Surface-feeding birds of the coastal waters in the Dutch North Sea

Background document for a protection plan

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Samenvatting

In het Akkoord voor de Noordzee is afgesproken om een aantal beschermingsplannen te ontwikkelen voor soorten en habitats die het meest kwetsbaar zijn voor de ontwikkeling van offshore windenergie en/of bescherming behoeven in het algemeen, zoals overeengekomen in internationale kaders of van cruciaal belang zijn voor natuurherstel en verbetering.

Elk beschermingsplan bestaat uit twee delen: een achtergronddocument en een actieplan. Het achtergronddocument bundelt en evalueert de actuele en wetenschappelijke informatie. Het actieplan bevat de maatregelen die de Nederlandse overheid zal nemen en zal worden opgesteld door het ministerie van LNV na consultatie van stakeholders van het Noordzeeoverleg. Het huidige rapport is het achtergronddocument voor het beschermingsplan voor oppervlakte foeragerende kustzeevogels. De Grote Mantelmeeuw en Zilvermeeuw worden geselecteerd omdat deze behoren tot de meest kwetsbare vogelsoorten voor de verdere ontwikkeling van offshore windenergie.

In dit rapport wordt voor de Grote Mantelmeeuw en Zilvermeeuw informatie verstrekt en geëvalueerd betreffende de volgende aspecten: soortbeschrijvingen, huidige status van de soort, monitoring en onderzoek, evaluatie van bedreigingen, impacts en kansen, bestaande nationale en internationale instandhoudingsmaatregelen, algehele status, kennislacunes en mogelijke acties. Hieronder zijn alleen de meest relevante informatie en bevindingen met betrekking tot de ontwikkeling van een beschermingsplan samengevat.

De Grote Mantelmeeuw is vooral een niet-broedende bezoeker en heeft een wijdverspreide verspreiding over het Nederlands Continentaal Plat (NCP) gedurende het hele jaar. De trend tussen 1991 en 2020 is licht dalend, maar de kleine Nederlandse broedpopulatie groeit. De huidige staat van instandhouding van de Grote Mantelmeeuw bevindt zich volgens de IUCN/BirdLife-criteria in de gunstige categorie ‘Least concern’, zowel wereldwijd als in Europa. Vanwege een achteruitgang gedurende een periode van drie generaties komt de soort echter in aanmerking voor een rode lijst in de categorie ‘Vulnerable’. De Staat van Instandhouding SvI in Nederland is ‘gunstig’ voor de broedende mantelmeeuw en ‘ongunstig’ voor de niet-broedende mantelmeeuw, maar de broedproductiviteit van de Noordzeepopulatie is onvoldoende.

Zilvermeeuwen zijn in de zomer vooral geconcentreerd nabij de kust, waar zich broedkolonies bevinden. In de herfst en winter verspreiden vogels zich verder over zee, maar de belangrijkste verspreiding blijft langs de kust. De huidige staat van instandhouding van de Zilvermeeuw volgens de IUCN/BirdLife-criteria is ‘Least concern’. Op de Europese rode lijst van vogels is de soort vanwege de gematigde populatieafname in de categorie ‘Near-threatened’ geplaatst en binnen de EU wordt de soort als ‘Vulnerable’ beschouwd. De trend tussen 1991 en 2019 is sterk dalend. De Nederlandse populaties van broedende en niet-broedende Zilvermeeuwen zijn niet in een gunstige toestand.

Bedreigingen/druk voor beide soorten omvatten een afname van de beschikbaarheid van voedsel (sluiting van stortplaatsen, vermindering van visserij discards), verlies en verstoring van en predatie op broedplaatsen, vogelgriep, aanvaringen met windturbines, bijvangst, vervuiling, inname van zwerfvuil en verstrikking in afval.

Er worden veel kennislacunes geïdentificeerd: status (reproductiesucces, demografische parameters), voedselbeschikbaarheid (kleine pelagische vissen), bijvangstrisico in de visserij, aanvaringsrisico in offshore windmolenparken.

Er worden maatregelen voorgesteld die gericht zijn op de problemen waarmee beide zeevogels te kampen hebben. Er wordt onderscheid gemaakt tussen prioritaire maatregelen en overige maatregelen. Dit is samengevat in onderstaande tabel. Deze beschermende maatregelen kunnen worden beschouwd als ‘directe preventie’ gericht op het voorkomen van een specifieke negatieve impact, zoals extra sterfte (bijvoorbeeld

een aanvaring met een windturbine) of 'indirecte preventie' gericht op het vergroten van de veerkracht van de bevolking. Voor beide vogelsoorten kan effectief behoud van populaties alleen worden bereikt door internationale samenwerking en coördinatie van een aantal van de maatregelen, vooral die betrekking hebben op de visserij, de ontwikkeling van windenergie en het vergroten van het broedsucces, omdat de meeste meeuwen die de Nederlandse wateren gebruiken elders broeden, in gebieden waar de Nederland geen directe managementinvloed heeft.

Probleem	Doel	Actie
Prioritaire maatregelen		
Voedselgebrek	Compenseer effecten van reductie van visserij discards	Indirecte maatregelen die andere beperkingen voor de meeuwenpopulatie verminderen (zie hieronder voorgestelde acties, bijvoorbeeld voor broedhabitats) Onderzoek naar de rol van natuurlijk pelagisch voedsel in het dieet van meeuwen en dienovereenkomstig handelen door de visserij op pelagische bestanden te verminderen
	Compenseer effecten van afgenomen toegang tot menselijk afval	Indirecte maatregelen
Gebrek aan veilige broedplaatsen	Zorg voor voldoende goede broedgebieden waar meeuwen geen onaanvaardbare problemen vormen voor andere soorten die beschermd moeten worden of voor menselijke bewoners	Handhaaf en verbeter broedplaatsen Creëer nieuwe / alternatieve broedplaatsen Houd bij het toepassen van deze maatregelen rekening met het vestigingsgedrag van meeuwen Opzetten van experimenten
Offshore windparken	Mitigeer effecten van mortaliteit door aanvaring	Plan windparken in gebieden met de minste vliegende vogels Ontwikkeling en toepassing van mitigerende maatregelen gericht op reductie van aanvaring Bijdrage en initiatief tot 'indirecte' maatregelen in broedgebieden buiten Nederland
Vogelgriep	Reduceer de verspreidingskans van vogelgriep vanuit pluimveebedrijven naar wilde vogels	Vaccineer pluimvee
	Reduceer verspreiding van vogelgriep binnen kolonies (en andere gebieden waar zich veel vogels verzamelen	Verwijder dode vogels in broedkolonies
Andere maatregelen		
Bijvangst		Verbeter onderzoek en monitoring van bijvangst

Probleem	Doel	Actie
	Reduceer bijvangstrisico in verschillende vormen van visserij	Pleit voor het gebruik van mitigerende maatregelen. Dwing deze af indien nodig
Vervuiling en afval	Reduceer gebruik, dumping en verlies van verontreinigende stoffen, plastic en ander afvalmateriaal	Minder verontreinigende stoffen en plastic in het mariene milieu Gerichte inzet op reductie van gebruik, dumping en verlies van plastic en ander afvalmateriaal die leidt tot minder verstrikking en inname

Er wordt aandacht besteed aan het onderzoek en de monitoring om de effectiviteit van maatregelen te evalueren, maar ook aan de kanalen voor communicatie, gegevensuitwisseling en bewustwording rond dit achtergronddocument en het komende beschermingsplan en evaluaties van de effectiviteit van het plan.

Summary

In the Dutch North Sea Agreement it was agreed to develop a number of protection plans for species and habitats that are most vulnerable to offshore wind development and/or in need of protection in general, as agreed upon in international frameworks or key to nature restoration and enhancement.

Each protection plan consists of two parts: a background document and an action plan. The background document compiles and evaluates the current and scientific information. The action plan contains the measures to be taken by the Dutch government and will be drawn up by the ministry of LNV after consultation of "Noordzeeoverleg" stakeholders. The current report is the background document for the protection plan: Surface-feeding coastal seabirds. Great black-backed gull and European herring gull are selected because these species are predicted to be most vulnerable for further development of offshore wind.

In this report information is provided and evaluated for great black-backed gull and European herring gull concerning the following aspects: species descriptions, current status of the species, monitoring and research, evaluation of threats, impacts and opportunities, existing national and international conservation measures, overall status, knowledge gaps and possible actions. Only the most relevant information and findings with regard to development of a protection plan are summarized below.

The great black-backed gull is mainly a non-breeding visitor with a widespread distribution across the Dutch Continental Shelf (DCS) throughout the year. The trend between 1991 and 2020 is moderately decreasing, but the small Dutch breeding population is growing. The current conservation status of great black-backed gull according to the IUCN/BirdLife criteria is in the favourable category of 'Least concern', both worldwide and in Europe. However, due to a decline for a three generations period, the species is a candidate for red-listing in the 'Vulnerable' category. The conservation status (Staat van Instandhouding SvI) in the Netherlands is Favourable for breeding great black-backed gull and Unfavourable for non-breeding great black-backed gull, but the breeding productivity of the North Sea population is insufficient.
European herring gulls are mostly concentrated near the coast during the summer, where breeding colonies are located. In fall and winter birds disperse further at sea, but the main distribution remains coastal. The current conservation status of herring gull according to the IUCN/BirdLife criteria is 'Least concern'. On the European red list of birds, the species has been placed in the category 'Near-threatened' in view of the moderate population decline, and within the EU its status is considered 'Vulnerable'. The trend between 1991 and 2019 is strongly decreasing. Dutch populations of breeding and non-breeding European herring gull are not in favourable status.

Threats/pressures to both species comprise decrease in food availability (closure of landfills, reduction of fishery discards), loss and disturbance of and predation at breeding sites, avian influenza, collision to wind turbines, bycatch, pollution, ingestion of litter and entanglement in waste.

Many knowledge gaps are identified: status (breeding productivity, demographic parameters), food availability (small pelagic fish), bycatch rates in fisheries, collision rates in offshore wind farms.

Measures are proposed targeted at the problems encountered by both seabirds. A distinction is made between priority measures and other measures. This is summarised in the table below. These protective measures can be regarded as either 'direct prevention' aiming to prevent a specific negative impact such as added mortality (e.g. collision with a wind turbine) or 'indirect prevention' aiming at increasing the resilience of the population. For both bird species effective conservation of populations can only be achieved by international cooperation and coordination for several of the measures, primarily those pertaining to fisheries, wind energy development and enhancement of breeding success because most gulls using Dutch waters breed elsewhere, in regions where the Netherlands have no direct management influence.

Problem	Objective	Action
Priority measures		
Food shortage	Compensate for effects of the reduction of fisheries discards	Indirect measures which reduce other limitations on the gulls' population (see actions proposed below, e.g. for breeding habitats) Conduct studies on the role of natural pelagic food in the gulls‛ diet and act accordingly by reducing fisheries on pelagic stocks
	Compensate for effects of reduced access to human waste	Indirect measures
Shortage of safe breeding habitat	Safeguard sufficient good breeding habitat at sites where gulls pose no unacceptable problems to other species of conservation concern or to human inhabitants	Maintain and enhance existing breeding sites Create new / alternative breeding sites Consider settling behaviour of gulls in applying these measures Set up experiments
Offshore wind farms	Mitigate impacts of collision mortality	Plan windfarms in areas with fewest flying birds Develop and employ collision-reducing mitigating measures Contribute to and initiate 'indirect' measures in breeding areas abroad
Avian influenza	Reduce probability of transmission from poultry industry to wild birds	Vaccinate poultry
	Reduce transmission within colonies (and other sites where many birds gather)	Remove dead birds in breeding colonies
Other measures		
Bycatch	Reduce bycatch risk in various types of fishery	Study and monitor bycatch better Advocate use of mitigating measures Enforce if necessary
Pollution and litter	Reduce use, disposal and loss of pollutants, plastic, and other waste materials	Less plastic and pollutants in the marine environment Entanglement in and ingestion of plastic and other waste materials

Attention is given to the research and monitoring to evaluate effectiveness of measures, as well as to the channels for communication, data sharing and awareness around this background document and the forthcoming protection plan and evaluations of the effectiveness of the plan.

1 Species (group)/habitat description

1.1 Name of species (group)/habitat

This plan covers the group of flying and/or shallow diving foraging birds of the coastal waters, with a focus on two priority species:

Name	Name (UK)	Name (NL)
Larus marinus	great black-backed gull	grote mantelmeeuw
Larus argentatus	European herring gull	zilvermeeuw

1.2 Rationale for selection of species (group)/habitat for a protection plan under MONS

In the North Sea Agreement (OFL, 2020) it was agreed to develop a number of protection plans for species and habitats that are (1) most vulnerable to offshore wind development, (2) in need of protection in general, as agreed upon in international frameworks (EU Habitat Directive (HD), EU Bird Directive (BD), OSPAR, Red Lists, etc.), and (3) those key to nature restoration and enhancement.

During the preparation of MONS (Monitoring-Onderzoek-Natuurversterking-Soortenbescherming[1]) (Asjes et al., 2021) it was proposed for birds to write conservation plans per functional group, or alternatively for individual species within the groups.

The request of the ministry of LNV was to first focus on the bird species considered most vulnerable to offshore wind development, as identified under KEC 4.0 (Potiek et al., 2022): great black-backed gull *Larus marinus*, herring gull *Larus argentatus*, black-legged kittiwake *Rissa tridactyla* and northern gannet *Morus bassanus.* These species were identified by modelling the effect of wind energy development scenarios on the long-term survival of the population for different scenarios for 10 seabird species and 8 migratory bird species.

Combined with the concept of functional groups, this choice resulted in two conservation plans:

Plan 1: Surface-feeding birds of the coastal waters (this plan);
Plan 2: Offshore foraging seabirds;

1.3 Legislative and policy context

The Netherlands has obligations to protect seabirds under the Birds Directive, the Marine Strategy Framework Directive (MSFD) and the North Sea Agreement. This species protection plan has been developed as an obligation from the North Sea Agreement. For an overview, see *Table 3* in Annex 1.

[1] Monitoring-Research-Nature-enhancement-Species protection

1.4 National and international conservation targets

The MSFD targets are currently being updated by the Dutch government as part of the 6-year cycle of the MSFD. The update is expected in 2024.

- MSFD Good Environmental Status (Ministerie van Infrastructuur en Waterstaat & Ministerie van Landbouw Natuur en Voedselkwaliteit, 2018):
  - Overarching: "population densities and demography of populations of birds indicate healthy populations."
  - D1C2: "for each functional group, the population size (breeding pairs, or individuals outside of the breeding season, averaged over a recent 6-year period) of at least 75 percent of the species is ≥80% (species laying 1 egg per clutch) or ≥75% (species laying >1 egg, including gulls) of a baseline value derived from observed abundance in the period 1991-2000 (OSPAR 2023)".
  - D1C2: "populations of marine birds must comply with the national targets from the EU Bird Directive".
  - D1C3: "breeding success must on average (over a recent 6-year period) be sufficient to prevent a population decline of 30% or more over three generations" (OSPAR 2023).

- MSFD Environmental targets:
  - D1T1: "contributing to the further development of the assessment of bird populations and identifying the most important pressures at regional level" (OSPAR).
  - D1T2: "recovery of undisturbed situation for sea mammals and birds due to reduced fishery in the Natura 2000 areas "De Vlakte van de Raan" and "the North Sea Coastal Zone" (in the framework of the VIBEG agreement)".
  - D1T3: "achieving the conservation objective for habitat types and species in the Natura 2000 areas at sea (EU Bird and Habitat Directives)".
  - D1T7: "monitoring of bird collisions with wind turbines in the framework of Wozep".

- Natura 2000 and the Birds Directive:
  - Maintain size and maintain habitat quality for population conservation of great black-backed gull. A favorable reference value for the national non-breeding population has been set at 17.000 birds (seasonal average) (SOVON, 2022).
  - Maintain size and maintain habitat quality for population conservation of herring gull. A favorable reference value for the national breeding population has been set at 67,000 pairs; that for the non-breeding population at 140,000 birds (seasonal average) (SOVON, 2022).

- Nature conservation act
  - The protection, maintenance or restoration of biotopes and habitats in sufficient variety is required under the Nature conservation act for all bird species naturally living in the wild in the Netherlands. The current conservation status of these bird species is described in section 2.4.

1.5 Description/definition of species

1.5.1 Great black-backed gull

Figure 1: Great black-backed gull (Larus marinus) adult (left) and juvenile (right). Photos: Oscar Bos, Hans Schekkerman.

Appearance
With a length of 71–79 cm and a wingspan of 152–167 cm, the great black-backed gull is the largest gull species worldwide. Mature individuals can be recognized by their dark grey to black mantle, back and upper wings which contrast with the white head, neck, and underparts. They have a large yellow bill with a subterminal red spot, and pinkish legs. Juveniles have a more checkered appearance, being heavily mottled white and pale brown, with an all-dark bill. The grey-brown coloring gradually changes to the mature plumage in four to five years.

Lifestyle
The species is opportunistic and omnivorous, eating everything that can be swallowed: fish, birds, eggs, small mammals, insects, marine invertebrates (molluscs), carrion, human refuse and fishing discards (BirdLife International, 2022a; del Hoyo et al., 1996; Good, 2020). The food types taken strongly depend on the foraging area. Along rocky coasts, the species mainly forages in low intertidal and shallow subtidal zones; diving into shallow waters to capture sea urchins, crabs and mussels (Good, 1992). On open sea the gulls tend to concentrate around features such as submarine mountains, sandbanks and small upwelling zones (Pierotti, 1988). Great black-backed gulls also regularly forage behind fishing vessels. During low tide the species also forages on mudflats to take worms and small bivalves. On land the eggs and chicks of co-occurring gull species (e.g. herring gull) are eaten regularly (Lock, 1973; Pierotti, 1979). In general, juveniles tend to use terrestrial feeding habitats, such as refuse dumps, considerably more than adults (Burdon et al., 2017; Cramp & Simmons, 1983; Good, 2020; Washburn et al., 2013).

The great black-backed gull is a partially migratory bird. Gulls from northern breeding grounds migrate southwards during winter (down to the Iberian Peninsula along the east Atlantic coasts), while birds breeding further south remain at their breeding latitude year-round (Cramp & Simmons 1983, Good 2020). The North Sea is particularly important as a migration area and wintering area (Skov et al., 1995), for birds originating from breeding areas in the UK and Germany, up to northern Scandinavia and NW Russia (Spina et al., 2022).

The great black-backed gull breeds mainly on rocky coasts along the North Atlantic, and since 1993 also settled in the Netherlands as breeding bird (SOVON, 2023b). Breeding occurs both in small colonies (50-100 individuals) and solitarily (Cramp & Simmons, 1983; del Hoyo et al., 1996). Pairs tend to come back together yearly at the start of the breeding season (March/April) and return to the same nest site. The nest, which is made of grass, moss, and seaweed, is placed on rocky, sandy, or grassy surfaces. Normally 2-3 eggs are laid between late April and late June and incubated for 30-32 days (BirdLife International, 2022a; Lock, 1973). The chicks fledge 7-8 weeks after hatching and leave the breeding grounds together with their parents in

early fall (Burdon et al., 2017; Cramp & Simmons, 1983). Great black-backed gulls are long-lived birds; the oldest ringed bird has been known to live for at least 29 years (Euring, 2023).

1.5.2 European herring gull

Figure 2 European herring gull (Larus argentatus) adult (left) and juvenile (right). Photos: Oscar Bos, Hans Schekkerman.

The European herring gull is an abundant, widespread and adaptable large gull species. Two subspecies are differentiated in Europe: *Larus a. argentatus* breeding in Scandinavia and NW Russia and *L. a. argenteus* breeding in Western Europe (including The Netherlands) and Iceland. The species' name European herring gull distinguishes the European taxon from the American herring gull *Larus smithsonianus* with which it was formerly considered to form one species. In the remainder of this document, we will use the vernacular name "herring gull" to denote European *L. argentatus*.

Appearance

The herring gull with an average length of 55-67 cm and a wingspan of 125-155 cm is a species endemic to Europe and a common bird in many European coastal and inland areas. The adult gulls in breeding plumage have a mostly white body (head, neck, tail, and underparts) with a light grey back and wings tipped black and white. They have a yellow bill (with a subterminal red patch), a yellow to light orange iris, and pinkish legs. In nonbreeding plumage (September-March) adults attain irregular grey-brown speckling on the head and neck. Males are noticeably larger than females, with larger bills. Juveniles are mostly brown with darker patterning and have dark-colored eyes and bill. They undergo several plumage cycles before they reach adulthood after four years (Cramp & Simmons, 1983).

Lifestyle

The herring gull has a very broad diet and may consume nearly any food source available. The diet includes fish, marine invertebrates (crabs, molluscs, starfish, or marine worms), small birds or chicks, bird eggs, rodents, earthworms, insects, berries and tubers, and human offal (BirdLife International, 2022b; Camphuysen, 2013; del Hoyo et al., 1996). Herring gulls regularly forage behind fishing boats and frequently visit waste dumps and sewage outfalls (del Hoyo et al., 1996; Hüppop & Wurm, 2000). Foraging distances vary per colony/location, but typically do not reach further than 100 km (Klein, 1994; Sell & Vogt., 1986; Spaans, 2002; Witt et al., 2008). Compared to their ecological sibling lesser black-backed gull, herring gulls breeding in The Netherlands derive a greater proportion of their food from intertidal habitats (mudflats and seawalls) and from terrestrial sites (Camphuysen, 2013). The herring gull is quite sociable outside the breeding season and congregates in large groups at preferred locations. They tend to return to the same foraging sites their entire life (Shamoun-Baranes & Van Loon, 2006)(Burdon et al., 2017). Most herring gulls in the Netherlands remain relatively close to their breeding grounds year-round and show limited southward winter movements (Camphuysen, 2013).

Nesting occurs on the ground in (often large) colonies in coastal dunes, harbors and industrial areas, but also on rooftops in industrial areas and increasingly in cities. In larger colonies herring gulls often breed mixed with Lesser black-backed gulls, although there usually is some separation with herring gulls occupying the more rugged and the black-backs the flatter areas of the colony (Camphuysen & Gronert, 2010; Spaans, 1998). The herring gull has one clutch per year, consisting of 2-3 eggs. Egg-laying occurs from late April to late June, peaking in early May. With an average incubation period of around 28 days, hatching starts in early June and the young fledge after around 35-49 days (Burdon et al., 2017; Camphuysen, 2013).

Herring gulls are known to have lived for 35 years (Euring, 2023), although a typical lifespan is about 12 years (BTO, 2023). Annual survival is 88-92% in adult birds, but markedly lower (50-60%) in the first year after fledging (e.g., Schekkerman e.a. 2021).

1.6 Ecological importance

These bird species are top predators. Besides their important role in shaping marine food webs and characteristics of their prey species (by natural selection), marine top predators often exhibit clear responses to environmental variability or change and indicate anthropogenic impacts on ecosystems (Hazen et al., 2019). Seabirds have been suggested as good candidates for ecological indicators of the marine environment (Cairns 1992).

1.7 Ecosystem services

Ecosystem services are defined as the contributions that ecosystems (i.e. living systems) make to human well-being (Haines-Young & Potschin, 2018).

Seabirds can contribute to shaping coastal ecological processes and services in a multitude of ways, among which directly influencing trophic status, biodiversity and food webs (Signa et al., 2021). The input of ornithogenic nutrients near breeding colonies can locally increase primary production and may trigger bottom-up effects on consumers. Seabirds are natural scavengers and thereby contribute towards waste breakdown by recycling organic matter (e.g. discarded fish) back into the marine ecosystem (Burdon et al., 2017). This is part of the ecosystem service category of regulation and maintenance (Haines-young & Potschin, 2011).

Seabirds also contribute to coastal and marine views ('seascapes'). Herring gull and great black-backed gull are an integral part of the seascape that is widely recognized by society, as evidenced by their frequent occurrence in literature and other arts. They therefore supply a relatively high contribution to the ecosystem service 'formation of seascapes' (Burdon et al., 2017).

1.8 Commercial importance

Although eggs and chicks of were an important source of food in some coastal human communities in the past, currently these bird species have no commercial importance.

2 Current status of the species

2.1 Distribution in the international North Sea and Dutch North Sea

2.1.1 Great black-backed gull

Great black-backed gulls are seabirds with a wide distribution range (Figure 3), they occur at sea far from the coast as well as in coastal waters and on land, but are mostly recorded near the shores of the northern Atlantic Ocean. The gulls breed along all kinds of coasts; rocky or sandy, barren or vegetated, oceanic or estuarine and even slightly inland, for example in closed inlets in the Netherlands (SOVON 2018). The breeding grounds stretch from eastern North America and Greenland, through Iceland and Spitsbergen to northwest Russia and south via the eastern Baltic Sea and the British Isles to northwest France (BirdLife International, 2022a. About 65% of the world population of the great black-backed gull resides in Europe, with largest numbers breeding in Scandinavia, Great Britain, and Iceland. Since 1993, the great black-backed gull also found breeding ground in the Netherlands, mostly in hard-to-reach areas such as artificial islands, dams and salt marshes (Figure 4).

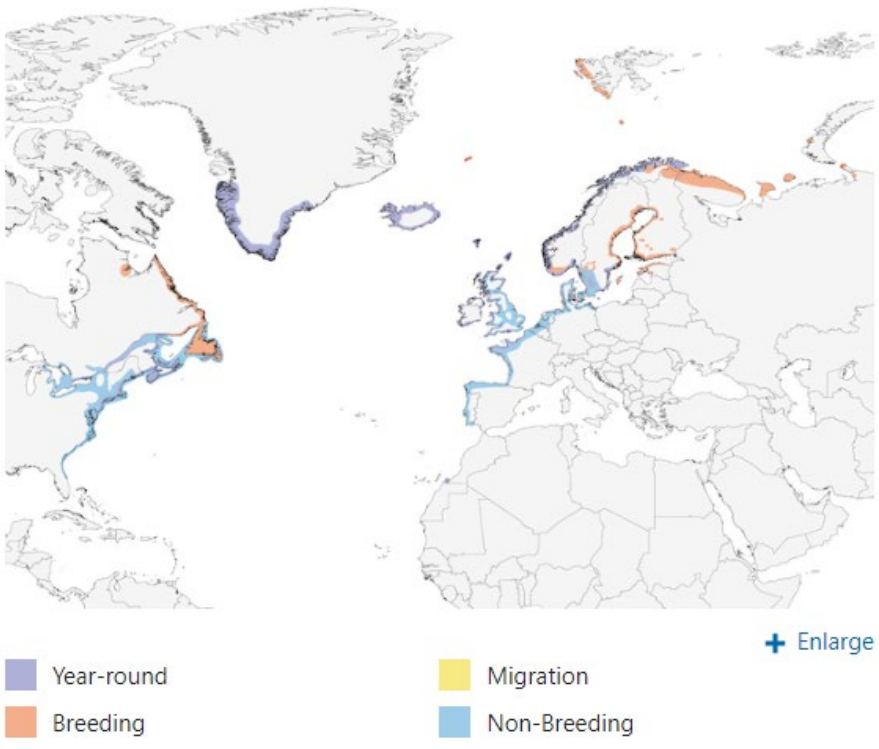

Figure 3 Great black-backed gull distribution map (From Good, 2020). The extensive at-sea distribution (particularly outside the breeding season) is not shown in this map.

The North Sea is particularly important as a migration area and wintering area for great black-backed gulls (Skov et al., 1995). On the Dutch Continental Shelf (DCS), they are observed widespread throughout the year except in late spring/early summer (*Figure 5*, *Table 1*). The birds on the DCS mainly originate from breeding areas outside the Netherlands, as the Dutch population numbers less than 100 pairs (SOVON, 2023b). About 5-10% of the flyway population resides during winter (SOVON, 2022) with the highest abundance observed in November.

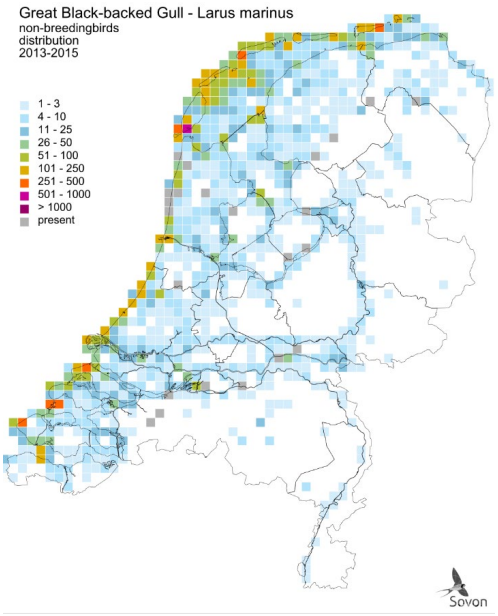

Figure 4. Non-breeding distribution of great black-backed gull in the Netherlands based on coastal and inland waterbird counts and atlas censuses (Sovon, 2018). For the distribution at sea, see Fig. 5.

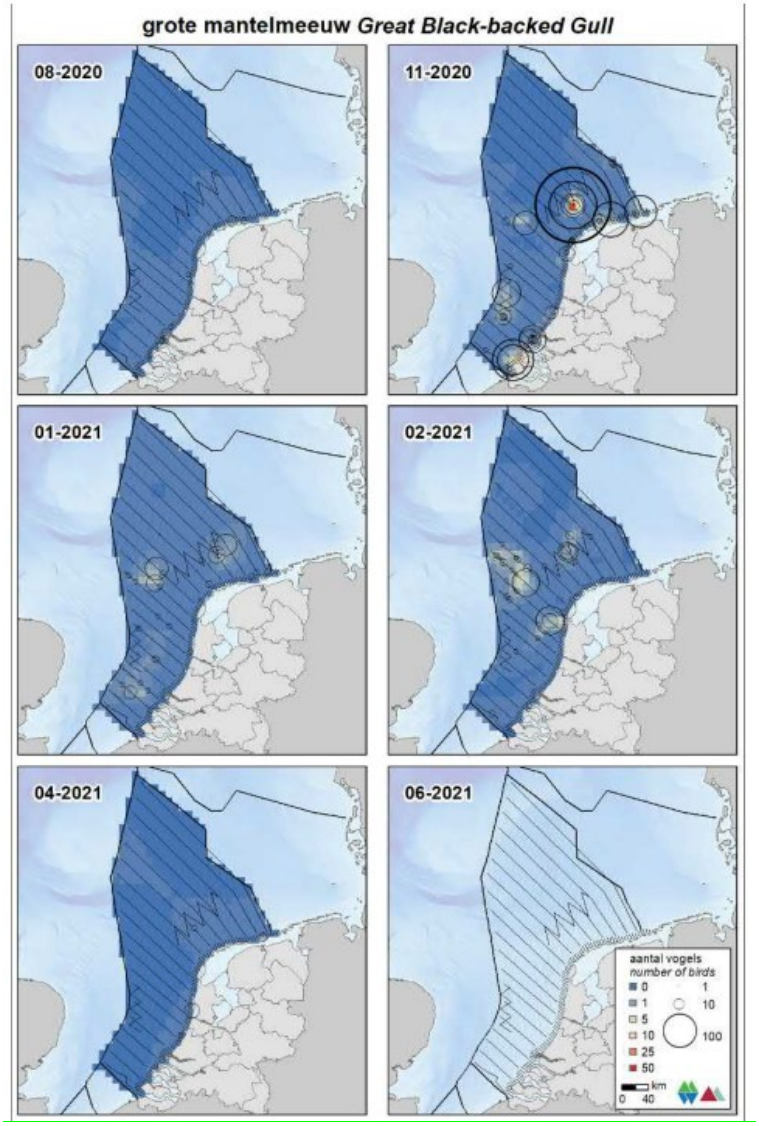

Figure 5 Distribution of great black-backed gull on the Dutch continental shelf in 2020-2021. Shown are individual sightings (circles) and interpolated density (birds/km^2) in colour (Fijn et al., 2022).

2.1.2 Herring gull

The breeding grounds of the herring gull range from Iceland, the British Isles and France through to northwest Russia. The largest breeding populations are found in the United Kingdom, France, and the Netherlands (*L. a. argenteus*) and Norway, Denmark, Sweden, and Russia (*L. a. argentatus*; BirdLife International, 2022b). In the Netherlands, large breeding colonies are concentrated in the dunes of the Wadden Sea islands and in the southwestern Delta area, and in large port and industrial areas (Sovon, 2018). Until the mid-1990s, large colonies were also present in the coastal dunes of mainland Noord- and Zuid-Holland, but these were vacated after the Red Fox became established here (Spaans, 1998). Part of these birds then moved into cities and villages in the coastal region, where they breed on rooftops, often to the chagrin of the inhabitants. Outside the breeding season, herring gulls can be found throughout the country, but they are particularly abundant in a wide strip along the coasts (Figure 7, Figure 8).

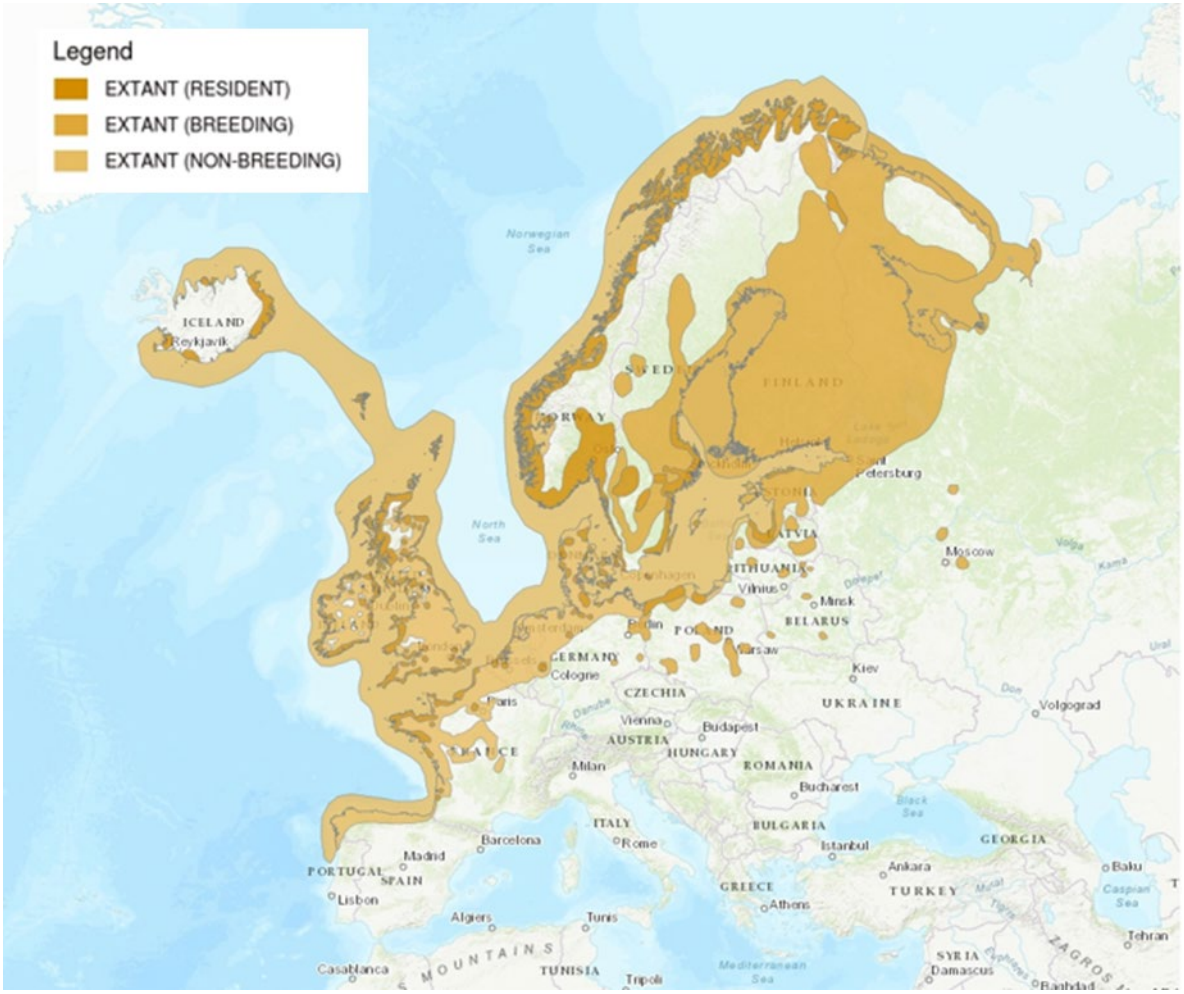

Figure 6 Distribution map of the herring gull (BirdLife International, 2021).

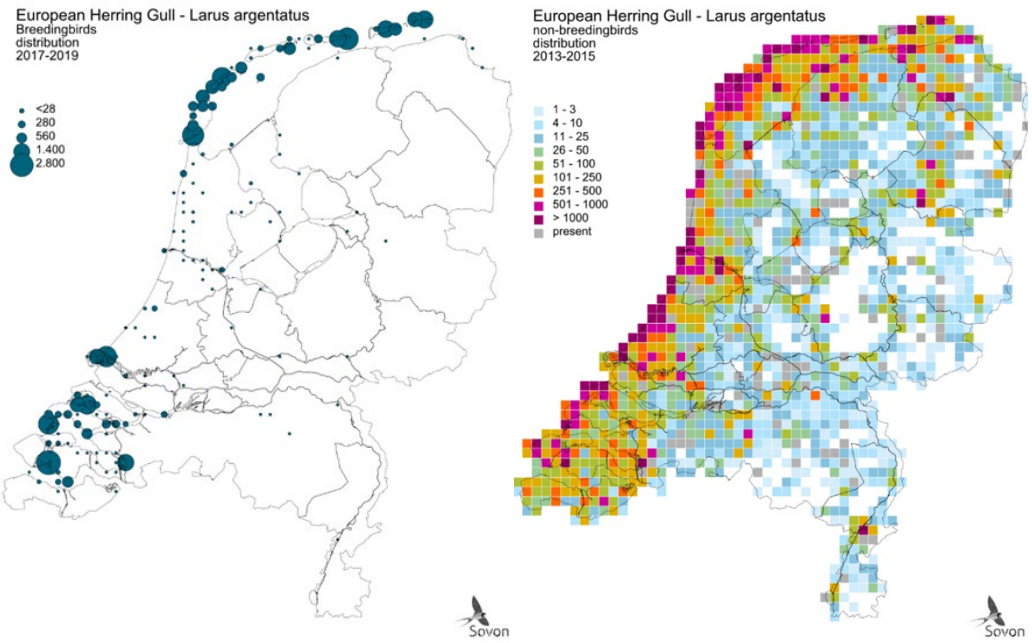

Figure 7. Distribution of herring gull in The Netherlands as a breeding bird (left) and during winter according to land-based census data (right) (Sovon, 2018). For the occurrence at sea, see Figure 8.

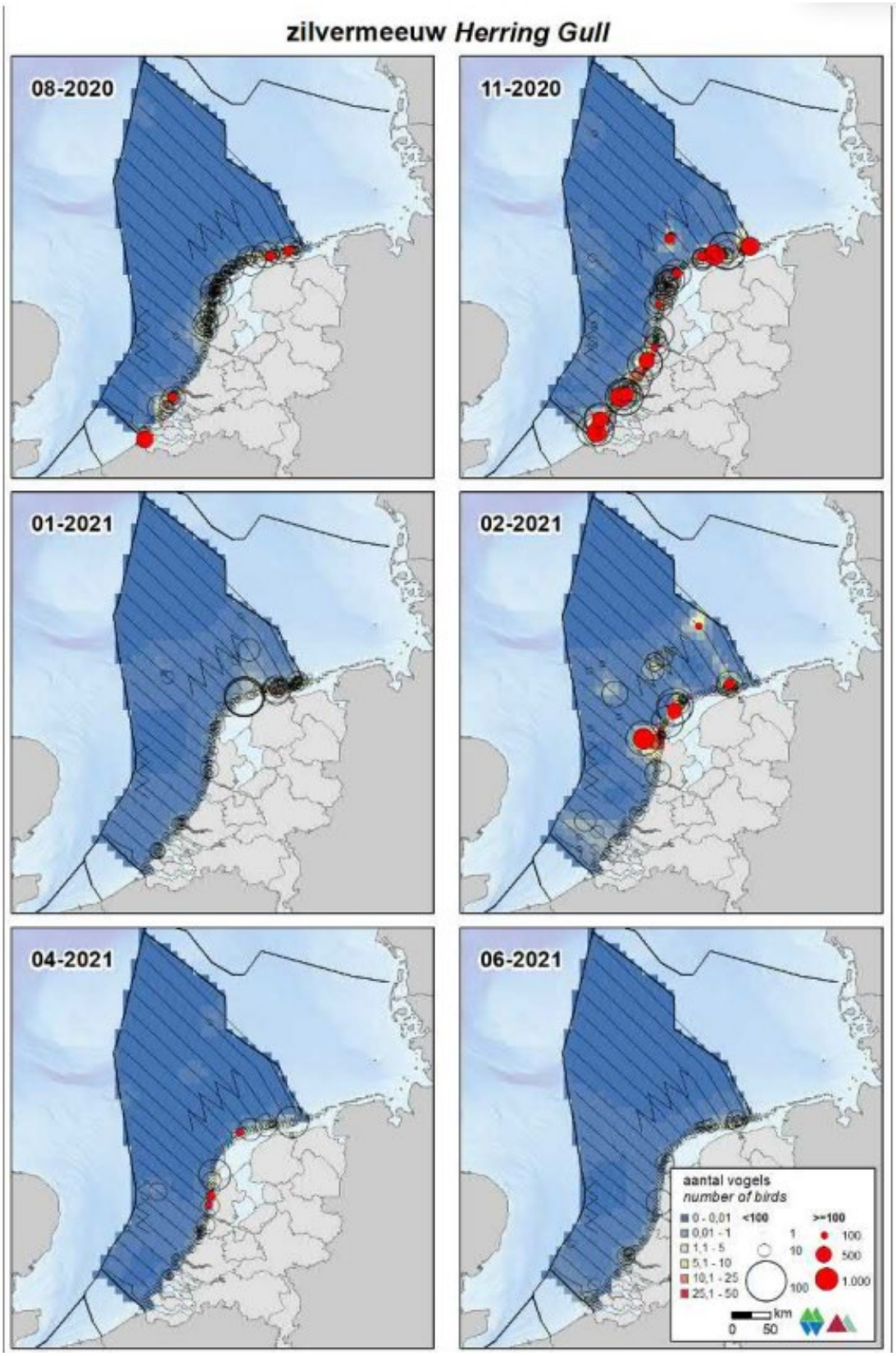

Figure 8 Distribution of herring gull on the Dutch continental shelf in 2020-2021. Shown are individual sightings (circles) and interpolated density (birds/km2) in colour (Fijn et al., 2022).

2.2 Population size in the international North Sea and Dutch North Sea

2.2.1 Great black-backed gull

The great black-backed gull showed a significant population increase between 1930 and 1975, including an expansion of its range both north- and southwards. More recently however, the world population has shown a significant decline (Langlois Lopez et al. 2022). Its size is currently estimated at 132,000-188,000 breeding pairs (translating to 396,000-564,000 individuals in total), with an estimated European population size of 79,000-119,000 pairs (Langlois Lopez et al 2022). No distinct biogeographical populations are distinguished within Europe (BirdLife 2022b).

Aerial counts over the Dutch continental shelf (outside the coastal zone) resulted in estimates of 1,520 birds on the DCS in late summer (August) in 2014 and 847 in 2021 (Fijn et al., 2015, 2022). During autumn and winter far more great black-backed gulls occur on the DCS; estimates for November were 4,905 in 2014 and 52,973 in 2021 (Fijn et al., 2015; 2022).

Numbers of great black-backed on the DCS have declined in the long term, but seem to have reached a stable level since around 2005 (Figure 9, Figure 11). A data compilation for the OSPAR QSR 2023 showed that since 1991 the great black-backed gull population has increased in (mainly Norwegian) Arctic Waters, particularly after 2010. In the Greater North Sea region, breeding numbers are currently c. 45% below the baseline value of 1991, but have been stable since c. 2005. In some subregions, notably the NE coast of Britain, the W coast of Norway and the Southern North Sea, they have shown a recovery or even a net increase in the most recent decade (Dierschke et al. 2022a). The Dutch breeding population has shown a steady increase since the species' settlement in 1993 (Figure 10). Compared to numbers breeding elsewhere in Europe, this population is still tiny however: 86-90 pairs (Sovon, 2023b).

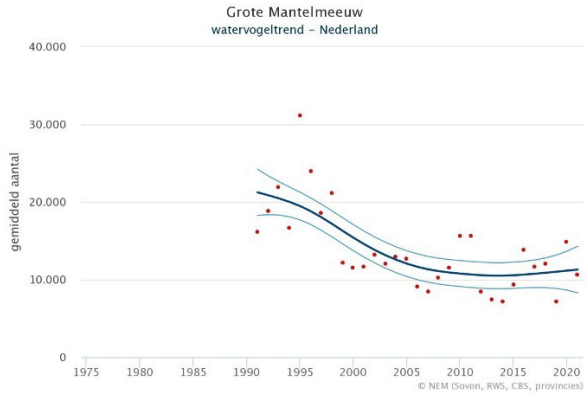

Figure 9 Number of great black-backed gulls (seasonal average) in the Netherlands (SOVON, 2023b)*. The data comes from the Waterbird Monitoring Network and systematic aerial surveys at sea. For each season the average number of birds (red dots), the trend line (dark blue) and associated standard error (light blue lines) are given. Seasons run from July to June. Trend since 1991 is a significant decrease, <5% per year; trend over 2010-2021 shows no significant change in numbers.*

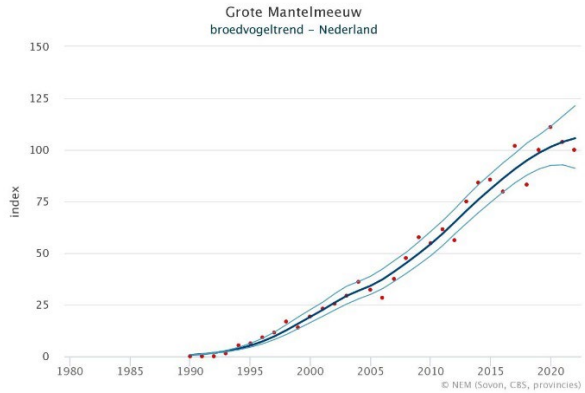

Figure 10 Trend of great black-backed gull as a breeding bird in the Netherlands (SOVON, 2023b). *Data derived from the annual survey of colonial and rare breeding birds. Shown is the annual population index (red dots) and the trendline (dark line), with standard errors (light blue lines). Trend over 1991-2020 shows significant increase, >5% a year; trend over 2012-2021 shows significant increase, <5% a year.*

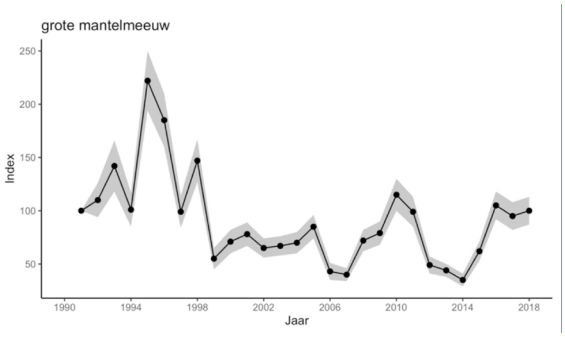

Figure 11 Indices (1991=100) with standard error of great black-backed Gull numbers on the Dutch continental shelf based on aerial counts, in 1991-2018 (Fijn et al., 2020). *This trend, combined with that based on land-based waterbird counts, is part of the national trend shown in fig. 10.*

2.2.2 Herring gull

The herring gull population consists of an estimated 531,000-608,000 breeding pairs (1,060,000-1,220,000 birds) (BirdLife International, 2022b). Data compiled for the OSPAR QSR 2023 showed that herring gull populations in the Greater North Sea have declined by about 40% between 1991 and 2008 and then stabilised. In the Southern North Sea however they have declined by a further 10% since 2008. In the Arctic Waters (mainly Norway), a similar decline has occurred in the 1990s but since 2010 numbers have recovered and now surpass the baseline by c. 30% (Dierschke et al. 2022a).

The development of the Dutch breeding population of herring gull in the 20th century was comprehensively described by Spaans (1998) and Camphuijsen (2013). After periods of increase in 1920-1940, and even stronger in 1970-1985, this population has shown a long-term decline, by more than 50% since ca. 1990 (Figure 12). About 37.000 breeding pairs were present in 2015-2020 (Sovon, 2022).

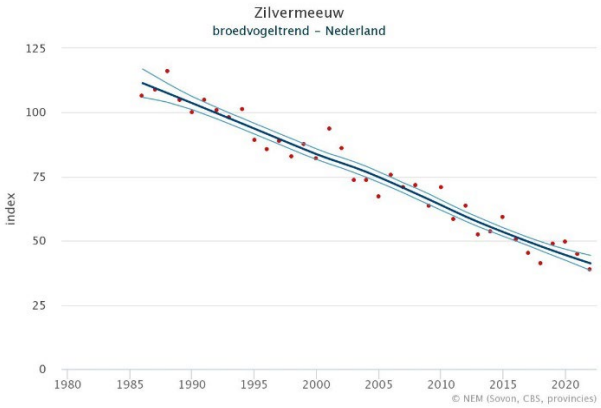

Figure 12 Breeding bird trend of herring gull in the Netherlands. Shown are the annual population indexes and the trendline (dark line) with 95% confidence limits (light blue lines). Since 1990 significant decrease, <5% a year; 2011-2022 significant decrease, <5% a year (Sovon, 2023a).

The non-breeding population in the Netherlands is estimated at 130,000-290,000 individuals, representing the estimated migration maximum in September-November 2016-2021 (SOVON 2023). The population trend outside the breeding season does not show significant change either since 1980 or in the last 12 years, although some decline seems to have occurred since a maximum in the mid-1990s (Figure 13). Since the start of the monitoring on the DCS in 1990, the numbers of herring gulls in the Dutch North Sea decreased significantly (Figure 14). Measured over the last 12 years, the trend is moderately increasing.

In the summer the birds are mostly concentrated near the coast where breeding colonies are located. During autumn the birds spread out over the Southern North Sea and the English Channel. Recent estimates based on counts in the North Sea report 83,000 (22,000 – 315,000) gulls on the DCS outside the coastal zone (within 12 miles from the coast) and 141,000 (86,000 – 231,000) in the coastal zone (Fijn et al., 2022; Table 2) (see *Table 1*).

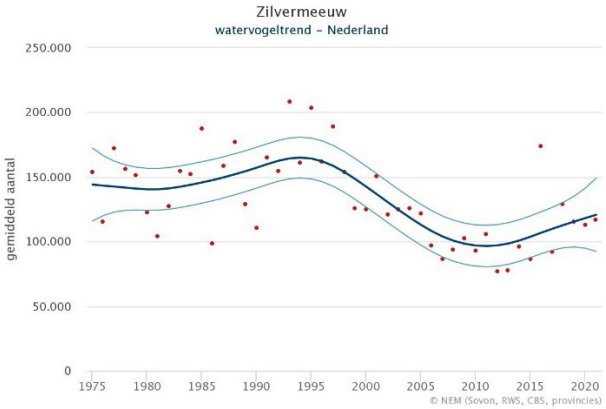

Figure 13 Population trend of herring gull (non-breeding) in the Netherlands. The data comes from the Waterbird Monitoring Network and systematic aerial surveys at sea. For each season the average number of birds (red dots), the trend line (dark blue) and associated standard error (light blue lines) are given. Trends both since 1980 and over seasons 2010-2021: no significant change in numbers (SOVON, 2023a).

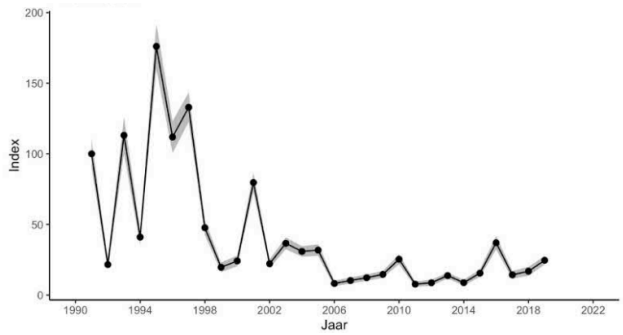

Figure 14 Index (1991=100) with standard error of herring gull for the period 1991-2019 on the Dutch continental shelf based on aerial counts (Fijn et al., 2022). This trend, combined with that based on land-based waterbird counts, is part of the national trend shown in fig. 13.

Table 1. Estimated population size (per aerial survey) of herring gulls and great black-backed gulls on the Dutch Continental Shelf (DCS) and coastal zone in 2017-2021, based on aerial counts. Means and range (min-max) are given for three periods of the year (source: MWTL).

	autumn (Aug-Sep)		winter (Nov-Feb)		spring (Apr-Jun)	
	mean	range	mean	range	mean	range
great black-backed gull						
offshore (>12 nm)	1310	291 - 2104	15523	1335 - 52973	510	0-1262
coastal zone (<12 nm)	708	46 - 1617	2037	144 - 11259	223	0-955
total	2018	337 - 3721	17559	1479 - 64232	733	0-2217
herring gull						
offshore (>12 nm)	729	272 - 1484	13093	436 - 83221	3124	281-9472
coastal zone (<12 nm)	14140	2339 - 47401	21169	583 - 141281	9963	4103-16281
total	14869	2611 - 48885	34262	1019 - 224502	13087	4384-25753

2.3 Condition/quality in the international North Sea and Dutch North Sea

2.3.1 Breeding productivity

Because successful reproduction in birds depends on a multitude of environmental conditions being adequate, and reproduction is one of the key drivers of population development, breeding productivity of seabirds is a useful indicator of the quality of their environment, as acknowledged by its inclusion as a formal GES indicator in OSPAR and EU MSFD assessments (OSPAR 2023).

The most recent assessment for the OSPAR region Greater North Sea shows that recent breeding productivity of great black-backed gulls has been insufficient to compensate for mortality levels reported for this species in the literature, and would if maintained over three generations (c. 35 years) result in a population decline of ≥50%, leading to an IUCN Red List status as 'Endangered' (Frederiksen et al., 2022). For the small Dutch breeding population the situation is more favourable, as indicated by its growth and breeding success estimates from the SW Delta area which indicate that this growth is enabled by local productivity (Schekkerman et al., 2017). In the OSPAR region Arctic Waters, including Norwegian coasts where part of the population wintering in the North Sea breeds, recent breeding productivity of great black-

backed gull is just high enough to balance mortality, corresponding to the IUCN category 'Least Concern' (Frederiksen et al. 2022).

For herring gull, the most recent assessment indicates that recent breeding productivity in the Greater North Sea (*L. a. argenteus*) is so low that a decline of ≥70% could occur over three generations if maintained, putting the subspecies in the 'Critically Endangered' Red List category. This assessment includes data from the Netherlands, which also indicate that breeding productivity is insufficient to keep the population stable (Koffijberg et al., 2020, Schekkerman et al., 2021). In Arctic Waters from which wintering *L. a. argentatus* originate, recent breeding productivity just balances mortality, and hence meets the threshold for 'Least concern'.

Condition/quality of these species' North Sea habitats are determined for a large part by pressures arising from human activities and natural and climate processes. Such pressures are described in chapter 4 of this document.

2.4 Conservation status

2.4.1 International

The current conservation status of great black-backed gull according to the IUCN/BirdLife criteria is in the favourable category of 'Least concern', both worldwide and in Europe (BirdLife International, 2022c). However, Langlois Lopez et al. (2022) published a reconstruction of the worldwide population trajectory of this species between 1985 and 2021, and reported a decline of 43-48% over this period spanning three generations, rendering it a candidate for red-listing in the 'Vulnerable' category. The decline has been strongest in North America (c. 69%); in Europe it was estimated less steep (c. 28%, though with a wide confidence interval of 0.4-50%).

The current conservation status of herring gull according to the IUCN/BirdLife criteria is 'Least concern' (BirdLife International, 2022c). On the European red list of birds, the species has been placed in the category 'Near-threatened' in view of the moderate population decline, and within the EU its status is considered 'Vulnerable' (BirdLife International, 2022b).

2.4.2 Netherlands

Information about the national conservation status (in Dutch: *Staat van Instandhouding* SvI) is used as an aid in conservation policy for birds in the Netherlands[2]. Dutch populations of both species are not in favourable status, except for the still small but growing breeding population of great black-backed gull (*Table 2*). This latter population is growing steadily, but is still small, below 100 pairs. For this reason the species is included In the *Red List of declining and threatened breeding birds in the Netherlands* as 'sensitive'. The non-breeding population of great black-backed gull shows a long-term decline and is currently 35% below the Favourable Reference Value (FRV) set at 17,000 birds (seasonal average). Although recent developments on the breeding grounds in the Greater North Sea indicate stabilisation, a swift recovery is deemed unlikely (Sovon, 2022).

The Dutch breeding population of herring gull is in long-term decline and current numbers (c. 37,000 pairs) fall far short of the national Favourable Reference Value set at 67,000 pairs based on numbers around 1980, the time when the Birds Directive came into force. Although the long-term trend in non-breeding abundance is not significant, recent seasonal average numbers are c. 17% lower than the FRV of 140,000 birds. The situation is not expected to improve markedly in the foreseeable future (Sovon 2022).

[2] https://www.sovon.nl/bepaling-staat-van-instandhouding

Table 2 Current national conservation status of great black-backed and herring gulls in the Netherlands (SOVON, 2022).

Aspect	Great black-backed gull		Herring gull	
	Breeding	**Non-breeding**	**Breeding**	**Non-breeding**
Distribution	Favourable	Favourable	Favourable	Unfavourable-inadequate
Population	Favourable	Unfavourable-bad	Unfavourable-inadequate	Favourable
Habitat	Favourable	Favourable	Favourable	Favourable
Future	Favourable	Unfavourable-bad	Favourable	Favourable
Total status	Favourable	Unfavourable-bad	Unfavourable-inadequate	Unfavourable-inadequate

3 Monitoring and research

3.1 National research and data collection

3.1.1 Long-term monitoring

NEM and MWTL

These bird species are monitored within the Network Ecological Monitoring (NEM) and the *Monitoring van de Waterstaatkundige Toestand des Lands* (MWTL). Counting seasons run from July to June in both programs.The NEM is a collaboration between governments for the purpose of collecting nature data for policy underpinning. Breeding numbers are monitored in all larger breeding colonies (on a near-annual basis) in the Colonial Birds module of Breeding bird Monitoring Programme. The (comparatively small) part of the herring gull population that breeds scattered in urban areas is less well covered, but snapshots are obtained during national atlas projects (about once every 15 years) and in dedicated local studies in some cities. In the waterbird census program, all migrating and wintering waterbirds are monitored in all major wetland areas, including the Wadden Sea. Birds passing by in the coastal zone are counted from migration counting posts along the coast. Also within the NEM framework is the annual monitoring of herring gull breeding success in the Wadden Sea, part of a trilateral cooperation between the Wadden Sea countries (e.g. Koffijberg et al., 2021).

Birds present at sea on the Dutch Continental Shelf (DCS) are counted from airplanes in the context of the MWTL programme, run by Rijkswaterstaat (e.g. Fijn et al. 2022). In the coastal zone, counts are made six times a year, in August, November, January, February, April and June. Four counts per year are made at the open sea (August, November, January and February). A fixed flight path is followed over the entire DCS (

Figure 15), and bird numbers are extrapolated from these transect counts. In addition, some parts of the Dutch North Sea, such as the Natura 2000 areas Voordelta, North Sea Coastal Zone, Frisian Front and Brown Ridge, are examined in more detail. The census design allows for population estimates per census for each species, in addition to the assessment of trends in abundance.

The counting data is collected by Sovon and then supplied to Statistics Netherlands. Results are published as population index numbers with derived trends per species and accessible via the Sovon website. Here also other information on these bird species is made available including distribution data and Conservation Status assessments (https://stats.sovon.nl/stats/soort/5920, herring gull, and 6000 great black-backed gull). Results of the MWTL monitoring for seabirds are also available in annually published reports (in Dutch), accessible via the report database of Rijkswaterstaat (e.g. Fijn et al., 2022).

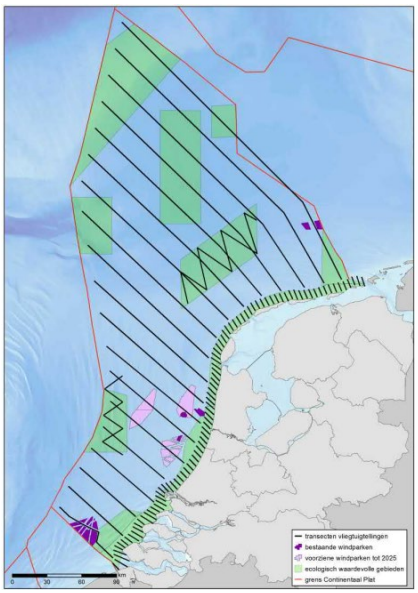

Figure 15. Monitoring transects on the Dutch Continental Shelf (DCS; border indicated by the red line), Brown Ridge, Frisian Front and coastal zone (FIJN ET AL 2022).

ESAS

Other at-sea count data such as counts from ships by Wageningen Marine Research and other parties are collected in the ESAS (European Seabirds At Sea) database (https://esas.ices.dk). Any party (government institutions, windfarm operators, ngo's) can submit seabird data, both from aerial and ship-based counts.

Beached Bird Survey

Systematic counts by volunteers of dead birds washed up along the North Sea shores (Nederlands Stookolieslachtoffer Onderzoek NSO) has run since the 1960s (Camphuysen 2023). The survey was initiated to expose and monitor the effects of chronic oil pollution at sea, but monitors any kind of mortality in seabirds. Apart from the main metric (numbers of dead birds per km of shoreline), additional data are collected on age distribution, proportion of birds that are oiled, and other indications for cause of death (e.g., Camphuysen, 2023).

3.1.2 Other research programs

Wozep and MONS

Seabirds are and will also be monitored as part of Wozep (Wind Op Zee Ecologisch Programma, a research program on the ecological effects of wind energy development at sea, starting in 2016 and ongoing), https://www.noordzeeloket.nl/functies-gebruik/windenergie/ecologie/wind-zee-ecologisch-programma-wozep/) and MONS (the 'Nature Strengthening and Species Protection Monitoring Survey' 2022 - ongoing) (Asjes et al., 2021). These two programs are and will be conducted in close collaboration. Relevant studies, planned or ongoing, are:

- Monitoring Seabirds Digital Aerial Surveys (ID-68); Monitoring of seabirds via Digital Aerial Surveys will in the future replace the current method with visual observations, which require low altitude flights not allowed within offshore wind farms. Digital Aerial Surveys are made from greater heights.
- Tagging Local Breeding Birds (ID-69). The tracking of breeding birds' movements is useful in studying the effects of wind farms and the success of breeding colonies (Asjes et al., 2022). In 2023, a start with such a tracking study was made outside the MONS framework in kittiwakes breeding on platform L7-B near the Frisian Front (Fijn et al. 2022).
- Model development (probably IBM) with the goal to model all possible effects of OWF (collisions, habitat loss and ecosystem effects) and possibly also other pressures on these species (as part of MONS), for several seabird species, possibly including both species considered in this plan. This will involve different steps like trying to quantify the effect of habitat loss.
- One year of digital aerial surveys of Borssele windfarm area and a reference area were analysed for species distribution and possible habitat loss. A repeat survey is scheduled for 2027 to see whether habituation occurred.
- Preparation of density maps of seabirds, including the two species in this plan, based on a statistical analysis of environmental variables which may explain their distribution.
- Measuring simultaneously actual collisions and avoidance behaviour inside offshore windfarm Luchterduinen, and flight behaviour inside Borssele windfarm.

3.2 International research and data collection

There is no dedicated international monitoring programme for these two species, but breeding populations are monitored in some way in all countries in the NE Atlantic region except most of arctic Russia. Collation and analysis of trend data is carried out within the framework of the OSPAR Quality Status Reporting, currently within a cycle 6 years (OSPAR 2017, 2023), and of the EU Marine Strategy Framework Directive (part I).

Monitoring at-sea abundance is carried out also in some neighbouring North Sea countries, though a complete coverage of national sea areas is only achieved in The Netherlands, Belgium and Germany. Elsewhere the coverage is incomplete and often project-directed. For example, in the UK data are collected

by the Crown estate and by offshore wind companies. Data are collected in the ESAS database, currently managed by ICES.

Of the two species covered in this plan, herring gull is a quite well researched seabird, with many hundreds of publications published on it. Great black-backed gull has been the subject of far less research work, partly because it does not breed in large colonies like herring gull does. However, for both species there are still important gaps in knowledge, particularly concerning their ecology at sea, and of sub-adult birds. Recent technological advances including leight-weight tracking devices are helping to lift the curtain on these aspects.

4 Evaluation of threats, impacts and opportunities

4.1 Sensitivity of the species in relation to pressures

As top predators gull species covered in this plan are sensitive to environmental pressures affecting lower trophic levels of the marine ecosystem. Being birds with a fairly 'slow' life history (i.e. a long lifespan but a relatively high age at first breeding and limited number of young produced per breeding year), their populations recover relatively slowly from declines in size caused by low breeding success or high mortality. On the other hand, both species have broad and flexible diet which should generally make them less sensitive to variations in the availability of a single prey type, although exceptions may occur (e.g. herring gulls and mussels in the Wadden Sea; see below).

The great black-backed gull and the herring gull experience similar pressures and threats coming from a variety of sources. However, the different breeding distribution and habitat of the species in the Netherlands and the greater dependence of herring gulls on coastal rather than offshore habitats in winter create differences in the vulnerability of each species to particular pressures.

4.2 Threats and impacts

4.2.1 Priority threats and impacts

Reduced food availability

In the last 50 years, three large changes have taken place in the availability of food to herring gulls (see below), which together are likely to have been a major driver behind the observed population decline. Impacts of low food availability on these gull species may arise by direct starvation of full-grown birds, but more readily by reductions in breeding productivity, in which cannibalistic predation of eggs and chicks is an important mechanism (Bukacinska et al., 1996; Spaans, 1998).

Closure and coverage of landfills

One of the contributing factors contributing to the rise of herring gull numbers in the middle part of the 20th century was the growing presence of open landfills where herring gulls, and to a lesser extent also great black-backed gulls, could obtain large quantities of easy food. Due to the closure of many such landfills and a change in the management (quick coverage of deposited waste) in others, far less food is nowadays available here. In the Netherlands, the decrease in accessible landfills has been more pronounced for birds breeding in the Wadden Sea (mainly since the 1980s) than for colonies in the SW Delta region (Spaans, 1998). In Northern Europe a similar decrease may have reduced opportunities to survive the local winter (Olsson & Hentati-Sundberg, 2017; Shlepr et al., 2021).

Reduction of discards in sea fisheries

Probably, fisheries have also been one of the drivers of the historical increase of great black-backed gull and herring gull in the North Sea area, through the added food availability created by discarding of unwanted fish and invertebrates. A subsequent lesser availability of fishing discards due to modifications in fishing methods since 1990 is likely to contribute to the declining trends in these species. Sherley et al. (2020) estimated that in 1990 about 510,000 tonnes of discards were produced in the North Sea, that could theoretically sustain 5.7 million seabirds, and that this had declined by 39% (equivalent to 2 million birds) in 2010. In 2013, the EU introduced a 'discard ban', an obligation to land undersized fish of commercially exploited species, which

was expected to further reduce this food source (Bicknell e.a. 2013). Reductions of breeding numbers of both herring gull in Western Scotland and great black-backed gull in Eastern Canada have been linked to reductions in regional landings of groundfish which provided offal and discards (Foster et al., 2017, Langlois Lopez et al., 2022). On the other hand, the establishment of the landing obligation since 2013 does not seem to have induced a sudden downward change in the trends of breeding abundance in the North Sea in either of these gull species (Dierschke et al. 2022a), nor in non-breeding numbers in the Netherlands (figures 7 and 9).

Loss of intertidal mussel beds

There are indications that herring gull breeding on the Dutch Wadden Sea islands have suffered from the depletion and loss of intertidal mussel beds in the Wadden Sea in the 1990s (e.g. Leopold et al., 2004). A subsequent partial recovery of these beds has coincided with the invasion of Pacific oysters, resulting in a current predominance of mixed-species beds on which herring gull may forage less effectively than on pure mussel beds (Waser et al., 2016). For the large colonies on Texel, an additional important feeding area disappeared when the seawall and mussel-rich breakwaters of the Hondsbossche Zeewering were covered with sand to improve coastal safety (Camphuysen & Gronert 2010).

Competition by fisheries?

Current fisheries levels reduce pelagic fish stocks to a level that affects surface-foraging seabirds at least in some parts of the greater North Sea basin (e.g. Frederiksen et al. 2004). Whether this also applies to large gulls in the southern North Sea is not clear but should be investigated.

Loss and disturbance of breeding sites

(This pressure does not apply to great black-backed gull breeding in The Netherlands.) Since the disappearance of formerly large breeding colonies of herring gull in the Dutch coastal dunes between Hoek van Holland and Den Helder due to colonisation of this region by Red Fox in the 1980s and 1990s, there have been two regional breeding strongholds in the Netherlands: the Wadden Sea islands (in dunes and saltmarshes) and the SW Delta area from Rotterdam southward. Here, besides colonies in coastal dunes, on dams and artificial islands, the largest colonies are present in port and industrial areas (e.g. Europoort-Maasvlakte, Moerdijk, Sloegebied) where initially much ground – often fenced and inaccessible to the public – remained unused. These areas however are gradually being developed and built upon, and thus become unsuitable for breeding gulls. In places, development is preceded by attempts to dissuade gulls from settling to avoid having to (illegally) disturb them later. In some port and industrial areas also eggs are treated with oil and nests removed to reduce numbers to combat corrosion of infrastructure by faeces and avoid unsafe situations for workers. All these activities reduce reproductive success. Some developments may also impact on survival of gulls, e.g. the establishment of a road with 80 km/h speed limit through a gull colony at the Maasvlakte where collisions with traffic occur. Moreover, the space available for safe breeding declines, causing many birds to move or settle elsewhere.

As a consequence of these developments, herring gull (and lesser black-backed gull) breeding numbers are declining strongly in the port areas. Displaced gulls have dispersed widely to mainly two types of areas elsewhere: urban habitats (e.g. in Rotterdam and The Hague), and more natural habitats in the Delta area. The level of reproductive success that they achieve there is not well known but it may be lower than when breeding in a large colony. Moreover, herring gulls may create problems in both types of habitats where they resettle. In urban areas they are perceived as a nuisance by the human inhabitants, with scaring measures and locally persecution as a result. In breeding areas of other coastal birds (often species of conservation concern), the gulls cause disturbance and predation (Schekkerman et al., 2021, Arts & Janse, 2021).

In natural breeding areas, succession of the vegetation may render breeding sites unsuitable after some time. Large gulls are less affected by overgrowth of breeding grounds than smaller species of coastal breeding birds, but eventually they clear the field in the event of thicket and forest formation. In the SW Netherlands, this pressure is evident in the Voordelta, where dune areas become overgrown with scrub. Rapid vegetation succession also occurs on breeding islands in stagnant Delta basins due to the lack of natural water dynamics; some former breeding islands here have been evacuated as a result. In some sites

active habitat management for gulls is carried out (Schekkerman et al., 2021). Vegetation succession does not yet seem to be a significant problem on the Wadden Sea islands.

Predation at breeding sites

Due to predation by settling red fox, formerly large herring gull colonies in the coastal dunes of mainland Holland have completely disappeared in the late 1980s and early 1990s (Spaans 1998). More recently, the Delta and port regions in the SW Netherlands have also been colonised by foxes, leading to abandonment of a large saltmarsh colony at Saeftinghe and exacerbating the problems caused by development in industrial and port areas described above). Meanwhile, predation by stone martens is also occurring in the eastern Delta (Arts & Janse 2021, Schekkerman et al. 2021). Increasingly, safe breeding habitat is concentrated in places where these predators do not occur (Wadden Sea Islands) or have limited access, such as islands and roofs of buildings. Locally smaller ground-predators, particularly rats, may also exert predation on gull eggs and chicks, but their impact is likely to be less severe or more local than that of the larger species.

For great black-backed gulls breeding in The Netherlands, predation seems less problematic on the whole since their breeding sites (often dams or small island surrounded by water, or saltmarshes) are often not easily accessible for predators. Abroad however, predation by invasive North American Mink in seabird breeding sites other than high cliffs has become a problem (Craik 1997).

Avian influenza

A recently arisen pressure on seabirds is the establishment of Highly Pathogenic Avian Influenza (HPAI, bird flu) as an endemic disease in seabirds worldwide, which has occurred since 2021 in Europe among colonial seabirds, including all large gulls. Both species have proven susceptible to HPAI mortality (both as young and mature birds, e.g. Slaterus et al., 2022). Although they were not among the species most affected by mass outbreaks in 2022, different bird species can be affected in different years (in part because of mutations in the virus), and their lifestyle (breeding in large colonies, scavenging on dead birds) is likely to render both gull species vulnerable.

Offshore wind energy development

Great black-backed gull and herring gull populations may suffer detrimental impact of offshore wind farms. Effects of wind farms on seabirds may arise through fatal collisions of flying gulls with turbine blades, and through habitat loss: either disturbance leading to avoidance of windfarm areas or attraction due to increased resting or foraging opportunities. In a recent review of 20 post-placement studies in offshore windfarms, both gull species were placed in the group of species being weakly attracted to OWFs (Dierschke et al., 2016), where they may rest on and forage around the turbine bases. Collision mortality is however expected to impact gull populations negatively. In a case study in a wind farm at the English coast, the herring gull has been listed as the most frequent casualty of turbine strikes (Newton & Little, 2009). Wind turbines placed along coastlines and inland waterbodies may impact this species comparatively heavily as some of these are situated near or in breeding colonies and important inshore foraging areas, with a high traffic rate of flying birds. At Zeebrugge in Belgium collisions have been shown to impact the local breeding population. Impacts of wind energy production on these two species are expected to increase in the near future. In model calculations of the expected population level effects of collisions in offshore wind farms included in the 'North Sea Programme' 2022-2027, all four scenarios evaluated resulted in a violation of the Acceptable Level of Impact (ALI) for the herring gull, and the most intensive national scenario (16.7 GW) violates the ALI for the great black-backed gull (Potiek et al., 2022). Note that this modelling assessment does not take into account mortality at existing and future land-based windfarms, and that the latest policy plans envisage instalment of 70 GW (rather than 16 GW) in Dutch offshore waters.

4.2.2 Other threats and impacts

Bycatch in fisheries

Given their feeding habits, both gull species are potentially vulnerable to mortality as bycatch in fishing gear such as longlines, trawls, and gillnets. Dierschke et al. (2022b) summarise the current knowledge on the bird species in fishing gears in the five OSPAR Regions and shows that the herring gull has been reported as by-catch in fishing gear in Arctic Waters and Greater North Sea, whereas great black-backed gull has been reported in Arctic Waters and Celtic Seas. Significant gaps were identified concerning limited data and overall poor spatial coverage (Dierschke et al. 2022b). The longline fishery is most likely to induce bycatch of gulls, but is not common in the southern North Sea area. Knowledge on bycatch rates in fisheries occurring here is poor due to insufficient monitoring, and the impact on populations is therefore unknown. In Norway, mortality events involving significant numbers of herring gull and great black-backed gull have recently been noted in a coastal purse seine fishery on herring (Christensen-Dalsgaard et al., 2022). In a study on the Norwegian coastal gill net fishery, gull species other than black-legged kittiwake (including herring gull and great black-backed gull) made up 4.1% of all seabirds bycaught, the total of which was estimated at 1580-11500 birds per year, which means 65-470 large gulls (Baerum et al., 2019).

Competition with fisheries

Pressure by fisheries on fish stocks, and climate change may have changed the availability of fish and invertebrate foods at sea, but the extent to which this may affect great black-backed gull and herring gull, two species with a wide and rather opportunistic diet, is currently unclear.

Disease (other than avian influenza)

Gulls are vulnerable to botulism and to toxic substances produced by blue-green algae. The chance of mortality as a result of this increases due to climate warming; for example, botulism is now regularly present in the Delta area in the breeding season, where previously it mainly occurred later. As botulism and blue-green algae mainly occur in freshwater areas, herring gulls are more likely to be impacted than great black-backed gulls.

Climate change

Both species have an extensive latitudinal distribution, suggesting that they can cope with a wide range of climatic conditions. However, recent warming of the climate may have some effects, either through changes in at-sea food availability or via conditions on land. Gull chicks are susceptible to mortality due to overheating in breeding colonies. This is not limited to extreme heat waves; any increase in temperature is magnified by the microclimate in the shelter of vegetation, in dune valleys and on flat asphalted roofs. In dry periods, expected to increase in the future due to climate change, access to food in agricultural areas becomes more difficult, and droughts can make breeding islands accessible to ground predators (Schekkerman et al., 2021).

Persecution

Currently, herring gulls are illegally disturbed in the Rotterdam Harbour and prevented from nesting at roofs in many cities, such as The Hague. Formerly, persecution (culling) was one of the main causes of death for both species (Coulson, 2015; Spaans, 1998). However, under the EU and national legislation it is now illegal to kill birds or destroy their eggs without a permit. Such permits are still issued for local measures to prevent safety hazards or predation on other bird species of conservation concern.

Pollution and litter

Other potential threats come from oil spills, oil pollution, microcontaminants and ingestion of plastics and other waste, They may have a currently unknown but probably limited effect on these gulls' populations.

4.2.3 Exploitation

Both species are not commercially exploited.

4.3 Opportunities

- Breeding space: offer alternative breeding spaces and strengthen existing colonies.
- Marine protected areas and offshore windfarms may increase prey availability, although also larger predatory fish may increase resulting in competition.
- Ecosystem based management of fisheries should take bird food requirements into account.

5 Existing national and international conservation measures

An OSPAR Regional Action Plan for Marine Birds is currently under development. Although the plan will partly focus on species on the OSPAR List of Threatened and Declining species (in which both gulls are not listed), it is expected that pressures identified and actions recommended in the action plan will also benefit these species.

The 'Meeuwenvisie Zuidwestelijke Delta' (Arts & Janse 2021) offers and overview of knowledge and measures for the SW Delta area.

6 Conclusion on overall status

	Surface-feeding coastal birds	
	Great black-backed gull	Herring gull
Rationale for protection	These birds are predicted to be most vulnerable for further development of offshore wind	
Distribution	Widespread across the DCS throughout the year, but mainly a non-breeding visitor; small but growing breeding population.	In summer mostly concentrated near the coast where breeding colonies are located. In fall and winter birds disperse further at sea, but main distribution remains coastal.
Population	Seasonal maximum numbers on the DCS are ca. 53,000 (13,500 – 208,000) individuals outside the coastal zone and 11,000 (5,400 – 23,000) individuals within the coastal zone. The trend between 1991 and 2020 is moderately decreasing.	In the coastal zone of the DCS highest numbers in November: 141,000 (88,400 – 231,000), outside the coastal zone in February: 83,000 (22,000 –315,000). The trend between 1991 and 2019 is strongly decreasing.
Condition	SvI habitat assessment for NL Favourable, but breeding productivity of North Sea population insufficient	SvI habitat assessment for NL Favourable, but breeding productivity insufficient
Threats/pressures	Decrease in food availability (closure of landfills, discard bans), loss and disturbance of and predation at breeding sites, avian influenza, others.	

7 Knowledge gaps

Knowledge gaps, including the ones identified in the MONS programme, are:

Status

- Numbers of herring gull breeding outside the main colonies, scattered inland and in urban and industrial habitats, are not well known; however these are expected to form a relatively small proportion of the population.
- Breeding productivity is known for an insufficient number of sites, although recent steps have been taken to improve the monitoring. In particular, the productivity of gulls breeding in small settlements in natural habitats, and in urban habitats, is poorly known.
- Although recently some estimates of survival in the herring gull have been published (Camphuijsen 2013, Schekkerman et al. 2021), the precision of these is limited (particularly for the younger age classes) and could be improved by collating and analysing unused data from existing colour-ringing programs around the North Sea.
- The latter applies even more strongly to great black-backed gull. For this species, the lack of estimates of demographic parameters has been identified as a key knowledge gap (Langlois Lopez et al., 2022)
- The exact causes of the population decline of great black-backed gull are not well known, although a reduced food supply due to reduction of discards seems to play a role. As sub-populations that are not or less influenced by the discards policy are also decreasing, multiple developments in the breeding and wintering areas may operate simultaneously (Langlois Lopez et al. 2022).

Food availability

- There is a lack of insight into the exact impact of the reduction in discarding on both bird species' populations, both in the years preceding the discard ban and since.
- An analysis is needed to assess whether the availability of small pelagic fish is at a sufficient level to sustain the populations of both gull species, e.g. in line with the estimated threshold of one-third of the maximum prey biomass observed in long-term studies (Cury et al., 2011).

Bycatch

- There is insufficient knowledge of bycatch rates of gulls in North Sea fisheries and their effect on populations. The CIBBRiNA EU LIFE project is envisaged to only partly fill this gap.

Collision rates

- Impact assessments for offshore wind development are still largely based on modelling approaches due to lack of field data on actual collision rates. State-of-the art techniques to measure these should be implemented at multiple sites, and developed further.

8 Possible actions

8.1 Introduction

Protective measures can be divided into 'direct prevention' aiming to prevent a specific negative effect occurring such as added mortality (e.g. collision with a wind turbine) and 'indirect prevention' aiming not at avoiding this specific effect but at increasing the resilience of the population, so that the effect has less impact on the population. An example of a direct measure is preventing predation at nest sites (eggs or juveniles) to enhance breeding success. However, the same action can also be an indirect measure, e.g. when it is taken to compensate an increase in mortality caused by the construction of a wind farm.

The breeding population of great black-backed gull The Netherlands is small, but growing. Some of the measures proposed for breeding herring gull are likely to also benefit great black-backed gull, although there are differences in breeding habitat and distribution between the species. In this species it is mainly the international population that is declining, which means that underlying pressures and impacts may act predominantly outside The Netherlands. This highlights a general characteristic of seabird conservation: for many species, effective conservation of populations can only be achieved by international cooperation. For instance, one pressure that is likely to impact great black-backed gull is the reduction of fisheries discards. This pressure cannot easily be taken away by direct measures, as a return to increased discarding is undesirable, also from a conservation perspective. Indirect measures that could reduce its impact by increasing population resilience by other means such as enhancement of breeding success, might be taken in the breeding areas but the majority gulls using Dutch waters breed elsewhere, in regions where the Netherlands have no direct management influence.

In the next paragraphs, the distinct threats and impacts identified in chapters 4 and 6 are revisited to describe the measures that could be taken to lessen or stop the effect of the threats. Additional there are some extra measures for threats that are part of a main threat. In paragraphs 8.3 and 8.4 a list of concrete measures is presented with a distinction between priority actions and other actions.

8.2 Conservation and/or restoration goals of the proposed actions

The stated conservation goal for both great black-backed gull and herring gull in the Netherlands is to stop the population decline and bring back or stabilise the population size on the favourable reference value (FRV; Sovon 2022). If the FRV is reached for these species, this also contributes to reaching the Good Environmental Status for the group of surface-feeding birds in the MSFD (descriptor D1-birds). All this should be achieved by minimizing the adverse impacts that have been identified in chapter 4. However, some of these impacts will not be lifted or reversed in the near future (particularly closure of landfills, the reduction of bycatch, and the development of offshore wind), and it is doubtful that we will be able to fully compensate for these impacts by indirect measures. Particularly for the herring gull therefore, it remains to be seen whether the stated numerical goal is actually achievable.

A second consideration is that in view of the perceived problems that the still numerous (although declining) herring gull causes in some areas, particularly nuisance to inhabitants of urban areas and predation on eggs and young of other birds of conservation concern, conservation management for this species should not only focus on achieving or maintaining some overall number, but also on maintaining or concentrating the population in sites where such problems do not arise.

8.3 Priority actions

Problem	Objective	Action	Rationale
Food shortage			
food shortage	Compensate for effects of the reduction of fisheries discards	Indirect measures Reduce fisheries on pelagic stocks?	The general reduction in discarding is unlikely to be reduced (shrinkage of the fleet) and the landing obligation will not be reversed to benefit seabirds. Its effect can thus only be counteracted by indirect measures addressing other limitations on the population (see the other actions proposed). A reduction of fisheries targeting pelagic fish could possibly enhance the availability of 'natural' food for these surface feeding gulls (pelagic fish and invertebrates), but it is unknown to what extent the availability of such prey is currently reduced by fisheries. Also, note that this will even further reduce the availability of fish offal and invertebrates, which are much taken by gulls scavenging behind fishing vessels and which do not fall under the landing obligation. The net effect for gulls could therefore even be negative, calling for more studies on the potential role of natural pelagic food in the gulls' diet.
	Compensate for effects of reduced access to human waste	Indirect measures	The closure of open landfills serves several environmental and health purposes. Its effect on gull populations cannot be negated with achievable direct measures, only be compensated with indirect measures.

Problem	Objective	Action	Rationale
Safe breeding habitats			
Shortage of safe breeding habitat	Safeguard sufficient good breeding habitat at sites where gulls pose no unacceptable problems to other species of conservation concern or to human inhabitants	Maintain and enhance existing breeding sites	Maintain existing colonies in sustainable locations wherever possible, to prevent dispersion. Optimise the conditions in existing colonies where there is still space, for instance by measures such as closing areas to the public, fences excluding access by foxes, vegetation management and providing shelters for chicks. This is important because gulls that are displaced preferentially join existing colonies, and particularly those where breeding success is good.
		Create new / alternative breeding sites	Designate or develop alternative safe breeding habitat in the vicinity of existing colonies that are under pressure, at sites where gulls can be accommodated with minimal unwanted side-effects and for an extensive period of time. Such sites can be large (space for >1000 birds) or small (e.g. a single 'accommodation roof'). Successes with offering alternative breeding habitat have been achieved at Moerdijk where a former sludge dump on an island in the Hollands Diep waterway directly opposite the industrial area was transformed into a breeding site for herring gulls and lesser black-backed gulls. Similarly, common and arctic terns at Eemshaven were successfully redirected to a newly built artificial island in the Eems-Dollard estuary c. 4 km away. In the North Sea coastal zone, the new infrastructure that is needed on land for the expansion of offshore wind could be designed to facilitate breeding birds, as could new infrastructure built for Carbon Capture Storage offshore this.
		Consider settling behaviour of gulls in applying these measures	However, large gulls seem to be less readily 'lured' to a new suitable breeding site than terns. Displaced adults show a tendency to disperse away and often it is mainly young adults that settle in new areas. Establishment of a new colony may therefore take several years and the success is likely to depend on the distance to existing source colonies (Arts & Janse, 2021; Stienen & Courtens, 2010).
		Set up experiments	In view of the potential benefits of an approach involving offering alternative breeding habitat, it would be worthwhile to conduct field experiments to see if gulls can be stimulated to settle at a site by e.g. playing sounds, placing dummy birds in courtship of breeding positions, or offering nest material or dummy nests.

Problem	Objective	Action	Rationale
Breeding success and predation			
Suboptimal breeding success	Enhance population resilience by increasing breeding output	Reduce access to colonies for predators	Increasing the breeding productivity of the population can be done by increasing the availability of suitable breeding grounds (see above) and by increasing the breeding success of pairs in existing colonies. Apart from food availability, the most important factor limiting breeding success of herring gull in the Netherlands (and probably great black-backed gull elsewhere, e.g. in Scotland) is predation of eggs and young, particularly by ground predators. Such predation can be counteracted by preventing/reducing access breeding sites for ground predators, either by surrounding them with water (likely to be less effective when the wet barrier is shallow or narrow) or by surrounding them with electric fencing. Electric fencing has been successfully used to exclude foxes from meadow bird breeding areas, but it will not prevent smaller predators from entering. Also, the fences require regular checking. At large colonies it can be useful to fence not only the perimeter but also compartmentalise the colony so that one intrusion does not mean access to the whole colony. This is applicable to both existing and new sites.
		Active control of predators locally	Active control of predators (e.g. by shooting) is often not an effective measure because it is usually impossible to eliminate them all, but it can be effective in places where access is already limited or in combination with predator fencing.
		Prevent disturbance	Prevention of disturbance by humans (recreation) could be another way to reduce breeding losses, as disturbance events may be important in creating opportunities for cannibalistic predation.
		Provide shelters for chicks	At sites where no or only limited opportunity is present for chicks to hide for predators or to seek shade in hot periods or shelter during rain, these could be provided e.g. in the form of boxes or pieces of piping.

Problem	Objective	Action	Rationale
Offshore wind farms			
Negative effects of wind farms	Mitigate impacts of collision mortality	Plan windfarms in areas with fewest flying birds	Direct impact may be reduced to some extent by thoughtful spatial planning of new wind farms, avoiding areas where most birds occur. Bird distribution has played a limited role in the spatial planning of windfarms so far, partly because our knowledge of seabird distribution in time and space was less good than it is now. More informed choices about the spatial development of offshore wind can now be made, although the scale of the current ambitions for the next decades is such that avoiding high density bird areas will only partly be possible.
		Develop and employ collision-reducing mitigating measures	Because of this limited scope for spatial mitigation, it will be of the utmost importance to employ 'operational' mitigating measures reducing collisions with turbines. This calls for more research into and field experiments with a wide suite of possible measures, including local curtailment, increasing lowest tip height and enhancing the visibility of turbine blades for birds.
		Contribute to and initiate 'indirect' measures in breeding areas abroad	Given the scale of development of offshore wind energy plans for the near and mid-term future and the results of modelling studies of expected effects, it seems unrealistic to think that mitigation and spatial planning will be sufficient to avoid negative impacts on populations of great black-backed gull and herring gull. This calls for a (internationally) concerted effort to increase the resilience of these populations through indirect measures, such as reducing other mortality factors and enhancing breeding productivity.
Avian influenza			
Avian influenza	Reduce probability of transmission from poultry industry to wild birds	Vaccinate poultry	Now that HPAI has become endemic and H5N1 sustains itself across years in wild birds, it will not be possible to fully prevent future outbreaks and or the emergence of new virus variants. Nevertheless, reducing the chance of transmission events from the poultry industry to wild birds remains a useful strategy, if only to reduce the likelihood of transmitting new variants that can overcome existing or newly achieved immunity in populations. Introducing vaccination in the poultry industry is long overdue. A full reform of the international poultry industry will be needed to minimise this risk of newly emerged variants spilling back to wild birds, but is outside the scope of this protection plan.
	Reduce transmission within colonies (and other sites where many birds gather)	Remove dead birds in breeding colonies	There are indications that spread of HPAI through breeding colonies / roost sites can be slowed down by immediate removal of dead birds.

8.4 Other actions

Problem	Objective	Action	Rationale
bycatch			
bycatch in fisheries	Reduce bycatch risk in various types of fishery	Study and monitor bycatch better	The number of birds bycaught in the Dutch part of the North Sea is thought to be low at present, but insufficiently known. Also, with the possible expansion of gillnet fisheries, the number of casualties may rise in the near future. This knowledge gap must be filled to see if dedicated measures are called for, like banning certain fishing methods from important bird areas.
		Advocate use of mitigating measures Enforce if necessary	A suite of practical measures that can reduce bycatch risk in various types of fishery has been identified internationally, and should be advocated within the fishing community. To date, the most feasible way to mitigate bycatch in gillnets has been through spatial and temporal regulation of fishing effort or gear substitution. In comparison to longline and trawl fisheries, research into technical bycatch mitigation measures for seabird bycatch in gillnet fisheries has been limited. Scaring lines and reduction in the release of wastewater during fishing operations have been advocated as effective mitigation measures in reducing bycatch rates of surface feeders (Baerum et al. 2019). In addition, increasing the visibility of nets and deployment of acoustic pingers can be considered (Zydelis et al. (2013).
Pollution and litter			
Pollution and litter		Less plastic and pollutants in the marine environment	Threats posed by plastics and other marine litter should be reduced through lessening the use of plastics, recycling, better awareness of not dumping trash overboard (better legislation of fishing gear (old fishing nets et cetera)). The suspected accumulation of toxic compounds can only be reduced by reducing the amount used and better regulation and control of disposal by industry.
		Entanglement in and ingestion of plastic and other waste materials	This threat can only be reduced by lessening the use of plastics, reuse of old plastics, and better awareness of not dumping trash overboard. A dedicated effort should be made to reduce loss of netting and lines and 'net floss' in fisheries.

8.5 Research and monitoring to evaluate effectiveness of the measures

Studies into the effectiveness of measures can be divided into two main types: (1) research conducted before a measure is applied, aiming to investigate whether a given measure is likely work in practice (proof of principle, will the measure take away some limitation on the system?) or to optimise the 'design' of the measure, and (2) research/monitoring aiming at establishing the effectiveness of the measures that are taken. Note that the timing of the latter type is not confined to after the introduction of the measure, as in many cases the response of the system/population must be compared to a baseline situation. In principle, any measure adopted should be flanked by type (2) research/monitoring into its effectiveness. Here we focus on type (1) studies related to the measures proposed in table 11, leading to recommendation to study the following topics:

- At-sea food availability:
  - increase knowledge of the relative importance of discards and 'natural' pelagic food sources in the diets of these species (and in lesser black-backed gull which belongs in the same ecogroup but is probably more dependent on offshore food sources than herring gull).
  - increase knowledge of associations between availability of discards and of natural prey on the one hand and breeding productivity and/or survival of gulls on the other
  - increase knowledge on the extent to which fishery take affects availability of prey for large gulls in the Southern North Sea.
- Enhancing existing and creating new/alternative breeding habitat:
  - Increase knowledge of optimal location and configuration of breeding locations with respect to both attractiveness for settling and breeding success;
  - Increase knowledge on dispersal and settling decisions made by both young (settling) and older (experienced) gulls, considering distance as a potential key element
  - Investigate (experimentally) ways to enhance settlement of gulls in new breeding sites made available (e.g. *Figure 16*).
- Effects of offshore wind energy:
  - increase knowledge of at-sea bird distribution and movements, both within and outside the breeding season, and not only of seabirds but also including migrating landbirds (and bats), in view of strategic spatial planning
  - increase knowledge of the effects of windfarms on distribution/ area use by seabirds, and on mortality (current planning studies and effect assessments are still based on theoretical rather than empirical estimates of collision mortality)
  - increase knowledge of effectiveness of various measures aimed at mitigating collision risk at sea.
- Bycatch:
  - Increase knowledge of the current incidence and species composition of seabird bycatch in fisheries in the Southern North Sea (including in particular gillnets) and its potential effect on bird populations
  - Increase knowledge of the effectiveness of various bycatch mitigation measures in a Southern North Sea perspective

8.6 Collaboration

International collaboration and coordination, e.g. within the context of OSPAR, is essential for several of the measures proposed above, primarily those pertaining to fisheries and wind energy development. Particularly because the great majority of the great black-backed gull and also a significant proportion of the herring gulls using Dutch waters during part of their annual cycle breed outside the Netherlands, this is however equally important for most other measures, not least those aiming to increase population resilience by improving conditions on breeding grounds. In addition to the obvious role for Dutch governance agencies in defining and implementing measures within our national borders therefore, there also lies a quite important task in initiating and contributing to conservation measures elsewhere, both at the level of international conservation and resource exploitation policy and in the form of tangible, hands-on (or 'wallet-on') contribution to projects.

8.7 Communication/awareness

Communication and data sharing

The species protection plan will be shared on the MONS-pages on Noordzeeloket.nl and Noordzeeoverleg.nl. A schematic overview will be given of the measures including their time frame. Also related research reports will be made available on Noordzeeloket.nl, as well as evaluations of the effectiveness of the plan. Where applicable, targets, monitoring and measures will be integrated into the MSFD-cycle.

Statistics on the population development per species are already shared through the website of Sovon. These pages link to more background information on the website of Vogelbescherming. On the latter site, more details will be added on the measures that are taken within the context of the species protection plan.

Awareness

Since gulls are sometimes perceived as a nuisance (e.g.: Meeuwen: fraaie, maar vaak ongewilde medebewoners | Vogelbescherming), it is of great importance to give more background to the public about the need for the protection of the herring gull and great black-backed gull. One of the ways to do this is through the factsheets which Vogelbescherming has published for birds that are abundant in cities (Factsheets stadsvogels | Vogelbescherming). The factsheet on the herring gull can be amended to include more details on the protection measures that are taken as part of the protection plan.

On specific locations where measures are taken like fences to protect gulls against predation, or adaptations to buildings to facilitate breeding, the public can be informed through information panels or factsheets.

Figure 16. A roof designed for seagulls at the IKEA store in Kiel, Germany. Photo from: Kubetzki & Garthe (2010) (from: M. Leopold, WMR)

9 Quality Assurance

Wageningen Marine Research utilises an ISO 9001:2015 certified quality management system. The organisation has been certified since 27 February 2001. The certification was issued by DNV.

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Justification

Report C097/23
Project Number: 4318100403

The scientific quality of this report has been peer reviewed by a colleague scientist and a member of the Management Team of Wageningen Marine Research

Approved: M.F. Leopold, PhD
Senior researcher

Signature: 

Date: 21 December 2023

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Date: 21 December 2023

Annex 1. Summary tables

Table 3 (Inter)national legal and policy instruments and their applicability for the great black-backed gull and herring gull ("Yes" = relevant; "No" = not relevant)

Instrument	Description	Great black-backed gull	Herring gull
International			
EU Birds Directive (BD) Natura 2000	The BD seeks to conserve all wild birds in the EU by setting out rules for their protection, management and control. Natura 2000 (a European network of protected nature areas where designated species and their natural habitats are protected in order to preserve biodiversity) areas in the Netherlands designated for bird species. Designation of Cleaver Bank, Central Oyster Grounds, Dutch Coast and Dogger Bank is currently being considered by the Dutch government.	Yes; Yes Brown Bank	Yes; No
EU Marine Strategy Framework Directive (MSFD)	The MSFD aims to protect the marine environment across Europe, including the conservation of seabirds.[1]	Yes	Yes
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	The Bern Convention aims to promote cooperation between the signatory countries in order to conserve wild flora and fauna and their natural habitats and to protect endangered migratory species. Appendix II: Strictly protected species; Appendix III: Protected species	No	No
Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)	AEWA aims to take measures to maintain or restore a favorable conservation status for waterfowl migrating between Africa and Europe. The agreement stems from the Bonn Convention.	Yes Annex II	Yes Annex II
OSPAR List of Threatened and/or Declining Species and Habitats	In order to protect biodiversity, OSPAR has defined a list of 'threatened and declining species and habitats' that are in need of protection.	No	No
EU Common Fisheries Policy (CFP)	The CFP is aimed at sustainable management of fish stocks. It also plays an important role in the reduction of negative impacts of fishing activities on seabirds, including seabird bycatch.[2]	Yes[3]	Yes[3]
National			
Red List	A Red List is an overview of species that have disappeared or are in danger of disappearing from the Netherlands	Yes Sensitive	No
Network Ecological Monitoring (NEM)	The NEM is a collaboration between governments for the purpose of collecting nature data for policy purposes	Yes	Yes
Framework Ecology and Cumulation (KEC)	KEC is an assessment framework initiated by the Dutch government to generate insights into how wind farms affect birds, bats and marine mammals.	Yes	Yes
North Sea Agreement	The NSA is an agreement between central government and stakeholder parties about policy and choices about activities in the North Sea until 2030 and beyond. As part of the North Sea Agreement, species protection plans will be developed and implemented for vulnerable species including birds.	Yes	Yes
Nature Conservation Act	Dutch law containing rules for the protection of nature	Yes	Yes
Gull vision for the Dutch Southwestern Delta	A joint vision of ngo's and nature management organisations in the Southwestern Delta Area and Port of Rotterdam, Port of Antwerp and North Sea Port on the management of gull populations in this region (Arts & Janse 2021).	No	Yes

1 The assessments of Good Environmental Status (GES) under the MSFD includes the state of marine bird populations: MSFD Primary Criterion D1C2 "The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured" (Commission Decision EU 2017/848). This species protection plan derives from the Dutch MSFD program of measures that describes that more generic species protection is important for long-lived and vulnerable species, such as seabirds.

2 An Action Plan has been developed to reduce incidental catches of seabirds in fishing gear and minimize seabird bycatch to levels which are as low as practically possible

3 Risk of bycatch has been identified for these species (Burthe et al., 2014). However, they have not been identified as bycatch sensitive species, i.e. species for which bycatch is identified as (one of) the most significant/prevailing threat, and/or known to be intensively bycaught (BirdLife International, 2022a).

Table 4. Summary table for status of Great back-backed gull and herring gull.

Description	**Great black-backed gull**	**Herring gull**	**Comment**
Is the species native to the Netherlands?	Yes	Yes	
Does the species depend on different habitats throughout its lifecycle?	Yes (breeding vs non-breeding)	Yes (breeding vs non-breeding)	
Is the quality of its habitat currently in decline or threatened?	Yes	Yes	See § 6.2
Is it a migratory species?	Yes (partly)	No or short-distance	
Does the species (group) fulfil the role of apex predator in the food web?	Yes	Yes (e.g. with mussel predation)	
Is the species (group) a keystone species[3] ?	No	No	
Is the species rare[4]?	No	No	Great black-backed gull is on the Dutch Red list categorised as sensitive.
Is the species of commercial importance?	No	No	
Is the condition of the species currently in decline/ threatened?	Yes	Yes	Insufficient breeding success (except Dutch great black-backed gull)
Is the population extent (distribution) in decline/threatened?	Breeding: No Non-breeding: Yes	Breeding: Yes Non-breeding: No?	
Is the distribution of the species in decline/threatened?	No	No	

[1] A species whose impact on the community is disproportionately large relative to its abundance. Effects can be produced by consumption (trophic interactions), competition, mutualism, dispersal, pollination, disease, or habitat modification (non-trophic interactions) (MEA, 2005).

[2] A critical habitat is of significant importance to certain species, threatened or unique ecosystems, or key evolutionary processes (Martin et al., 2015). For example, an identified breeding site, nursery area or feeding ground.

[3] Bird species are considered rare because of small populations or restricted local distribution (EC, 2010); Habitat species are considered rare with small populations that are not at present endangered or vulnerable but are at risk. The species are located within restricted geographical areas or are thinly scattered over a more extensive range (EC, 1992).

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Table 5 Overview monitoring in relation to policy frameworks (RWS 2020)

Framework/area	Airplane counts	Migration counts	Breeding bird census	Waterbird counts
BD	X	X	X	X
OSPAR			X	X
N2000	X		X	X
Offshore (Frisian Front, Brown Ridge)	X		X	X
Coastal (Voordelta, North Sea Coastal Zone)	X			

Table 6. Overview of national and monitoring programs and (inter)national status assessments. (GBBG; great black-backed gull; EGH: European herring gull)

National monitoring programs and status assessments	**Species**
Network Ecological Monitoring (NEM)	GBBG, EHG
National Water Systems Monitoring Programme (MWTL monitoring) (this is MSDF/Natura 2000 monitoring under Dutch Marine Strategy part 2)	GBBG, EHG
Monitoring Research-Nature restoration-Species protection (MONS)	GBBG, EHG (??)
Statutory Research tasks (WOT) and Policy Support tasks (BO) monitoring	GBBG, EHG (??)
Offshore wind ecological programme (WOZEP) monitoring	GBBG, EHG [5]
NSO Beached Bird Survey	GBBG, EHG
Meeuwenvisie Zuidwestelijke Delta (Arts & Janse, 2021)	EHG
N2000 management plan reviews	GBBG, EHG
(Inter)national status assessments	
Birds Directive/Vogelrichtlijn Art. 11	GBBG, EHG
MSDF/KRM Mariene Strategy Framework Part 1	GBBG, EHG
OSPAR Quality Status Assessments	GBBG, EHG
Trilateral Wadden Sea Cooperation	GBBG, EHG

[5] https://www.noordzeeloket.nl/en/functions-and-use/offshore-wind-energy/ecology/offshore-wind-ecological-programme-wozep/birds/

Table 7. Summary table of key threats and impacts to species/habitat.

Type of pressure/ impact	Cause of threat	Comment	Scale of threat	Prospects (to 2030)
Reduced food availability	Discard ban	Less food available	GBBG high EHG medium	Increase
Reduced food availability	Decline of intertidal Mussel beds		EHG medium	Decrease/ Stabilise
Reduced food availability	Competition		?	?
Loss of breeding sites	Industrial development	in ports, industrial areas	EHG high	no change
Loss of breeding sites	Vegetation succession	(semi) natural sites	EHG low	no change
Predation in breeding sites	Mammals mainly		EHG Medium/Low GBBG Low/Medium	Increase?
Collision mortality	Wind energy development		EHG high GBBG high?	Increase
Loss of habitat	Wind energy development		?	
Disease mortality	HPAI	mortality, low breeding success	EHG + GBBG Unknown/High	Unknown
Bycatch mortality	Fisheries		EHG + GBBG Unknown	Unknown
Climate change	Greenhouse gas emissions	chick mortality, food sources	EHG + GBBG Uknown/Low	Increase

Table 8 Impacts, risks and opportunities regarding the transitions on the North Sea.

Regarding the transitions on the North Sea:	Species	Comment
Nature transition		
Does creation of MPAs without bottom trawling activities improve the species (group) /habitat?	both: Possibly	Reduction of fisheries may further decrease availability of discards; however sandeel stocks may benefit (Tien et al. 2017)
Energy transition		
Is improvement of the species' habitat a means of mitigating effects of the energy transition? (Do large-scale wind farms have negative effects?)	both: Yes	OWF increase mortality with expected negative effects on populations
Or do large-scale wind farms offer an opportunity to improve the species??	both: No	But 'energy islands' may offer breeding habitat
Can the improvement or protection of the species contribute to the climate goals?	both: No	
Food transition		
Is improvement of the species (group)/habitat related to the food transition?	both: Possibly	Mariculture may yield feeding opportunities

Table 9 Overview of current protection measures and regulations in place.

National conservation measures	**Species/habitat**
Does a national species/habitat protection plan already exist for this species/habitat?	GBBG: No EHG: No
Does a national management or protection plan already exist in another framework? (e.g. national, international, agreements, etc.)	GBBG: No EHG: Yes[1]
Do national protective measures already exist?	GBBG: Yes EHG: Yes
Is the species/habitat protected in one or more N2000 management plans?	GBBG: Yes EHG: No
Are there measures in the Programme of measures under the Dutch Marine Strategy (Part 3) (Min. IenM & Min. EZ, 2015)?	?
International conservation measures.	
Do international species/habitat protection plan already exist for this species/habitat?	GBBG: No EHG: No
Do international protective measures already exist? (e.g. EU regulations)	GBBG: Yes EHG: Yes
Are OSPAR Recommendations applicable (recommendations for species and habitats on the OSPAR List of Threatened and/or Declining Species and Habitats[6])	GBBG: No EHG: No
Are measures applicable under the Trilateral Wadden Sea Collaboration?	?
Or under the EU Common Fisheries Policy?	No (bycatch?)

[1] Meant here is the Meeuwenvisie Zuidwestelijke Delta (Arts & Janse 2021)

[6] https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats

Table 10 Overview of recommendations for new protective measures.

nr	National protective measure	Framework policy/legal	Responsible parties	Executing parties
1	Reduce fishing on certain pelagic stocks	CFP	LNV, EU	
2	Ban pelagic fisheries from N2000 areas	BD, N2000, CFP, MSFD	LNV	
3	Maintain existing breeding colonies as much as possible		LNV, provinces, landowners, industry	
4	Enhance capacity of and breeding success in existing colonies		landowners, industry	
5	Provide alternative / new breeding habitat in suitable places		LNV, RWS, provinces, landowners, industry	LNV, EZK, RWS, industry, science, NGOs
5a	Research ways to attract gulls to new breeding areas		LNV, RWS, provinces, landowners, industry	
6	Reduce access to breeding colonies for predators		LNV, RWS, provinces, landowners, industry	
7	Other actions to improve breeding success (incl. reducing disturbance)		landowners, industry	
8	Strategic planning offshore windfarms	BD, MSDF	IenW, LNV, EZK, RWS	IenW, LNV, EZK, RWS
9	Reduce collision risk at turbines	BD, MSDF	LNV, industry	
10	Advocate bycatch-reducing methods in fisheries	CFP, MSFD	LNV, fisheries organisations	LNV, VBN, fisheries organisations
11	Establish (yes/no) need to impose bycatch-reducing methods	CFP, MSFD	LNV, science	LNV, science
12	Measures to reduce transmission of HPAI from poultry to wild birds		LNV, industry	
13	Monitor HPAI mortality and remove carcasses in breeding colonies		LNV, landowners, …	
	International protective measures			
14	Reduce consumer plastics	MSFD		
15	Reduce loss of fishing gear	MSFD, CFP		
16	Strategic planning of offshore wind farms	MSFD, ORED		
17	Improve conditions at breeding sites abroad	MSFD, OSPAR		

Annex 2. Lists of pressures, threats and impacts

Marine Strategy Framework Directive (MSFD) pressures list (EU, 2017)[7]

Theme	Pressure
Biological	Input or spread of non-indigenous species
	Input of microbial pathogens
	Input of genetically modified species and translocation of native species
	Loss of, or change to, natural biological communities due to cultivation of animal or plant species
	Disturbance of species (e.g. where they breed, rest and feed) due to human presence
	Extraction of, or mortality/injury to, wild species (by commercial and recreational fishing and other activities)
Physical	Physical disturbance to seabed (temporary or reversible)
	Physical loss (due to permanent change of seabed substrate or morphology and to extraction of seabed substrate)
	Changes to hydrological conditions
Substances, litter and energy	Input of nutrients — diffuse sources, point sources, atmospheric deposition
	Input of organic matter — diffuse sources and point sources
	Input of other substances (e.g. synthetic sub stances, non-synthetic substances, radionuclides) — diffuse sources, point sources, atmospheric deposition, acute events
	Input of litter (solid waste matter, including micro-sized litter)
	Input of anthropogenic sound (impulsive, continuous)
	Input of other forms of energy (including electromagnetic fields, light and heat)
	Input of water — point sources (e.g. brine)

OSPAR Pressure list: key pressures reported by OSPAR (2010)[8]

Key Pressures

Barriers to species movement
Climate changes
Death or injury by ship strikes
Habitat damage
Habitat loss
Hazardous substances
Hydrographical changes
Introduction of non-indigenous species and translocations
Litter
Loss of prey species
Microbial pathogens
Nutrient and organic enrichment
Oil pollution
pH changes
Predation
Removal of target and non-target species
Siltation rate changes
Threats outside the OSPAR area
Underwater noise

[7] Commission Directive (EU) 2017/845 of 17 May 2017 amending Directive 2008/56/EC of the European Parliament and of the Council as regards the indicative lists of elements to be taken into account for the preparation of marine strategies. Official Journal of the European Union L 125/27.

[8] OSPAR Quality Status Report 2010 (https://qsr2010.ospar.org/en/ch10_02.html)

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