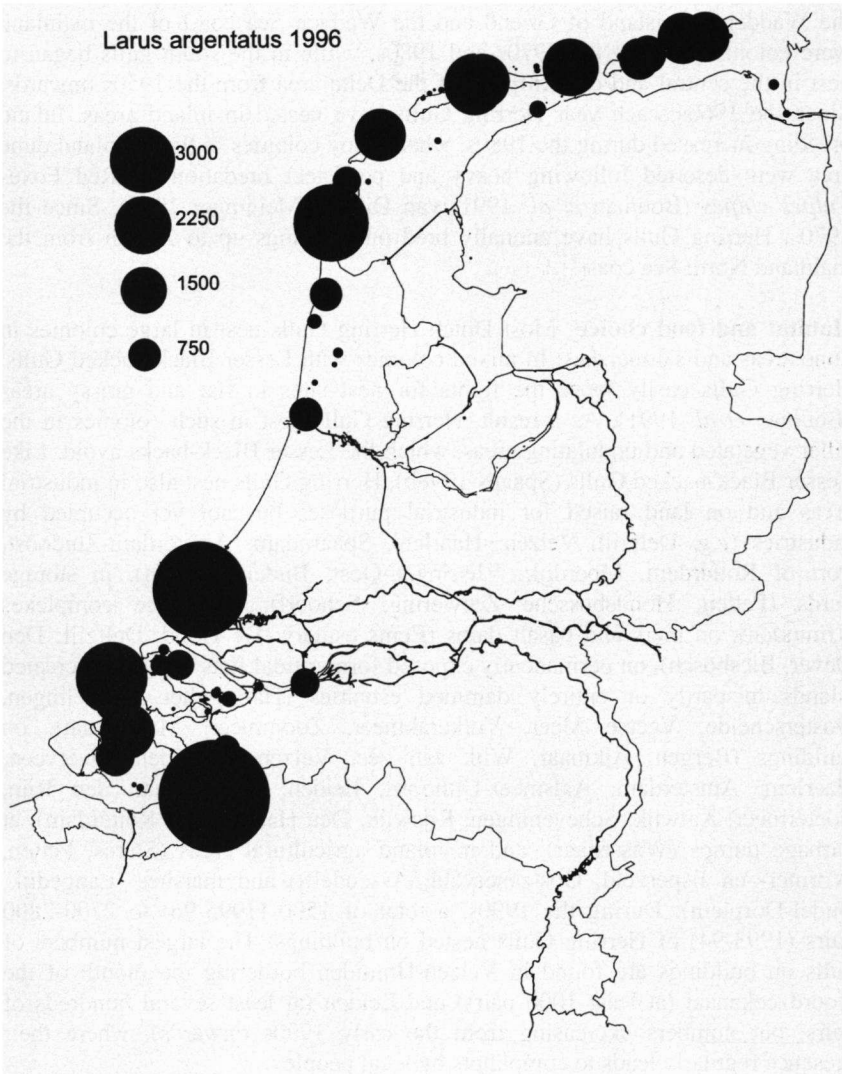


Figure 4. Distribution of breeding Herring Gulls in The Netherlands in 1996.
Figuur 4. Verspreiding van de Zilvermeeuw als broedvogel in Nederland in 1996.

distribution again became strictly coastal. During the second half of the century, the Herring Gull further expanded its breeding range (Figs 3, 4). In the north, the Wadden Sea island of Griend and the Wadden Sea coast of the mainland were colonised during the 1970s and 1980s, while in the south gulls began to nest in the central and eastern parts of the Delta area from the 1950s onwards. Since the 1960s, each year Herring Gulls have nested in inland areas. Inland breeding increased during the 1980s, when many colonies in the mainland dune area were deserted following heavy and persistent predation by Red Foxes *Vulpes vulpes* (Bouman *et al.* 1991; van Dijk & Meininger 1995). Since the 1970s, Herring Gulls have annually bred on buildings up to 25 km from the mainland North Sea coast.

Habitat and food choice Most Dutch Herring Gulls nest in large colonies in dune areas and saltmarshes. In mixed colonies with Lesser Black-backed Gulls, Herring Gulls easily lose the fights for nest sites in flat and grassy areas (Bouman *et al.* 1991). As a result, Herring Gulls nest in such colonies in the taller vegetated and undulating areas, which the Lesser Black-backs avoid. Like Lesser Black-backed Gulls (Spaans 1998b), Herring Gulls nest also in industrial areas and on land raised for industrial purposes but not yet occupied by industries (*e.g.* Delfzijl, Velzen, Haarlem, Spaarndam, Amsterdam-Zuidoost, Port of Rotterdam, Moerdijk, Vlissingen-Oost, Budel-Dorplein), in storage yards (Petten, Hondsbossche Zeewering, School), on sluice complexes (IJmuiden), on piers and basalt dams (Eems estuary: De Hond, Delfzijl; Den Oever, Biesbosch), on permanently exposed former tidal flats and newly created islands in partly or entirely dammed estuaries (Haringvliet, Grevelingen, Oosterschelde, Veerse Meer, Volkerakmeer, Zoommeer, Markiezaat), on buildings (Bergen, Alkmaar, Wijk aan zee, Velzen, IJmuiden, Overveen, Haarlem, Amsterdam, Aalsmeer-Uithoorn, Leiden, Alphen aan den Rijn, Zoetermeer, Katwijk, Scheveningen, Rijswijk, Den Haag, Delft, Rotterdam), at garbage dumps (Wassenaar), and in inland agricultural areas (Stiens, Petten, Wormer- en Jisperveld, Oostzanerveld, Assendelft) and marshes (Langedijk, Budel-Dorplein). During the 1990s, a total of 1500 (1995-96) to 2700-2800 pairs (1993-94) of Herring Gulls nested on buildings. The largest numbers of gulls on buildings are found in Velzen-IJmuiden bordering the mouth of the Noordzeekanaal (at least 1000 pairs) and Leiden (at least several hundreds of pairs, but numbers decreasing from the early 1990s onwards), where their presence regularly leads to complaints by local people.

Herring Gulls are omnivorous birds. Coastal breeders, however, mainly feed on mudflats and in coastal waters for shellfish (Mollusca), crabs (Brachyura), Brown Shrimps *Crangon crangon*, Common Starfish *Asterias ruber*, pelagic fishes, and discards and fish offal picked up behind fishing-boats

(Wadden Sea area, Rooth 1957; Swennen & Spaans 1960; Spaans 1971; Noordhuis & Spaans 1992; Camphuysen 1995; Delta area, Noordhuis 1989; Noordhuis & Spaans 1992; see also Camphuysen *et al.* 1995). Terrestrial and dump feeding also frequently occurs (Spaans 1971; Noordhuis 1989; Noordhuis & Spaans 1992). Gulls from inland colonies may feed exclusively terrestrially and at garbage dumps. For example, Herring Gulls breeding on roofs of buildings in Leiden at only 8 km from the coast are completely terrestrial in their feeding habits (G.J. de Bruijn *pers. comm.*).

Reproductive output Reproductive output in Dutch Herring Gulls varies spatially and temporally, and is related to the size or density of the colony (Coulson *et al.* 1982; Spaans *et al.* 1987). Thus, on the Wadden Sea island of Terschelling, the number of fledged young decreased from 1.25-1.50 young per pair during 1967-69, just before the number of breeding pairs exponentially increased, to 0.34-0.43 young per pair during 1983-84, when numbers were stabilising (Spaans & Spaans 1975; Spaans *et al.* 1987). Since then, the number of breeding pairs decreased to 16,000 in 1990, while the number of fledged young further decreased to about 0.1 young per pair (Brouwer *et al.* 1995). On the islands of Rottumeroog and Schiermonnikoog, elsewhere in the Wadden Sea, breeding success amounted to 0.9 and 0.8 fledged young per pair, respectively, during the mid 1980s, when breeding numbers were stabilising (Nolet 1988; van Klinken 1992).

In the colony in the dunes of Wassenaar near Den Haag, the reproductive output was almost 1.57 young per pair during 1980, when the population of Herring Gulls was still increasing in numbers (Wanders 1985), and almost zero when the population crashed as a result of a heavy and persistent Red Fox predation (Bouman *et al.* 1991; R.M. Wanders *pers. comm.*). In the Schouwen colony, the reproductive success varied between 0.30 and 1.20 (average 0.68) fledged young per pair during 1991-94, when numbers were decreasing (Vercrujssse 1999). In 1994, however, the food situation on the nearby rubbish dump of Serooskerke was temporarily enhanced, resulting in a breeding success of 1.20 young per pair, twice to four times as many young as in the three other years. When the exceptional breeding season in 1994 is neglected, the average reproductive output was 0.50 fledged young per pair (Vercrujssse 1999).

DISCUSSION

The Herring Gull, like other gull species, rapidly increased in numbers with the introduction of general bird protection measures in The Netherlands during the beginning of the 1910s. The rapid increase was facilitated by the large quantities

of rubbish, fish offal and discards that came available for the gulls during this century (e.g. Spaans 1971). However, in other gull species, numbers gradually increased, whilst in the Herring Gull the increase was with two spurts of growth, separated by a period of thirty years during the middle of the century in which the numbers remained relatively stable. Such a long period of relatively stable numbers in Herring Gulls at that time was not seen in other north-west European countries (e.g. Great Britain and Ireland, Gibbons *et al.* 1993; south-west Finland, Denmark, west Germany, north-west France, Spaans *et al.* 1991). The period of relative stability in numbers in The Netherlands was characterised by a drastic persecution of Herring Gulls by man. During the Second World War, eggs were again heavily collected for food (Brouwer & Junge 1945, 1946). From the mid 1940s until the mid 1960s, large numbers of adult gulls were culled, and many eggs and chicks were destroyed by governmental agencies in all main colonies, because the species was regarded as a threat to other coastal species (e.g. van Dobben 1934; Mörzer Bruijns 1958). The national gull control campaign was ended in 1966, without having reached the goal of lowering the number of breeding pairs to 10,000 (Mörzer Bruijns 1958). In general, gulls have been culled only locally and on a small scale since then (e.g. on the small island of Griend in the centre of the Wadden Sea to prevent the displacement of about 10,000 pairs of nesting terns, Spaans *et al.* 1996). The destruction of nests and eggs, however, has been practised at some places and sometimes at a large scale up to and including the 1990s (Schiermonnikoog, Veen *et al.* 1996; Delta area, files IBN-DLO; P.L. Meininger *pers. comm.*). In the Delta area, the extensive collection of eggs in the large colony of Schouwen and in some smaller colonies during the last few decades probably enhanced the range expansion of the gulls during that period (van Swelm 1996; P.L. Meininger *pers. comm.*). On Schiermonnikoog, the extensive collection of eggs has been stopped (J. Veen *pers. comm.*). In the Delta area, however, Herring Gulls are still controlled locally (Hompelvoet, Prinsesseplaat near Bergen op Zoom, P.L. Meininger *pers. comm.*).

During the mid 1960s, the number of Herring Gulls unexpectedly dropped from 24,000 pairs in 1964 to 17,000 pairs in 1965, a decrease of 28.0%. The fall in numbers was much greater on the mainland North Sea coast (61.8%) and in the Delta area (51.0%) than in the Wadden Sea area (13.5%). The fall in numbers can be attributed to pollution of the coastal waters by organochlorine pesticides originating from a leakage by a factory near the mouth of the river Rijn during the 1960s (Koeman 1970; Spaans 1980). In the Wadden Sea, the numerical decrease in Herring Gulls was less dramatic than in other seabirds nesting in this area (Koeman 1972).

Since the 1980s, the population development significantly differed between regions, and paralleled the regional differences in the population

development in the Lesser Black-backed Gull (Spaans 1998b). Thus, like the situation in the Lesser Black-back, the numbers of Herring Gulls have increased in the Delta area until now, while those on the mainland North Sea coast increased until the mid 1980s and then fell to a very low level due to a heavy and persistent Red Fox predation (Bouman *et al.* 1991; van Dijk & Meininger 1995). Gulls which deserted colonies on the mainland North Sea coast joined gulls in the Port of Rotterdam or established new colonies outside the dune area (Bouma *et al.* 1991; N.D. van Swelm *pers. comm.*). In the Wadden Sea, numbers stabilised in the 1980s, but then, in contrast to the situation in the Lesser Black-backed Gull (Spaans 1998b), decreased due to a low hatching and fledging success. Although conspecific predation was the main direct cause of the egg and chick mortality in the Herring Gull, food shortage indirectly determined the high mortality rate (Spaans *et al.* 1987; van Klinken 1992; Noordhuis & Spaans 1992; Brouwer *et al.* 1995; Bukacinska *et al.* 1996). Since the 1980s, the gulls in the Wadden Sea area have much less access to rubbish dumps than before. This contrasts with the situation in the Delta area, where gulls from most colonies can still heavily rely on rubbish dumps (Vercruijsse 1999). Within the Delta area, the colony on Schouwen is one of the few colonies no longer increasing in numbers. In 1991-94, reproductive success in this colony averaged 0.68 fledged young per pair, with variations between years in relation to the availability of food at the nearby rubbish dump (Vercruijsse 1999; *cf.* Pons 1992). These data suggest that at present the food situation for Schouwen gulls is often inadequate for a high reproductive success.

So, the available data indicate that colonies increasing in numbers reproduce better than colonies with stabilising or decreasing numbers. The same was suggested for the Lesser Black-backed Gull (Spaans 1998b). In general, the reproductive output in European Herring Gulls ranges between 0.6 and 1.2 fledged young per pair (Glutz von Blotzheim & Bauer 1982). In The Netherlands, colonies increasing in numbers reproduce as good as in the average European situation; for colonies decreasing in numbers the output is well below that average.

The number of Dutch Herring Gull has shown a downward trend from the mid 1980s onwards. The first data for 1997 and 1998 indicate that this trend has not stopped yet, so that a further decrease in numbers can be expected. This strongly contrasts with the situation in the Lesser Black-backed Gull, whose total number still increases and soon will exceed that of the Herring Gull. What will be the situation at the end of the 21st century?

ACKNOWLEDGEMENTS

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SAMENVATTING

*In de loop van de twintigste eeuw is het aantal Zilvermeeuwen *Larus argentatus* in Nederland toegenomen van een paar duizend broedparen aan het begin van de eeuw tot maximaal 89.000 paren in het midden van de jaren tachtig. Sindsdien is het aantal gedaald tot 68.000 paren in 1996. De toename heeft in twee stappen plaatsgevonden: tussen 1915 en 1939 en tussen 1969 en 1984. In de tussenliggende periode schommelde het aantal tussen 13.000 en 24.000 paren, een periode die gekenmerkt werd door een intensieve vervolging door de mens (Tweede Wereldoorlog, gevolgd door een intensieve meeuwenbestrijding van overheidswege tot 1966 en vergiftiging van meeuwen als gevolg van vervuiling van het kustwater met organochloorverbindingen in de jaren zestig). Tot de jaren tachtig was de trend in het aantalsverloop voor het gehele land in grote lijnen identiek. Vanaf die tijd zijn er echter grote verschillen tussen de verschillende regio's. In het Deltagebied stabiliseerde het aantal in de jaren tachtig, waarna het in de jaren negentig met 41% toenam. In het Waddengebied stabiliseerde het aantal eveneens, maar daar nam het aantal in de jaren negentig met 40% af als gevolg van voedseltekort, resulterend in een sterke predatie van eieren en vooral jongen door soortgenoten. In de kuststreek tussen Den Helder en Hoek van Holland nam het aantal aanvankelijk tot het midden van de jaren tachtig nog toe, waarna het als gevolg van een langdurige en hevige predatie van eieren en kuikens door Vossen *Vulpes vulpes* met 79% afnam tot 2100 pairs in 1996. In het binnenland broedt de soort sinds het midden van de jaren veertig in wisselende aantallen. In 1993-96 broedden 460-600 (gemiddeld 530) paren in het binnenland. Sinds de jaren zeventig wordt de soort jaarlijks broedend op daken van gebouwen tot op 25 km van de kust aangetroffen (1993-94 2700-2800 paren, 1995-96 1500 paren). Tot voor kort werd de grootste kolonie van ons land op Terschelling aangetroffen (1983 22.000 paren, 1995 12.000 paren). In 1996 nam Europoort-Maasvlakte de leidende positie voor één jaar over. In 1997 en 1998 herbergde Saefinghe de grootste kolonie (respectievelijk 10.000 en 9500 paren). Meeuwen uit kustkolonies foerageren zowel op zee (vis, vooral puf en afval) en in de getijdenzone (vooral schelpdieren) als op het land (vooral vuilstortplaatsen e.d.). Meeuwen die in het binnenland broeden, zijn geheel terrestrisch georiënteerd. Groeiende kolonies hebben een hoger reproductiesucces dan kolonies waarvan de aantallen stabiliseren of afnemen.*

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