

BREEDING BLACK-HEADED GULLS *LARUS*
RIDIBUNDUS ALONG THE COAST OF THE
NETHERLANDS DURING THE 20TH CENTURY
DE KOKMEEUW ALS BROEDVOGEL LANGS DE
NEDERLANDSE KUST GEDURENDE DE TWINTIGSTE EEUW

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During the first half of the 20th century, less than 50,000 pairs of Black-headed Gulls *Larus ridibundus* were nesting in The Netherlands. After three decades of increase the population peaked in the early 1980s at 250,000 pairs. During the late 1980s and early 1990s, a steep decline occurred, and in 1996 the national total was estimated at only 132,000 pairs. Numerical developments along the coast were generally similar to national trends, but there are notable differences between areas. Until 1950, the Delta population (11,000-28,500 pairs) outnumbered the Wadden Sea population (4100-6800 pairs). Since 1975, the opposite is true (Delta area max. 20,100-48,300 pairs, Wadden Sea area max. 53,000-77,400 pairs). Along the mainland North Sea coast of Holland, numbers were small until 1960 (max. 1087 pairs) and after 1985 (max. 543 pairs), but peaked at 10,700 pairs in 1970-75. Dutch coastal breeding Black-headed Gulls mainly inhabit saltmarshes. Since 1961, breeding in grassland has increased while colonies in dunes decreased. Feeding upon Brown Shrimp *Crangon crangon*, Blow Lug *Arenicola marina* and marine fish takes place in streams in saltmarshes, on mudflats and in inshore areas. Agricultural land and water bodies in dunes also form important feeding habitats. Human settlements are used to a lesser extent. The population growth during the present century was most likely favoured by a strong increase of food sources provided by man, buffering the negative impact of fluctuations in natural food resources and resulting in a higher survival rate. The recent decline is probably related to changes in food availability. The steep population fall along the mainland North Sea coast of Holland can be attributed to the re-appearance of the Red Fox *Vulpes vulpes* in the dune area.

INTRODUCTION

The Black-headed Gull *Larus ridibundus* is the least marine and most numerous gull species nesting in The Netherlands. During the 20th century, the breeding population has increased markedly, as elsewhere in Europe. Isenmann *et al.* (1991) describe the superabundance in the Black-headed Gull as "a textbook example of how human interactions with the environment in industrialised countries have had a paramount influence in some birds' recent demographic boom and range expansion. Increasing access to foraging grounds, utilisation of

new and artificial food sources, and protective measures changed its status during this century from a species at risk to the most abundant gull species in the Palearctic zone". All over Europe population growth has been impressive, in particular during the 1950s through 1970s. In the middle of the 1970s, the European population held at least one million breeding pairs, and in 1985-89, there were approximately two million pairs (Isenmann *et al.* 1991). In the 1980s, however, it became obvious that population growth had stopped, and in several European countries a serious decline was reported (Bensch 1992; Viksne *et al.* 1996). In this paper, the population dynamics of the Black-headed Gull along the Dutch coast during the 20th century will be described, and the possible causes of population changes are briefly discussed.

In The Netherlands, as in many other countries, Black-headed Gulls breed along coasts as well as in inland areas. This paper focuses on developments along the coast. To analyse local trends, the Dutch coast has been divided into three regions (see map in Spaans 1998; page 122 of this issue). The Delta area, south of Hoek van Holland, has been formed by the estuaries of the rivers Rijn and Schelde. It is a complex of (former) islands, covered with dunes and polders, sea-arms, and estuaries with tidal mudflats and saltmarshes. Since 1960, most sea-arms have been dammed and turned into freshwater or salt water lakes. The mainland North Sea coast between Hoek van Holland and Den Helder consists mainly of dunes with artificial freshwater lakes and ponds. The Wadden Sea area between Den Helder and the German border has vast mudflats and some sandbars. The islands in the Wadden Sea are covered with dunes, saltmarshes, polders and a few small lakes. The mainland coast of the Wadden Sea also holds vast saltmarshes.

MATERIAL AND METHODS

To reconstruct the historic population numbers and distribution, all available sources on Black-headed Gulls were investigated, including archives, periodicals and local reports. The amount and quality of available information has grown tremendously in the course of this century. Most reports on breeding Black-headed Gulls during the first half of the 20th century are based on casual visits of colonies (*e.g.* Haverschmidt 1942). The first nation-wide census was undertaken in 1961 (Higler 1962). Since that time, regular censusing of individual colonies or complete regions became more and more usual. In the Delta area, annual counts of all Black-headed Gull colonies are organised by the Rijksinstituut voor Kust en Zee (RIKZ) since 1979 (*e.g.* Meininger *et al.* 1996, 1997, 1998); colonies elsewhere along the coast were often counted by individuals or local working groups. In 1985, a special project for colonial nesting birds was launched, aiming to assess the annual distribution and

numbers in The Netherlands (SOVON/CBS 1985). In the Black-headed Gull, however, an annual nation-wide coverage was not achieved until 1991, when a special census project in the Wadden Sea was started (Dijksen & Klemann 1992; Koks & Hustings 1998).

Differences in coverage and census methods have had an important influence on the census results. Older population estimates, particularly those during the 1920s and 1940s, have had a rather poor coverage in several regions. From 1961 onwards, coverage has grown strongly and reliable population estimates can be made for several periods, although estimates based on former and recent information had to be made for missing values (occupied colonies that were not counted). In 1991-96, coverage in coastal areas amounted to at least 90% (van Dijk *et al.* 1997, 1998).

Table 1. Numbers of Black-headed Gulls breeding in coastal regions in The Netherlands, 1920-96 (Wadden Sea area, mainland North Sea coast, and Delta area).

Tabel 1. Aantallen in de kustgebieden broedende Kokmeeuwen sinds 1920 (Waddengebied, Noordzeekust vasteland en Deltagebied).

area	1920-30	1940-50	1960	1970	1980	1990	1996
Wadden Sea area (total)	4140	6797	22080	35538	77396	60704	61778
Texel	2450	5000	12200	10768	9000	8068	1220
Vlieland	1385	500	550	2000	150	161	5
Terschelling	0	50	425	705	3757	3800	1264
Ameland	0	62	40	150	125	200	2434
Schiermonnikoog	5	15	130	615	550	354	884
Rottum	0	0	0	0	11	30	86
Griend	300	250	10	4000	5000	16000	28500
mainland Noord-Holland		300	2525	2350	5469	6696	4464
mainland Friesland		600	2500	6500	20000	8596	6568
mainland Groningen		20	3700	8450	33334	16799	16363
mainland N.Sea coast (total)	1000	341	1087	4863	2976	250	3
Delta area (total)	11825	28493	39048	38891	43431	41670	21435
Europoort, Voorne	300	1850	5600	1755	2350	13565	1643
Schouwen Duiveland	10000	10050	55	668	7	18	0
Oosterschelde	1000	2353	4891	4008	3090	3269	2138
Veerse Meer		270	3350	4500	1750	863	405
west Brabant		4000	3200	1000	855	2640	1147
Westerschelde		2203	9453	18140	25680	4929	4576
Zeeuws-Vlaanderen	500	800	2174	3152	603	887	175
entire coastal area	16965	35631	66215	76292	123803	102624	83226
total Dutch population	30000	47000	90000	115000	225000	200000	132000

In older censuses, methods used are generally unknown. In most cases it is probable that nest counts or rough estimates (based on the number of birds present in the colony) were made. It is unknown to what extent these estimates differ from true breeding numbers. Census methods were standardised in 1985 (Hustings *et al.* 1985) and slightly refined in 1996 (van Dijk & Hustings 1996). At present, at least one count of occupied nests, alarming pairs or breeding birds in May-June, preferably in the second part of May (when most pairs will have eggs or recently hatched chicks) is prescribed. If only adult birds are counted, numbers are divided by 1.5 to assess the number of breeding pairs (the old custom of dividing the number of birds by two has been abandoned, as it turned out that is unlikely that all parents are simultaneously present in the colony). Other factors affecting the reliability of census results include the abandonment or movement of colonies following floods, intensive predation or serious human disturbance. In these cases, it was tried to avoid double counts through best professional judgement, using experience from previous years.

BREEDING DISTRIBUTION AND NUMBERS

Total numbers breeding in The Netherlands During the first half of the 20th century, the total Dutch population remained below 50,000 pairs, although a slight increase during that period was likely (Table 1). A steep increase was recorded from the 1960s onwards, resulting in a national population maximum of about 250,000 pairs at the beginning of the 1980s. By the late 1980s and the early 1990s, a steep decrease took place (van Dijk & Meininger 1995). In 1996, the population was estimated at 132,000 pairs (van Dijk *et al.* 1998), a reduction of 53%.

Numbers breeding along the coast For the beginning of the century, the coastal population of the Black-headed Gull can be estimated at 10,000-20,000 pairs (Table 1). In 1980, when the population was at its highest level, the number had risen to nearly 124,000 pairs. In 1996, however, the population held only 83,200 pairs, a 33% decrease since 1980. Until 1980, the annual population growth rate was 2.2% to 4.4%. The decline since 1980 varied between 0.5% and 2.7% per annum.

In the Wadden Sea area, the population growth was slow until 1950 (4100-6800 pairs in 1920-50), but accelerated soon afterwards until the 1980s. In 1960, 22,000 pairs were counted, in 1970 35,500 pairs and in 1980 77,400 pairs. In 1985-96, the population decreased by 20.2% to 61,800 pairs. The population in the Delta area increased continuously between 1920 and 1975 (from 11,000 to 48,300 pairs). Between 1975 and 1982, the population stabilised and reached its top with 48,700 pairs in 1982. In the 1990s, however, a steep decline to 20,100 pairs (1997) took place (59% decrease).

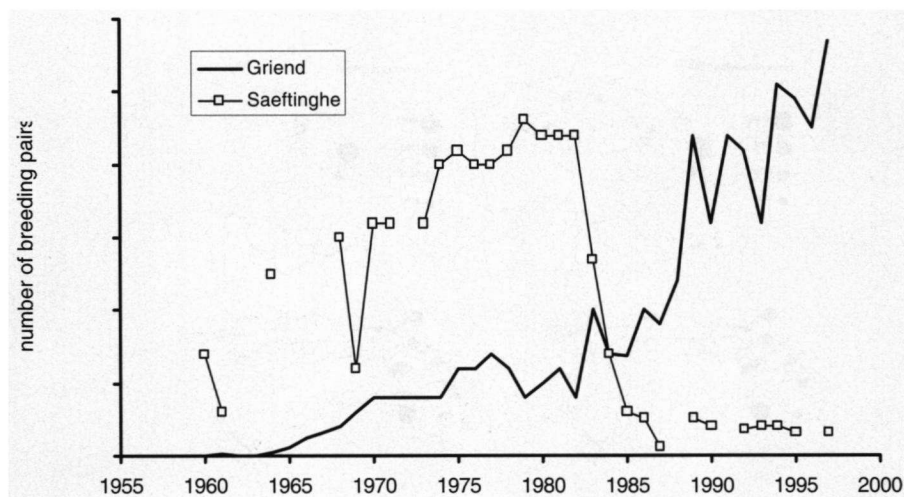


Figure 1. Numbers of breeding pairs of Black-headed Gull on Griend and in Saeftinghe.
Figuur 1. Aantal broedparen van de Kokmeeuw op Griend en in Saeftinghe.

Along the mainland North Sea coast, population numbers between 1920 and 1960 remained below 1100 pairs. During 1970-75, a strong and sudden increase to 10,700 pairs was recorded. However, within the two decades that followed this population collapsed and numbers fell to almost zero.

The population changes in individual colonies did not always follow the regional pattern, as is shown by the figures for Griend and Saeftinghe (Fig. 1). The colony on Griend, a small and uninhabited island in the centre of the Wadden Sea, has grown for decades to what is now by far the largest Dutch colony, despite the falling numbers elsewhere in the Wadden Sea. In Saeftinghe, a large saltmarsh in the Delta area, the population collapse preceded that elsewhere in that region by approximately ten years. In comparison to the situation in the interior of The Netherlands, the increase and subsequent decrease along the coast has evolved more gradually.

Coastal distribution Within the coastal region, the Delta and Wadden Sea areas have been strongholds of Black-headed Gulls throughout the entire 20th century (Fig. 2). Before 1970, 51-75% of the gulls were found in the Delta area, whilst after 1970 55-71% were located in the Wadden Sea area. Throughout the century, the mainland North Sea coast held only 1-10% of the population. During the 1920s and 1940s, the largest colonies (maximum numbers) were found on Schouwen (10,000 pairs), Scheelhoeck (2750 pairs), Texel (2450 pairs),

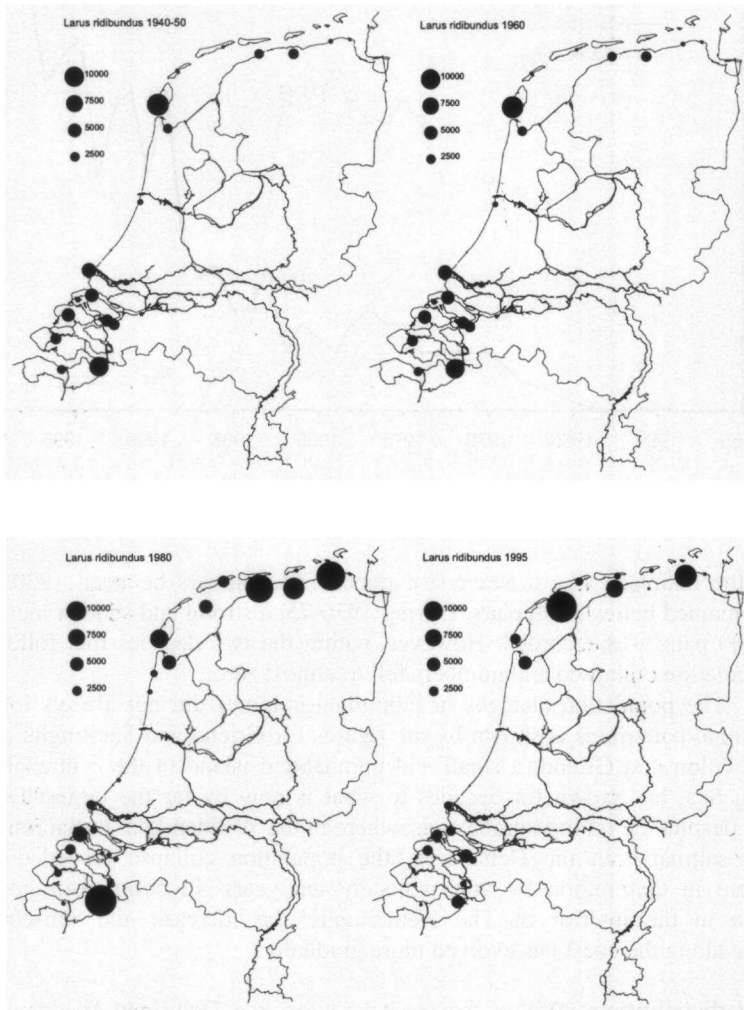


Figure 2. Past and present breeding distribution of Black-headed Gull along the Dutch coast.

Figuur 2. Vroegere en tegenwoordige verspreiding van broedende Kokmeeuwen langs de Nederlandse kust.

Vlieland (1385 pairs) and Zwanenwater (1000 pairs). In these years, however, many breeding locations were occupied irregularly and in strongly fluctuating numbers, often resulting from the mass collection of eggs in many Dutch colonies.

During 1920-50, a range expansion must have been taken place, because the national census in 1961 revealed the occurrence of many more colonies along the coast than in previous decades. The largest colonies (maximum numbers) were located on Texel (12,200 pairs), Saeftinghe (6000 pairs) and the former 'De Beer', opposite Hoek van Holland (5000 pairs). During the 1960s and 1970s, the distribution remained rather unchanged, despite a numerical increase in most areas. Around 1980-85, when the coastal breeding population reached its highest level, huge numbers were counted along the mainland coasts of Friesland and Groningen (20,000 and 21,500 pairs, respectively), in the newly reclaimed Lauwersmeer (11,700) and in Saeftinghe (22,000). In the late 1980s and early 1990s, a severe range contraction and reduction in numbers took place along the mainland North Sea coast. In 1991, only some 220 pairs were found nesting in this region and all to the far north, whereas in 1975-85 colonies were evenly distributed along that coast, with maximum numbers of up to 8000 pairs near Zandvoort, 1800 pairs in Zwanenwater and 1785 pairs in Meijndel.

HABITAT AND FOOD CHOICE

In Dutch coastal habitats, most Black-headed Gull colonies (62-64%) are located in saltmarshes (Fig. 3). Approximately 5-16% are found in or near ponds and lakes or in wet dunes, and 10-19% in wet agricultural grasslands, often near ditches. Marshland (freshwater and brackish, 8%) and other habitats (sand plains, storage yards, building sites, 6%) are less favoured. Within a few years, however, building activities and vegetation succession usually render the last mentioned habitats unsuitable for gulls.

Between 1961 and 1995, a shift in habitat choice took place. Breeding in dunes has strongly decreased during that period, while grassland and building sites have become more important breeding habitats. Breeding on roofs of buildings, as is known at some inland sites (*e.g.* Veldkamp 1996), has not yet been reported along the coast. Coastal breeding Black-headed Gulls are often reported to feed in the vicinity of the colony. Main feeding habitats are water bodies in the dunes, streams in saltmarshes, mudflats, inshore areas and agricultural land (pastures as well as arable land, especially during ploughing, mowing, dunging and harvesting). To a lesser extent feeding birds occur near buildings, at camping sites and in harbours (*e.g.* Dijkens 1996; Fleet *et al.* 1994; Goethe 1983). In general, earthworms Lumbricidae, up to 50% of the food mass

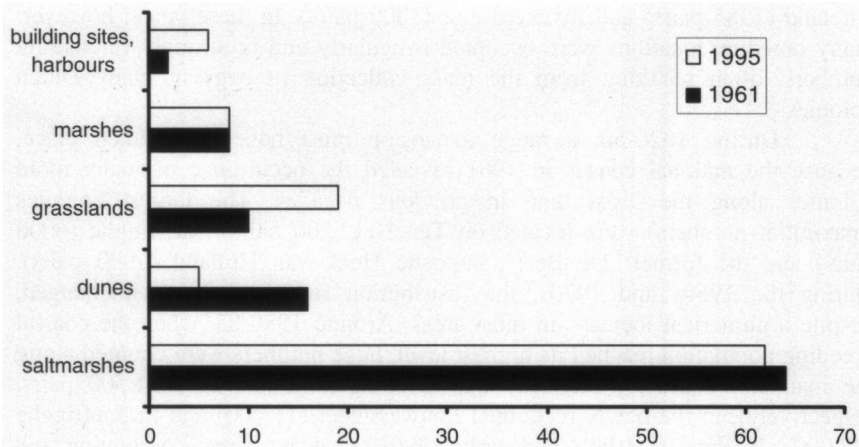


Figure 3. Habitat use (% of pairs nesting in habitat) of Black-headed Gulls in the coastal area of The Netherlands in 1961 (51 areas derived from Higler 1962) and in 1995 (52 areas).

Figuur 3. Habitatgebruik (percentage paren) door langs de kust broedende Kokmeeuwen in 1961 (51 gebieden) en 1995 (52 gebieden).

mass, and insects (15%) predominate in the diet. In coastal regions, Black-headed Gulls feed their chicks largely with earthworms, small fish, Brown Shrimps *Crangon crangon* and polychaetes (Glutz von Blotzheim & Bauer 1982). Stienen *et al.* (1998) mention Brown Shrimp, Blow Lug *Arenicola marina* and marine fish as the main foods of Black-headed Gulls breeding on Griend. According to Gorke (1990) and Dervedde (1993) polychaetes form the most important food source in the German Wadden Sea. They also observed terrestrial foraging, but the amount is rather small, and food sources such as refuse tips and sewage farms are not regularly used. Food piracy directed towards Sandwich Terns *Sterna sandvicensis* has regularly been observed in the Wadden Sea area (Veen 1977; Gorke 1990).

DISCUSSION

Favoured by its opportunistic behaviour, the Black-headed Gull was able to increase in numbers and to expand over large parts of Europe during the 20th century (Isenmann *et al.* 1991). In recent years, however, a reversal of fortunes has become obvious, both in The Netherlands and in several other European countries. As highly flexible generalists, Black-headed Gulls rapidly take advantage of a wide diversity of food sources, both in the breeding season and

during the winter. The major factor favouring its previous population growth was the strong increase of food sources provided by man through intensification of agricultural land use, newly created suitable feeding habitats (e.g. garbage dumps, parks and lawns in urban areas) and feeding by man. This buffered the negative impact of fluctuations in natural food resources, in particular outside the breeding season. Moreover, various protective measures have enhanced the species' breeding success and overall survival (Glutz von Blotzheim & Bauer 1982; Cramp & Simmons 1983; Isenmann *et al.* 1991). The most plausible explanation of the huge increase, according to studies summarised by Isenmann *et al.* (1991), is the increase of adult survival due to human activities. Recently, in some populations a decrease in reproductive output has been recorded, although adult survival is still high (Bensch & Källander 1997; Isenmann *et al.* 1991; Rytman 1998).

The reasons for the recent general decline are not fully known. In 1997, remarkable differences were found in hatching success and breeding success within six Dutch colonies (Stienen *et al.* 1998). Hatching success was high (75-90%) in three colonies in the Wadden Sea area, whereas in one colony in the Delta area and in two inland colonies hatching success was extremely low (0-43%). Only in one colony (Griend) fledging success was high (66%). The average reproductive output is considered too low for a stable population. Stienen *et al.* (1998) attributed the recent population decline of the Black-headed Gull in The Netherlands to changes in food availability. Black-headed Gulls on Griend, where the population has increased until now, feed completely on marine food. A colony on the mainland coast at least partly depends on the Wadden Sea for foraging. These two colonies were unique in being the only sites during the 1997 study where young Black-headed Gulls fledged. In the other colonies studied, gulls fed mainly on invertebrates and insects. Stienen *et al.* (1998) suggested that the present availability of these prey items is insufficient to raise any young.

Low breeding success in some coastal colonies in The Netherlands is often related to flooding, depredation by land mammals (Red Fox *Vulpes vulpes*, Brown Rat *Rattus norvegicus*, Weasel *Mustela nivalis* and Hedgehog *Erinaceus europaeus*), and disturbance by cattle and man (Higler 1962; Meininger *et al.* 1996, 1997, 1998; Stienen *et al.* 1998; Veen 1977). It seems unlikely, however, that these factors in general are decisive in the overall recent population changes in The Netherlands, except perhaps for the Red Fox. The re-appearance of foxes in the coastal dunes of Holland in the 1970s had a devastating effect on breeding Black-headed Gulls (Baeyens 1989; Bouman *et al.* 1991). During 1975-85, the population dropped from 10,670 to 450 pairs. In the Wadden Sea and Delta areas, Red Foxes are either absent or have been observed only sporadically (Mulder 1992). Very recently, however, some nests were depredated by foxes in

colonies along the mainland coast of the Wadden Sea (Koks 1994). Locally, low breeding success is caused by man through egg collecting, aiming to reduce predation or piracy of Black-headed Gulls on terns breeding in association with the gulls. On Griend, however, it turned out to have the opposite effect, as the advantage of close nesting of terns together with Black-headed Gulls outweighs the disadvantages of predation (Veen 1977). Nevertheless, (illegal) egg collecting, as conservation measure, is still in practice in some colonies in the Wadden Sea area (Koks 1994).

Long-term censuses of breeding Black-headed Gulls along the Dutch coast have given good insight into the species' population dynamics. Continuation of census work is essential, but it is clear that more information is needed about the reasons of the recent population changes. In this respect it is important to mention the first step in monitoring the breeding results of Black-headed Gulls in The Netherlands (Stienen *et al.* 1998).

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SAMENVATTING

*In de loop van de twintigste eeuw hebben zich belangrijke veranderingen voorgedaan in de stand van de Kokmeeuw *Larus ridibundus* in Nederland. Vóór 1950 hebben hier nimmer meer dan 50.000 paren gebroed. Sinds de eerste helft van deze eeuw is het aantal broedparen echter toegenomen tot bijna een kwart miljoen in het begin van de jaren tachtig. Daarna is het met de soort bergafwaarts gegaan. In 1996 broedden er in ons land nog slechts 132.000 paren. Ook langs de kust was er eerst sprake van een geweldige aantalstoename, gevolgd door een scherpe daling van het aantal, al waren er tussen de kustgebieden wel verschillen in de mate waarin de veranderingen plaatsvonden. Zo was in de eerste helft van deze eeuw de stand in het Deltagebied (11.000-28.500 paren) veel groter dan in het Waddengebied (4100-6800 paren). Sinds het midden van de jaren zeventig is de populatie in het Deltagebied (20.100-48.300 paren) echter kleiner dan de Waddenzeepopulatie (53.000-77.400 paren). Langs de Noordzeekust van het vasteland was de broedvogelstand vóór 1960 (max. 1087 paren) en na 1985 (max. 543 paren) vrij laag. In de tussenliggende periode piekte de soort met 10.700 paren in de jaren zeventig. De meeste Kokmeeuwen meer in graslanden en minder in de duinen gaan broeden. Het voedsel van de Kokmeeuwen langs de kust is voornamelijk van mariene herkomst. De aantalstoename die in de loop van de twintigste eeuw heeft plaatsgevonden, wordt vooral toegeschreven aan een toename van de voedselmogelijkheden door menselijke activiteiten, zowel in het broedgebied als in de overwinteringsgebieden. De aantalsvermindering die sinds de jaren tachtig plaatsvindt, lijkt een gevolg van een verminderde voedselbeschikbaarheid. De ineenstorting van de Kokmeeuwenpopulatie langs de Noordzeekust van het vasteland is echter vooral terug te voeren op de verschijning van de Vos *Vulpes vulpes* in het Hollandse duingebied.*

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