

Monitoring and assessment of the proportion of oiled Common Guillemots in The Netherlands:

annual update, winter 2016/17, with a preview into 2017/18



C.J. Camphuysen 2018

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Summary - This is the annual update for OSPAR of the beached bird survey (BBS) results in The Netherlands (winter 2016/17), with a preview into 2017/18 (data that have thus far accumulated, up to and including to February 2018). The Dutch BBS provides data for OSPAR area's 8, 9 and 10, but data from Belgian and German colleagues will have to be merged to arrive at the final values for these areas. For the Dutch North Sea region, significant declines in oil rates were reported over a long study period (1977/78-2015/16) as well as (clearly accelerating) over the last 10-15 years, but the last seasons show consistently low oil rates in all species, including the target species Common Guillemot.

In winter 2016/17, no major seabird wrecks have occurred, except an outbreak of avian flu affecting mostly Great Black-backed Gulls (*Larus marinus*) within the northernmost provinces of the country. The sample size for Common Guillemots was sufficient for the OSPAR subregions bordering the North Sea, but too small for the Wadden Sea region itself. The oil-rate (percentage of oiled Common Guillemots of all complete Common Guillemots found dead) reached an all-time low of only 3.0% (n= 166) for all studied areas, or 3.5% (n=141) for the North Sea coast of OSPAR areas 8 and 9 combined in 2015/16 (correction of the data provided in the previous report as a result of a larger sample size), but this value was slightly higher in 2016/17 (5.5% (n= 73) for all study areas combined, 6.0% (n= 67) for the OSPAR areas 8 and 9 combined). This current figure, however, is the second lowest value ever measured within The Netherlands and it follows and confirms the sharp drop in oil-rates that occurred after 2015. A preview into 2017/18 suggests that this extremely low level will be consolidated (5.0% oiled (n= 40) within the OSPAR areas 8 and 9 combined). The five-year running mean in (Dutch) national Common Guillemot oil rates (over 2012/13-2016/17; mean \pm SD) arrived at $18.4 \pm 16.2\%$ (OSPAR 8-9) which is a further confirmation of a rapid decline. The results obtained over the last decade(s) suggest a continuation of low oil rates in Common Guillemots in Dutch waters.

Following the significant trends in the most recent data set, a projection for 2020 is difficult to provide, because the recent decline in Common Guillemot oil rates accelerated and is no longer linear. The OSPAR target is clearly within reach.

Vaststelling van het percentage met olie besmeurde Zeekoeten in Nederland; jaarlijkse rapportage, winter 2016/17, met een vooruitblik op 2017/18

Samenvatting - Dit is de jaarlijkse weergave voor OSPAR van de resultaten van systematische strandtellingen langs de Nederlandse kust, met een verslag over het seizoen 2016/17. Middels deze tellingen verzorgt Nederland haar bijdragen voor de OSPAR deelgebieden 8, 9, en 10. Om een compleet beeld te krijgen voor deze deelgebieden zullen Belgische en Duitse gegevens moeten worden toegevoegd en gecombineerd. In deze rapportage worden alleen de Nederlandse gegevens besproken. Voor de Nederlandse Noordzeekust kon de lange termijn afname in oliebevuilingspercentages bij de Zeekoeten worden bevestigd en de laatste seizoenen hebben bijzonder lage waarden laten zien. Zoals het er nu naar uitziet wordt dit bijzonder lage niveau in 2017/18 geconsolideerd, waarmee de doelstellingen van OSPAR binnen bereik zijn gekomen.

Introduction

It was in the 1970s to 1990s of the previous century that chronic oil pollution within the North Sea became finally recognised as a nuisance that had to be controlled and minimised. Beached bird surveys had been used, in fact already since the 1950s, to show the heavy impact of oil pollution on marine wildlife year after year after year (Mörzer Bruijns & Brouwer 1959, Dunnett 1982, 1987, Camphuysen 1989, 1995). It was, however, a number of major oil spills such as with the Torrey Canyon in 1967 and the Amoco Cadiz in 1978 that triggered action.

The usefulness of beached bird surveys to monitor levels of chronic marine oil pollution had been demonstrated in the late 1990s (Camphuysen & Heubeck 2001). The Marine Strategy Framework Directive now demands an indicator for oil pollution, in order to evaluate the effectiveness of measures to reduce chronic oil pollution (Commission Decision of 2010, Chapter 8.2, Effects of contaminants, EU 2010). The information need for the monitoring and assessment of oil fouling of seabirds was first established in the OSPAR organization in the form of an OSPAR Ecological Quality Objective (EcoQO). In the legal Dutch Kader Richtlijn Marien document (page 78; “Vervuilende stoffen”; Anon. 2012), the EcoQO indicator is explicitly implemented. In the EcoQOs for the North Sea, “the Proportion of oiled Common Guillemots among those found dead or dying on beaches” was subsequently listed Under Issue 4 (Seabirds), EcoQO element (f). The “Oiled Guillemot EcoQO”, as agreed by the 5th North Sea Conference, was defined as: “*The proportion of such birds should be 10% or less of the total found dead or dying, in all areas of the North Sea*” (Anon. 2002), later refined to target mean proportions of 20% in 2020 and 10% in 2030 over periods of at least 5 years (Anon. 2012).

In the early 21st century, probably as a result of a combination of stricter control, the establishment of oil reception facilities in harbours and the effective training of new sailors that the number of detected oil spills declined markedly and levels of chronic oil pollution are currently rather low. Most detections of oil slicks are still concentrated around the major shipping lanes and off major ports such as Rotterdam and IJmuiden (leading to Amsterdam; Camphuysen & Vollaard 2015). Beached bird surveys have indeed been instrumental to document these declines (Camphuysen & Van der Meer 1996, Camphuysen 2003, 2010). The recent reports to OSPAR, from each of the participating countries, all bring the same news: chronic oil pollution is finally reaching ‘target levels’.

This is the annual update for The Netherlands for winter 2016/17. The emphasis of this study is on Common Guillemots, but similar data are collected for all stranded birds and in this report details are provided for several other species: four more offshore or pelagic seabirds (the Northern Fulmar *Fulmarus glacialis*, the Northern Gannet *Morus bassanus*, the Black-legged Kittiwake *Rissa tridactyla* and the Razorbill *Alca torda*) and three coastal species (the Great Black-backed Gull *Larus marinus*, the Herring Gull *Larus argentatus*, and the Common Eider *Somateria mollissima*). The first group is meant to evaluate trends in chronic oil pollution at

greater distances from the nearest coast, the second group would reflect the occurrence of nearshore oil pollution.

All data collected since winter 1977/78 are incorporated in this report. Oil-rates (% oiled) of Common Guillemots are provided for the Dutch contributions to OSPAR areas 8, 9, and 10, and for the Dutch North Sea coast as a whole (areas 8 and 9 combined). Raw data are provided in Appendices, also for the more characteristic and commoner species of seabirds found in 206/17. Given the nature of the underlying database (historical data can be merged with earlier published material whenever they emerge to enlarge earlier sample sizes), the exact values may deviate slightly from earlier publications.

Material and methods

The Dutch monitoring programme was developed in the early 1970s when dedicated volunteers were asked to follow a strict protocol, to monitor their own effort (kilometres of coastline searched per survey) and in fact to oversee their own stretches of coastline. They were asked to report all stranded (large) animals, including at least all birds, and to check for oil in their feathers. Birds were identified, often aged, checked for completeness, for any other cause of death and for the absence of presence (including % coverage) of oil, and were listed on especially designed forms. The organisation, called 'Nederlands Stookolieslachoffer-Onderzoek' (NSO) became adopted by the newly founded Dutch Seabird group (NZG), somewhere in the 1980s (NZG/NSO). Since 1977, these surveys are co-ordinated by the author of this report, who became personally involved in beached bird surveys in 1974. High numbers of oiled birds kept the volunteers going and there was hardly any need to call in further assistance.

Times have changed in recent years and two particular changes made this network of volunteers disintegrate: a serious reduction in the number of (oiled) stranded birds, and the development of numerous digital bird recording systems on the internet, including for example online databases to report colour rings (cr-birding.org), counts of migratory birds (www.trektellen.nl), and any sightings or records of species (fauna and flora) as a form of a digital notebook (www.waarneming.nl). It are these developments that made most volunteers less motivated to follow the strict protocol and to report beached birds in the standardised way, directly to NZG/NSO. In order to collect sufficient data, more and more emphasis was put on web browsing (searching for beached birds on www.waarneming.nl) to top up the material that was obtained by the more traditional means. The photo's online, coupled with descriptions, were all individually checked to guarantee that adequate material was obtained. A serious problem with waarneming.nl is that many observers see this as a personal notebook, so that single animals get reported multiple times. Therefore, each of the reported finds had to be checked manually to eliminate double recordings.

As a direct result of this approach, spatial coverage of the beached bird monitoring programme was excellent in 2016/17, with over 118 strandings reports (counts and incidental reports combined) for OSPAR region 8, 95 for region 9, and 86 for region 10. The entire coastline could be overseen with the collected data (Fig. 1). The observer effort peaked in January (98 reports), but was otherwise quite high with 34-46 reports over each of the months (Nov-Apr; Fig. 2). A downside is that genuine observer effort is no longer known, for incidental reports are not coupled with indications of the length (km) of the search. Negative visits are also missing. In future years, we might try and solve that problem in direct contact with the waarneming.nl database managers and developers.

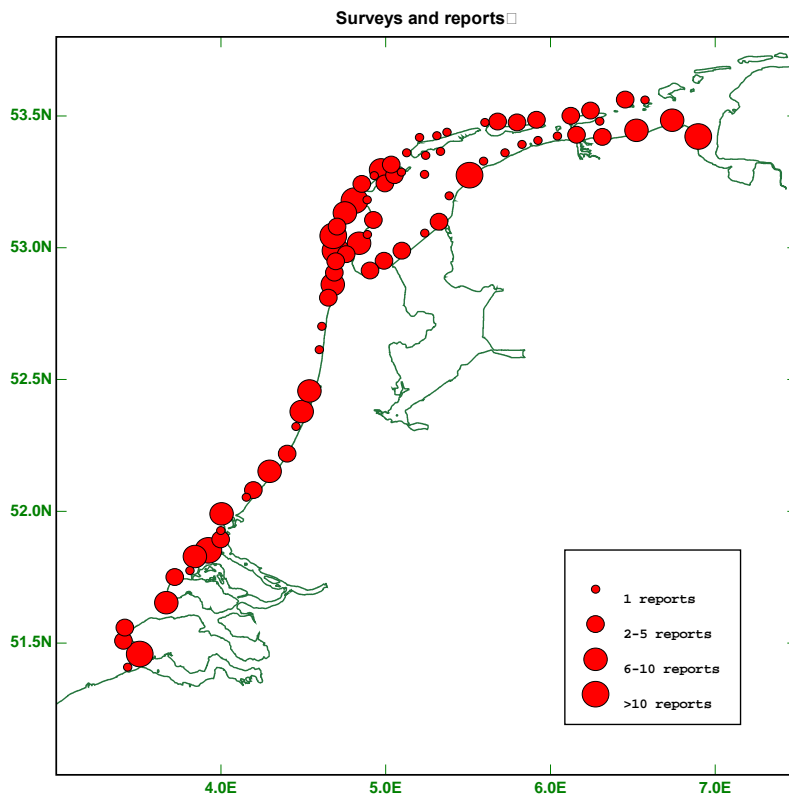


Figure 1. Spatial coverage of strandings reports based on a combination of systematic beached bird surveys (NZG/NSO) and accidental reports from named observers (www.waarneming.nl) in winter 2016/17.

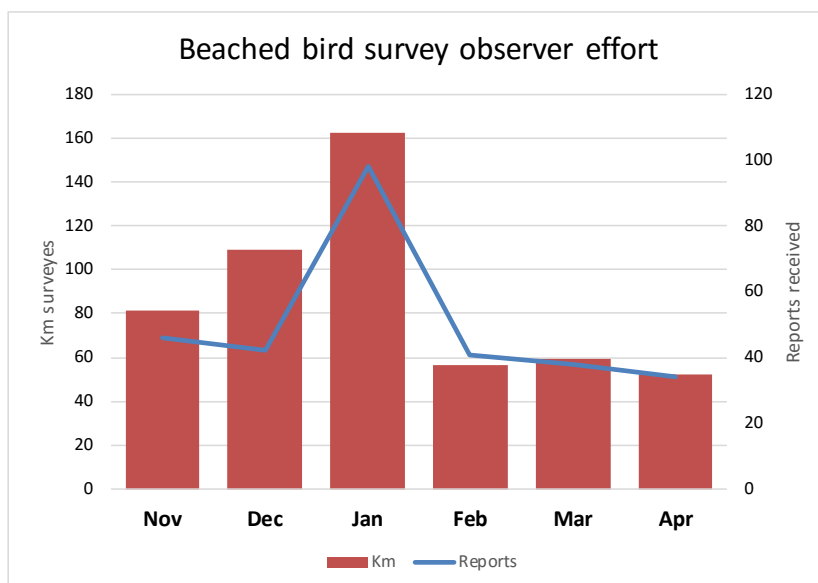


Figure 2. Seasonal pattern in observer effort (km surveyed) and strandings reports in winter 2016/17.



Coastal erosion on Texel, January 2017 (CJ Camphuysen)



Coastal erosion on Texel, January 2017 (CJ Camphuysen)

Beached bird surveys were locally hindered by considerable erosion of the dunes, covering the tideline (and corpses) with massive quantities of sand while ruining the dunes.

Observers

Strandings data from the following observers have been used in this report: Gerard Aalbersberg, Daan Bakker, Anne Balk, Bernadette Balten, Michel Barendse, Evelien Baudoin, Louis Beijert, Nel Bekema, Ad van Benten, Klaas van den Berg, Sanne van den Berg-Blok, Ad van den Berge, Ruud van Beusekom, W. van Boekel, Folkert de Boer, Juun de Boer, M.P. de Boer, Joey Bom, Meindert Boskma, Thyrsa Boskma, Rixte Boskma-Buitenwerf, Jaap Bouwman, Klaas Bouwmeester, Jeroen Brandjes, Siebold van Breukelen, Maarten Brugge, Marco Brugge, Bernd-Jan Bultink, Kees Camphuysen, Stephanie Chrispijn, Ruud Costers, Conny & Peter Das, Jurriën van Deijk, Jelle van Dijk, Robbin van Dijk, Adriaan Dijkse, Chris Dijkshoorn, Sietze Dijkstra, Rob van Dorland, Vincent Douwes, Daan Drukker, Wouter Dubbeldam, Pieter Duin, Nils van Duivendijk, Enno Ebels, Johan Eckhardt, Albert Eggens, Jaap van Egmond, Wouter van Faassen, Thijs Fijen, Jan Andries van Franeker, Pieter van Franeker, Afra Geerling, Ton de Groot, Niels Godijn, Erwin Goutbeek, Jitty Hakkert, Frank Haven, Youp van den Heuvel, Rob Hoeben, Laurens van de Hoef, Remco Hofland, Job ten Horn, Teunis IJlstra, Nicole Janinhoff, Patrick Jansen, Esther de Jong, Gejo de Jong, Johan de Jong, Klaas de Jong, Willem Jongma, Robert Keizer, Leon Kelder, Roel Klijzing, Marcel Klootwijk, Frank van der Knaap, Ted van der Knaap, Kas Koenraads, Bas Kok, Ben Koks, Henk-Jan van der Kolk, John Kool, Anna Kreffer, Suse Kühn, Jan van der Laan, Sander Lagerveld, Marco Langbroek, Wim Langbroek, Rob de Langen, Ivo van der Lee, Jan van Leeuwen, Anita Leeuwis, Jefta Leeuwis, Jonathan Leeuwis, Eduard Leinwand, Pim Lemmers, Mardik Leopold, Peter Lindenburg, Merijn Loeve, Germen Lont, Jelmer Luyckx, Jan van der Mei, Gerben Mensink, Robert Middelveld, Michiel Muller, Griet Nijs, Chris de Nooijer, Henry Noorman, Cees van den Oever, Tim Oortwijn, René Oving, John Peerenboom, Joaquim Pontes, Ad Postma, William Price, Marijn Prins, Luuk Punt, André van Reenen, Marco van Reenen, Henk Remijn, Carine Richerzhagen, Lucette Robertson-Proot, Bram Roobol, Corne Roobol, Jillis Roos, Rutger Rotscheid, Evert Ruiter, Erik Sanders, Chris van Schaik, Wim van der Schot, H. Schouwenburg, Threes Schreurs, Stijn Schreven, Elly & Wim Schumm, Hans Semeins, Aron Sinke, Richard Slagboom, Arien Slagt, Dan Sloodmaekers, Maarten Sluijter, Tom van Spanje, Annemieke Spoelman, August van Steensel, Joke Sterringa, John Stigters, Vincent Stork, VWG Texel, Bram Ubels, Laurens van der Vaart, Arjan van der Veen, D Veenendaal, Berend Veenstra, Ko Veldkamp, Bas Verhoeven, Rik Vinke, Staatsbosbeheer Vlieland, André van Vliet, Piet van Vliet, Kees Vliet Vlieland, Mark de Vries, Nico de Vries, Bram Vroegindewey, Rob de Waijer, H. Welp, Gerard Westerhuis, Jacob Westerhuis, Ruud Wielinga, Jan Ekke Wigboldus, Willem Wind, Edwin Winkel, Pim Wolf, Henri Zomer, Carl Zuhorn, Heleen Zwennes, J. Zwetsloot, Wim van Zwieten, and Zeezoogdierenhulp Kop van Goeree. A large amount of data were derived from strandings reported at www.waarneming.nl. All these were checked and confirmed by either the database manager of that organisation, followed by a check by the author.



The Texel shoreline near De Hors, January 2017 (Photo: CJ Camphuysen)

Birds found stranded (species accounts)

In the species accounts below, some remarks are made to further explain the observations over winter 2016/17, at times explaining the current trends, or at times questioning them. All major groups of species are included in the discussion, but with emphasis on the more important taxa that provide information on the condition of the North Sea and the Wadden Sea with respect to chronic oil pollution. Selected for a more full discussion and treatment are the species listed in Table 1. The first five species are indicative for the open sea, the other three are expected to reflect nearshore conditions.

Table 1. Temporal pattern in reports of strandings of the commoner seabirds in winter 2016/17.

Species	Scientific name	Nov	Dec	Jan	Feb	Mar	Apr
Northern Fulmar	<i>Fulmarus glacialis</i>	9	2	23	8	1	6
Northern Gannet	<i>Sula bassana</i>	6	2	22	14	15	8
Black-legged Kittiwake	<i>Rissa tridactyla</i>	2	2	3	2		1
Common Guillemot	<i>Uria aalge</i>	10	4	49	5	17	11
Razorbill	<i>Alca torda</i>		1	6	4		1
Eider	<i>Somateria mollissima</i>	6	10	28	6	17	4
Herring Gull	<i>Larus argentatus</i>	55	29	16	6	9	2
Great Black-backed Gull	<i>Larus marinus</i>	22	21	24	11	23	2

Divers Gaviidae

Historically, divers (or loons in American) were highly characteristic victims of nearshore oil pollution in the southern North Sea. Every year considerable numbers were found and nearly all these birds were contaminated with oil (Camphuysen 1989). While wintering numbers of wintering divers (notably Red-throated Divers *Gavia stellata*) have markedly increased in recent decades (www.trektellen.nl), only very rarely do we find them dead on the beach. Divers are sufficiently ‘uncommon’ to attract attention by ordinary birdwatchers and their near absence in database reports is therefore the more remarkable. In fact, the problem of ‘double counts’ in strandings reports generated from www.waarneming.nl was most prominent in divers. One particular bird found in Kwade Hoek (Goeree) was reported eight times on two subsequent days. Now that oil has gone down at sea, divers stopped washing ashore in numbers. Exceptions are occasional mass strandings following drowning incidents (none are known to have occurred in winter 2016/17). The simple *absence* of dead divers on Dutch beaches can be seen as an immediate and highly positive effect of the decline in the level of chronic oil pollution in Dutch coastal waters in recent years. Five divers were reported in total this season; three Red-throated Diver, one confirmed Great Northern Diver *Gavia immer*, and an unidentified (large?) diver. None were reported as oiled.

Grebes Podicipedidae

Grebes are all highly vulnerable species with regard to oil pollution, and numbers at sea are often very large in cold winters. Only two birds were reported in this season: one Great Crested Grebe *Podiceps cristatus*, and one Black-necked Grebe *P. nigricollis*.

Northern Fulmar *Fulmarus glacialis*

Northern Fulmars were the only species found dead that represented the tube-noses Procellariiformes in winter 2016/17. Clusters of reports were found at the northern half of Texel and the westernmost tip of Vlieland and around the Maasvlakte (Goeree-Scheveningen) in Zuid-Holland (Fig. 3a). There is no clear explanation for these clusters: their offshore distribution would promote a more scattered pattern of strandings, assuming the carcasses came floating in from a distance. Northern Fulmars are collected to have their stomachs examined for their plastic contents (ongoing studies Jan Andries van Franeker, Wageningen Marine Research). Of 24 Northern Fulmars that were intact and checked for oil, none were contaminated. The long-term trend in oil-rates is promising: no or very few recent case of oil contamination have been logged (Fig. 4).

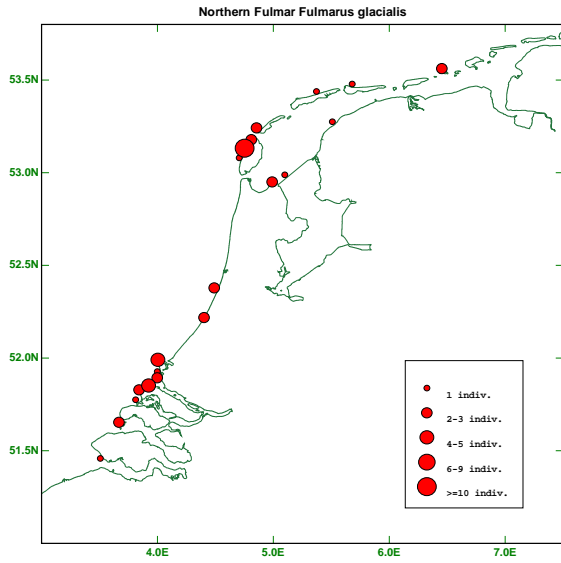


Figure 3a. Spatial pattern in strandings reports of **Northern Fulmars** (incomplete carcasses included), winter 2016/17 (n= 49).

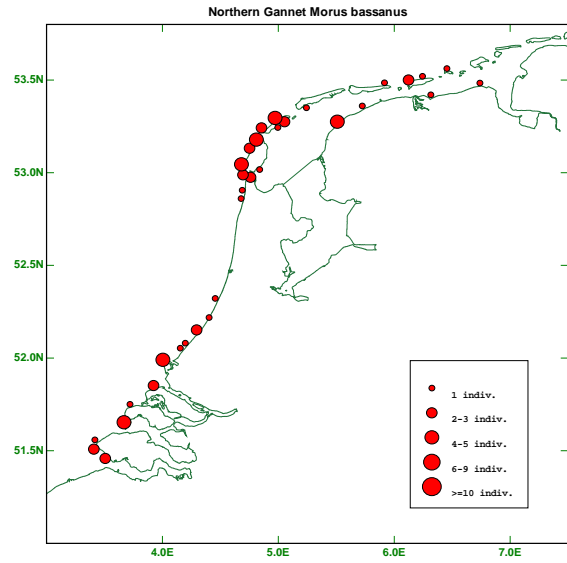


Figure 3b. Spatial pattern in strandings reports of **Northern Gannets** (incomplete carcasses included), winter 2016/17 (n= 67).

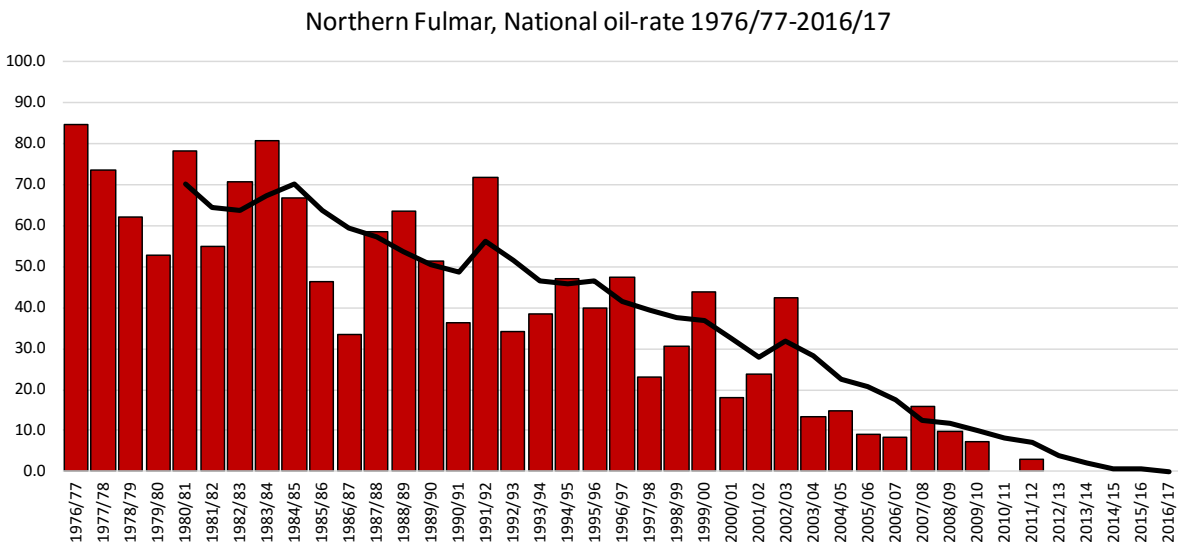


Figure 4. Annual oil rates in **Northern Fulmars** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. A total of 24 intact birds were checked in 2016/17, none of which were oiled. Three further intact corpses within the Wadden Sea (OSPAR 10) were also unoiled.

Northern Gannet *Morus bassanus*

With 67 known strandings, rather many Northern Gannets were found in winter 2016/17. Strandings occurred scattered all over the Dutch coastline, as could be expected from a largely pelagic species, but with a rather high number on Texel and Vlieland (Fig. 3a). Of 55 properly aged individuals, 84% were adult birds. Only five juveniles were recorded and four birds were

identified as immatures (plumages stages 2 and 3). As so often, entanglements in fishing gear were reported, but with ‘only’ five cases (one depicted below) the incidence was fairly low this season. Four birds were entangled in nylon rope, one (shown below) in nylon line, fish hooks and a yellow float.

None of the Northern Gannets found dead were reportedly oiled, which is a fine continuation of an extremely low oil rate in recent seasons (Fig. 5). Unfortunately, a sneak preview into the preliminary results of the upcoming season (2017/18) shows an oil rate of approximately 5% in 38 carefully checked individuals (Appendix 2).



Immature (type 2) Northern Gannet *Morus bassanus* entangled in fishing gear, Scheveningen, 3 November 2016. Photo Ted van der Knaap (published at waarneming.nl).

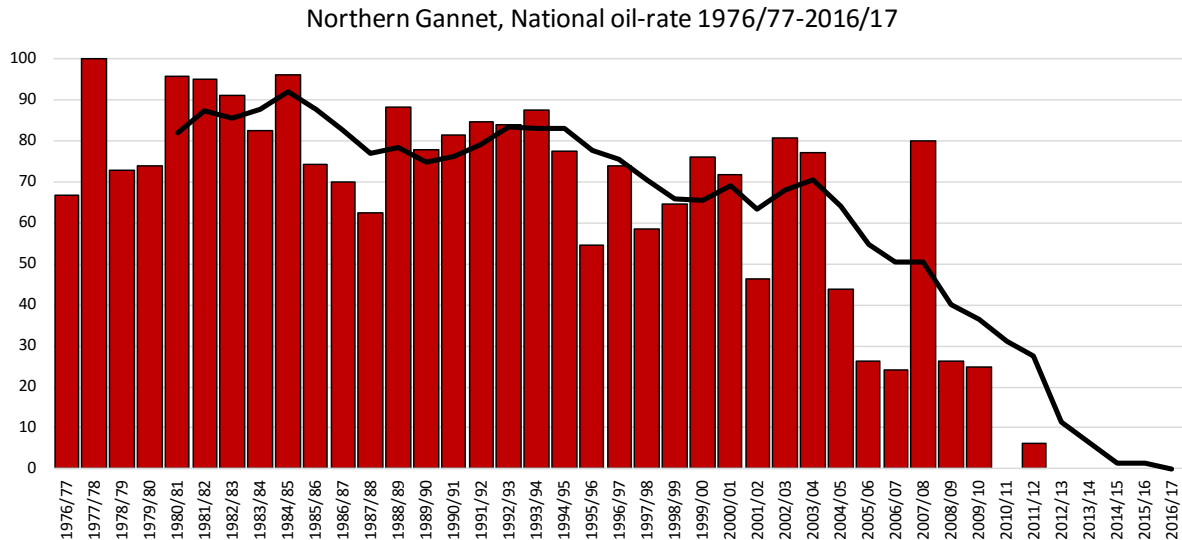


Figure 5. Annual oil rates in **Northern Gannets** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. A total of 27 birds were checked in 2016/17, none of which were oiled, but a sneak preview for 2017/18 suggested an oil rate of ~5%.

Waterfowl Anatidae

The list of reported waterfowl comprised 17 different species of ducks and geese (Appendix 1). Only Grey-lag Goose *Anser anser* (12), Brent *Branta bernicla* (10), Shelduck *Tadorna tadorna* (45), Common Eider *Somateria mollissima* (71), and Common Scoter *Melanitta nigra* (11) reached double figures and not a single oiled duck or goose was recorded. Traditionally, only Common Eiders and Common Scoters are given full treatment in these reports, but the numbers of the latter were (again) too low to be considered here. Common Eiders were exclusively found within and around the Wadden Sea district (Fig. 6). With not a single bird oiled, the long-term

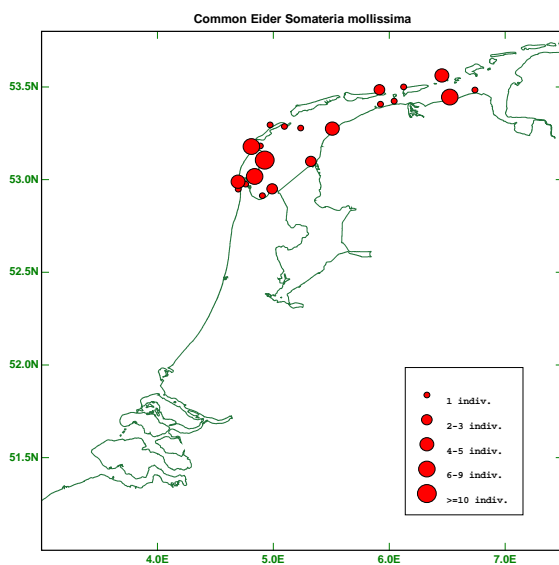


Figure 6. Spatial pattern in strandings reports of **Common Eiders** (incomplete carcasses included), winter 2016/17 (n= 71).

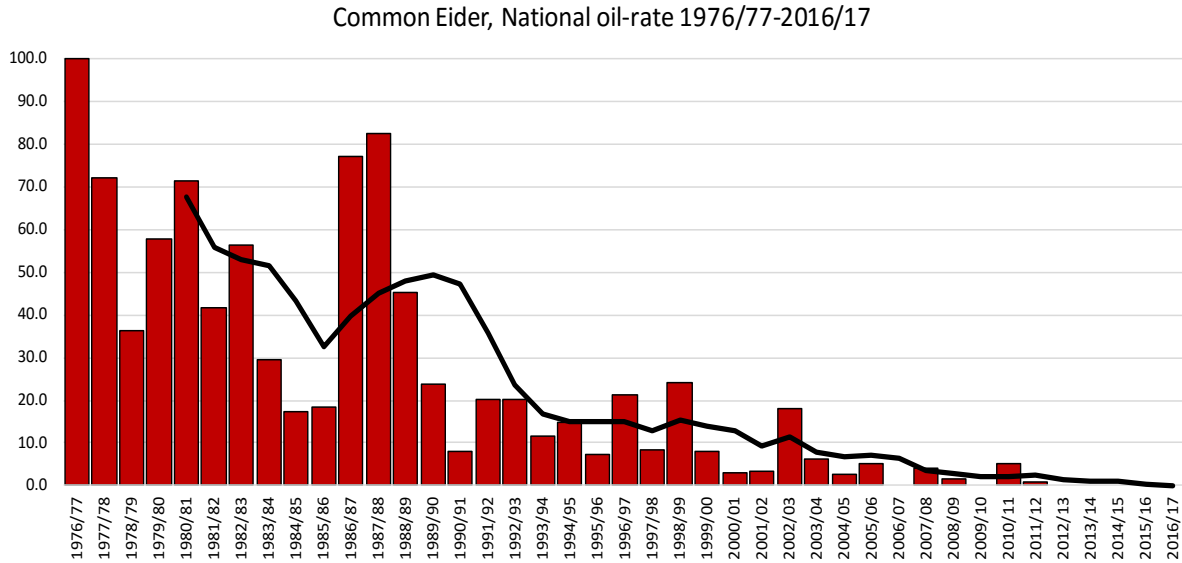


Figure 7. Annual oil rates in **Common Eiders** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. Only 11 intact birds were examined in 2016/17, none of which were oiled. Seven more intact birds within the Wadden were checked and none were oiled.

trend reflecting an almost or entirely clean Wadden Sea with regard to oil pollution is continued (Fig. 7). Of 28 properly aged and sexed individuals, 24 were male of which 23 were adults. Common Eiders may tend to not be reported by ordinary bird watchers under waarneming.nl (too common to be of interest), so that the total number of strandings could well be underestimated.

Waders

A mild winter, hence small numbers of waders only, none of which were reported as oiled (but few could be checked for many corpses were scavenged or largely eaten as usual). At least six species were found, all listed in Appendix 1. Only Oystercatchers *Haematopus ostralegus* reached double figures in the database (but see remarks under Common Eiders).

Skuas Stercorariidae

Six Great Skuas *Stercorarius skua* were found, but only three birds were checked for oil and all these were negative. None of the smaller species of skuas were found dead this season, which could be considered an all-time low.

Gulls Laridae

Six species of gulls were reported, two of which were common: the Herring Gull *Larus argentatus* and the Great Black-backed Gull *Larus marinus*. In both species, most reports were clustered at and around Texel (Fig. 8ab), but this could well have been caused by the ‘disinterest’ of birdwatchers factor highlighted before under the Common Eider and which would reduce the likelihood of reports under waarneming.nl. The number of Great Black-backed Gulls is remarkable in comparison to the number of Herring Gulls (nearly 1 : 1, Appendix 1). In previous winters this ratio averaged 4.5 (SD 2.3) HG : 1 GBBG. The apparent extra mortality of Great Black-backed Gulls may have been related to an unprecedented outbreak of a highly pathogenic virus, H5N8, in November 2016 and subsequent months, as reported by Slaterus (2016). Whichever has caused the mortality observed, none of the checked and intact birds found dead were oiled.

The oil rate in large gulls (normally only shown for Herring Gulls) is highly similar (Fig. 9ab), with rather moderate oil rates in historical times (20-30%, only occasionally higher), followed by a steady decline to trivial fractions only today. The Great Black-backed Gull is slightly less representative for the coastal zone, for fairly large numbers occur well offshore, but the oil rates for both species were remarkably similar on most years.

Winter 2016/17 was characterised by an influx of Glaucous Gulls *Larus hyperboreus* and Iceland Gulls *L. glaucoides* in the Netherlands and a several of these died and were found. The data shown here are all from systematic surveys. A complete check of waarneming.nl would reveal at least 15 corpses scattered around the coast, all of which described as juveniles.

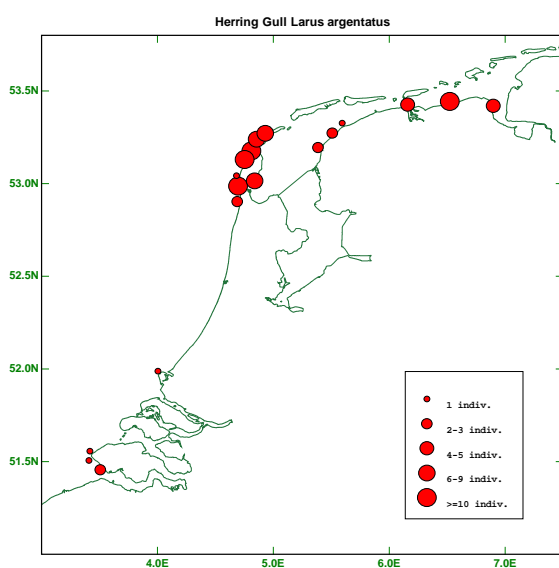


Figure 8a. Spatial pattern in strandings reports of **Herring Gulls** (incomplete carcasses included), winter 2016/17 (n= 117).

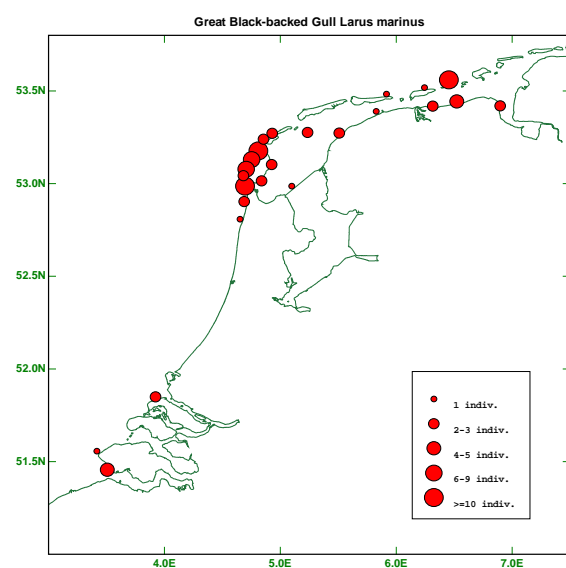


Figure 8b. Spatial pattern in strandings reports of **Great Black-backed Gulls** (incomplete carcasses included), winter 2016/17 (n= 103).

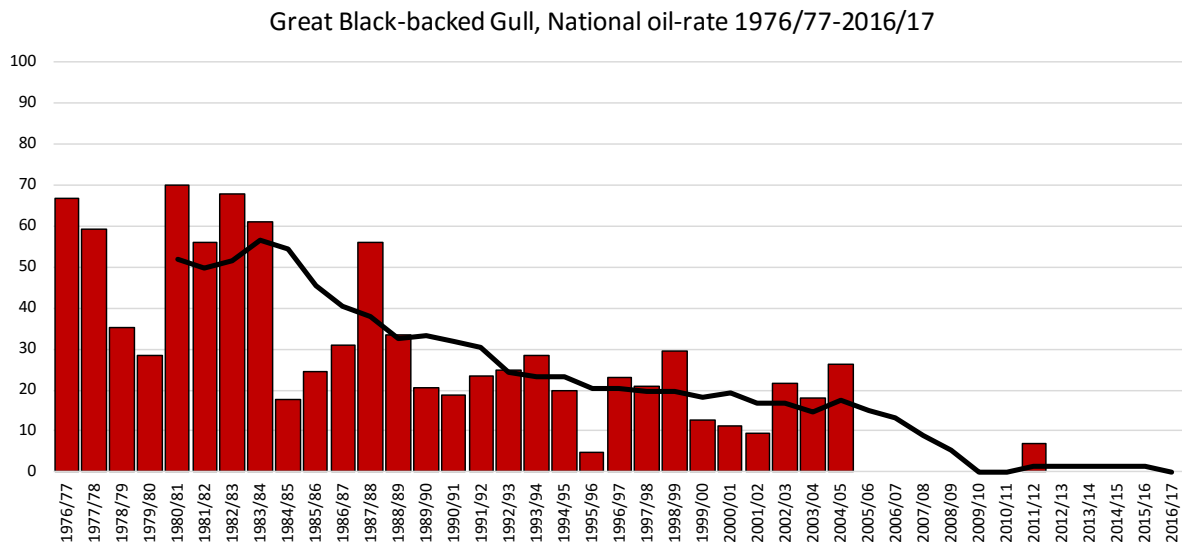
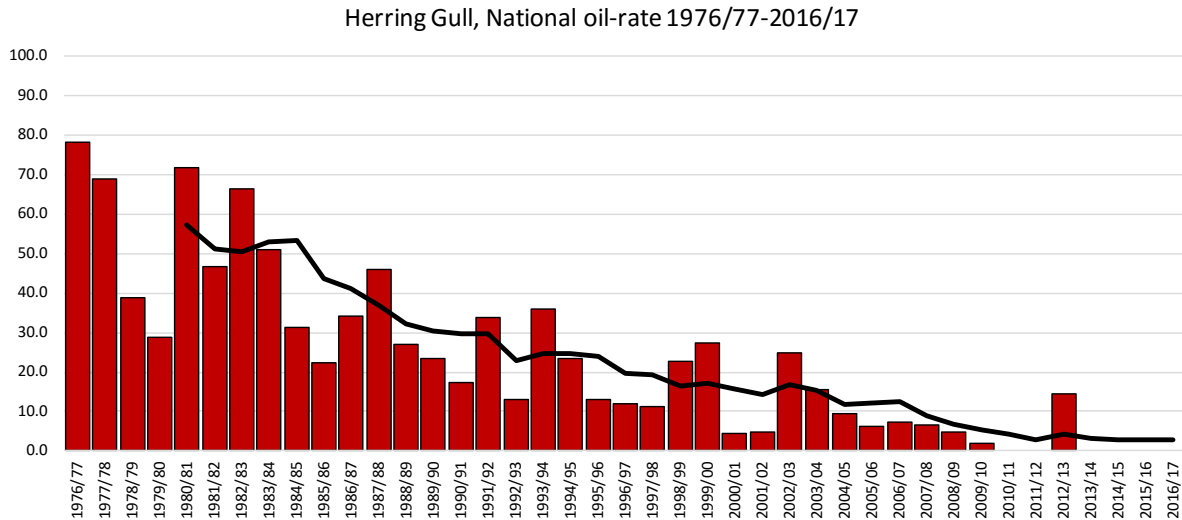


Figure 9ab. Annual oil rates in **Herring Gulls** (top) and **Great Black-backed Gulls** (bottom) along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. The number of intact birds examined in 2016/17 amounted to 37 in the Herring Gull and 38 in the Great Black-backed Gull, none of which were oiled. A further 14 and 13 intact birds of either species found within the Wadden were checked and none of these were oiled. Especially the number of Great Black-backed Gulls was rather high and this mortality may have been related to an outbreak of the highly pathogenic H5N8 virus in November 2016 (Slaterus 2016).

Of the smaller gulls, both Common Gull *Larus canus* and Black-headed Gull *Chroicocephalus ridibundus* reached double figures, but the mortality can only be described as normal and with no incidences of oil contaminated that are known to have occurred.

Black-legged Kittiwakes *Rissa tridactyla* are always given a full treatment, for these are often common or abundant species and they are considered representative for the offshore zone, just as the auks Alcidae. The number of reported Kittiwakes was very low, however, in winter 2016/17, and given that most stranded birds tend to be scavenged (pairs of wings rather than an intact body), there was very little chance for a reliable oil rate. As expected, the finds were scat-



A juvenile Glaucous Gull *Larus hyperboreus* found on Texel, 16 January 2017 (CJ Camphuysen)



An immature Great Black-backed Gull *Larus marinus* found on Texel, 16 January 2017 (CJ Camphuysen)

tered along the coastline (Fig. 10) and although the absence of any oil-related corpses does fit the long-term trends (Fig. 11), we should await a more substantial set of data in years to come to check if this species can be of any use to assess the levels of chronic oil pollution in future.

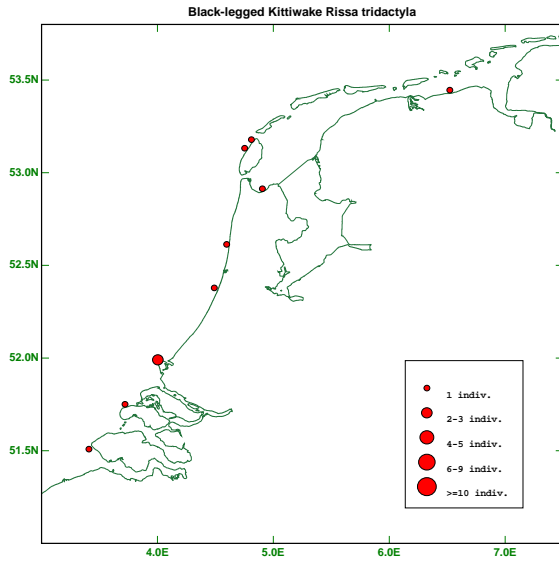


Figure 10. Spatial pattern in strandings reports of **Black-legged Kittiwakes** (incomplete carcasses included), winter 2016/17 (n= 10).

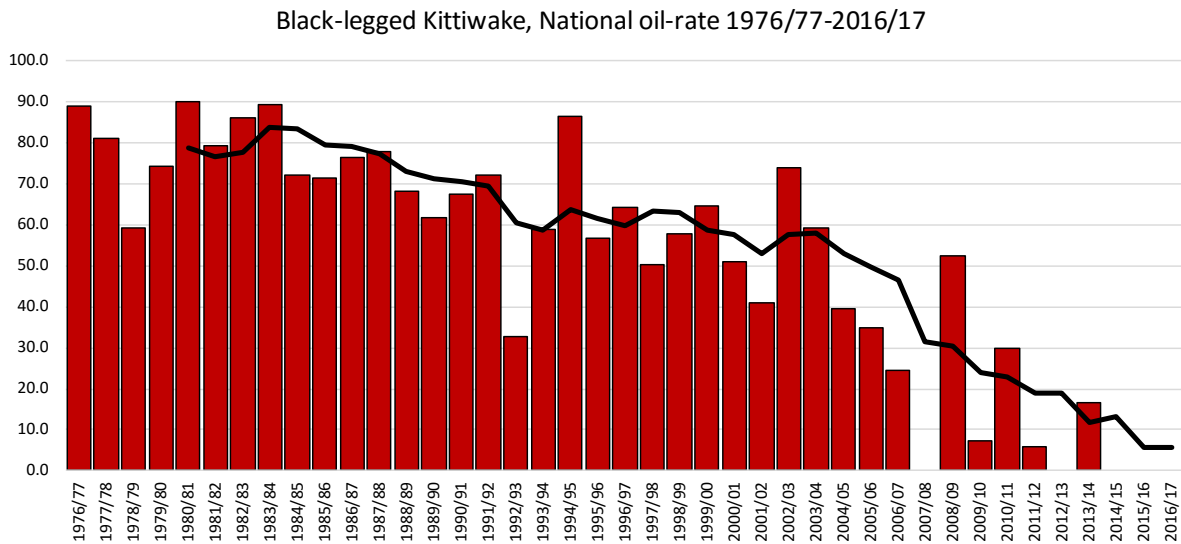


Figure 11. Annual oil rates in **Black-legged Kittiwakes** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. Only 2 intact birds were examined in 2016/17, none of which were oiled. No more intact birds were found within the Wadden to be checked.

Auks Alcidae

The auks are of prime importance for this study. Four species were found, but with only a single Atlantic Puffin *Fratercula artica*, it was not possible to generate an oil rate for this species. As usual, all Little Auks *Alle alle* that could be checked (n= 14) were unoiled, and with 27 reported cases, we have to consider a minor wreck for this species in 2016/17.

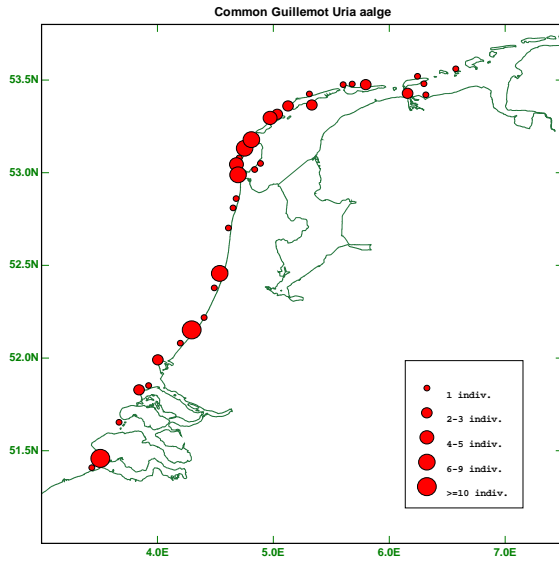


Figure 12a. Spatial pattern in strandings reports of **Common Guillemots**(incomplete carcasses included), winter 2016/17 (n= 95).

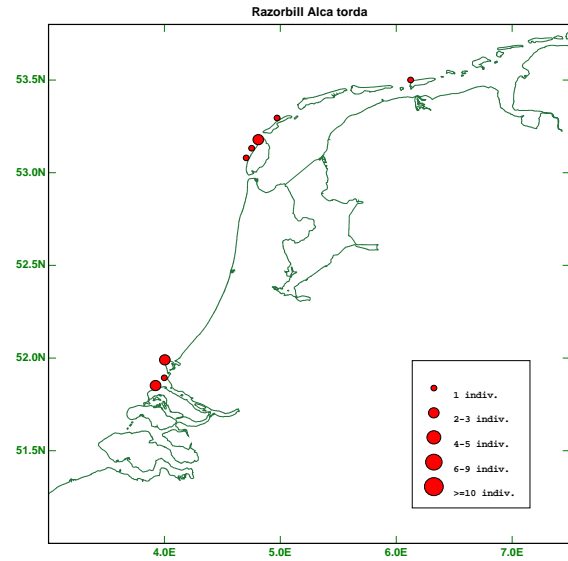


Figure 12b. Spatial pattern in strandings reports of **Razorbills** (incomplete carcasses included), winter 2016/17 (n= 117).

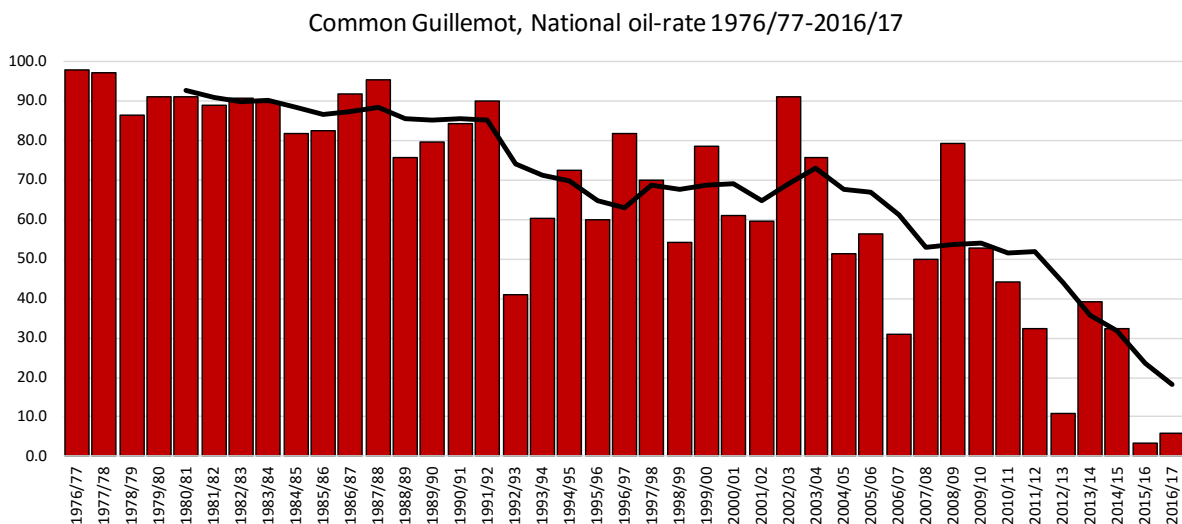


Figure 13. Annual oil rates in **Common Guillemots** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. In Appendix 2 can be seen that each season yielded a sufficient number of intact carcasses to evaluate oil rate reliably. In total 67 intact birds were examined in 2016/17, four of which were oiled. Six more intact birds within the Wadden were checked, one of which was contaminated with oil.

Common Guillemots occurred widespread along the entire coastline and enough birds were thoroughly checked to provide a reliable oil rate for 2016/17 along the North Sea coast. Of only six birds reported within the Wadden Sea, one bird was oiled (Appendix 2).

When we examine the long-term trend in oil rates along the North Sea coast (Figs. 13-14), we must conclude that the observed decline is highly significant, but no longer linear. The oil rate has dropped markedly in recent years and with the sneak preview obtained for the upcoming season (preliminary data suggest ~5.0% oiled), we can only conclude that this

marked decline is consistent. The highly significant long-term trend based on the 5-year running mean (Fig. 14) would lead to projections of future oil rates that are likely way too high and the target level of the OSPAR EcoQO may actually have been reached already. With regard to the

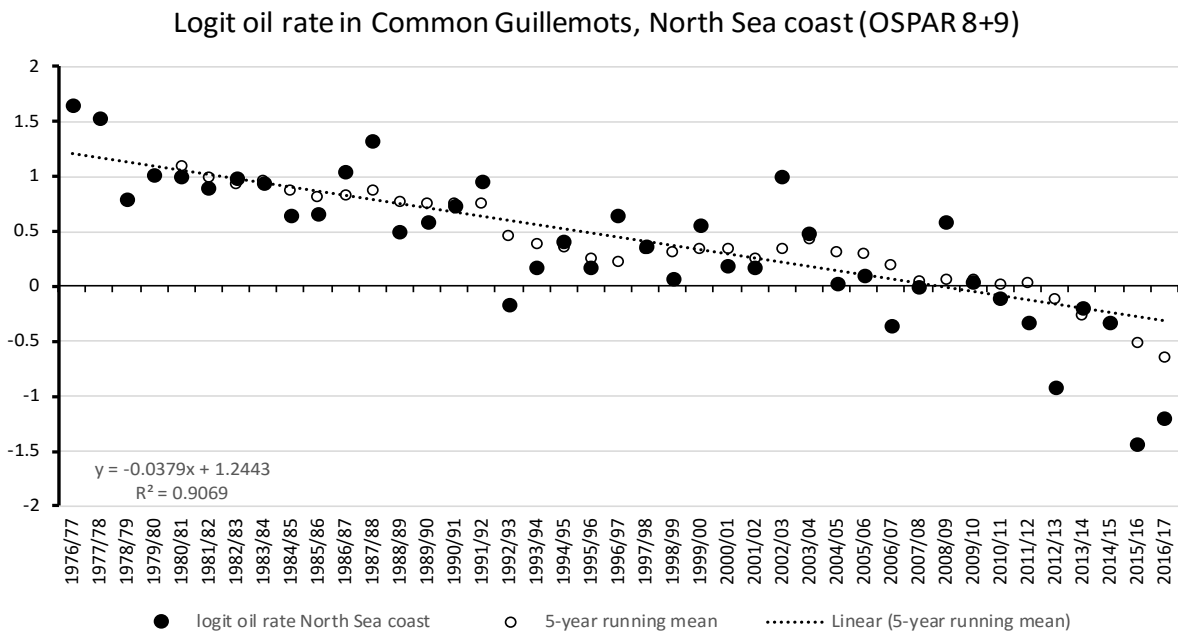


Figure 14. Logit-transformed annual oil rates in Common Guillemots ($n > 25$ complete carcasses) along the North Sea coast in The Netherlands (OSPAR areas 8, 9) and the 5-year running (arithmetic) mean oil rates since 1976/77. A linear regression was calculated over the running mean (dashed line; $P < 0.001$).



Common Guillemot in poor condition, Katwijk aan Zee 14 January 2017. Photo Bram Roobol (published at waarneming.nl)



Guillemot mass stranding 22 January 2017 Scheveningen. Photo Meindert & Rixte Boskma (published at waarneming.nl)

2016/17 data, however, one final note has to be made. A mass stranding occurred late January 2017, generating at least 15 fresh corpses of Guillemots on a very short stretch of coastline (shown above). This mass stranding is unexplained (a drowning event cannot be excluded entanglements in nearshore fishing gear occur every now and then), but this has reduced the oil rate somewhat. The total number of only five oiled casualties in total, however, can be seen as an encouraging sign of a highly improved situation at sea, however.

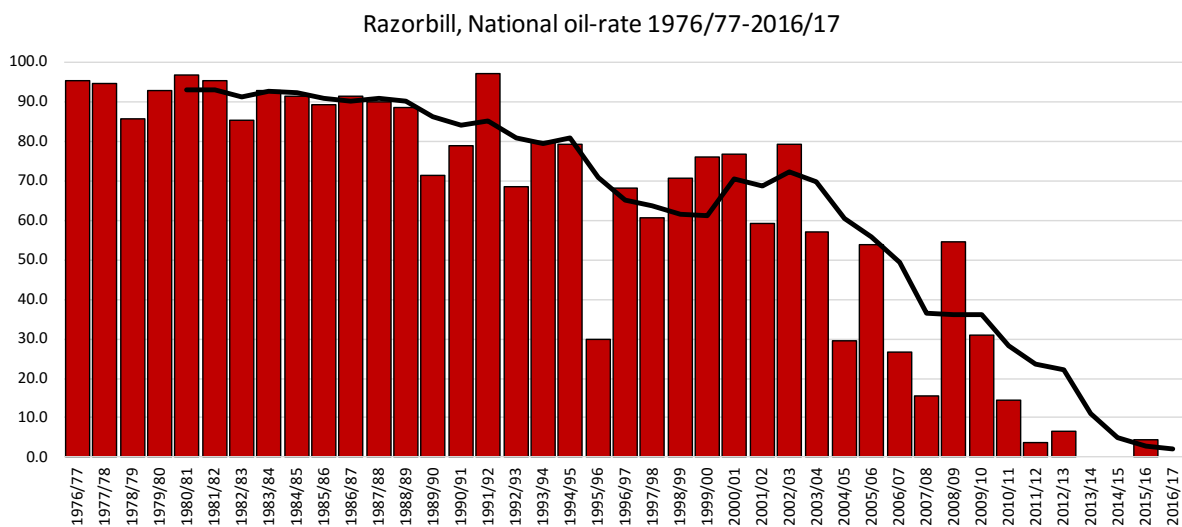


Figure 15. Annual oil rates in **Razorbills** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. Only 9 intact birds were examined in 2016/17, none of which were oiled. No more intact birds were found within the Wadden to be checked.

The number of Razorbills found dead was rather low, and with only 9 intact birds examined along the North Sea coast the oil rate must thus be considered unreliable (Fig. 15).

Other species

In autumn, a small wreck of thrushes Turdidae occurred, but as usual, there is no indication that this had anything to do with marine oil pollution. Harbour Porpoises *Phocoena phocoena* get nowadays reported to www.walvisstrandingen.nl and the reported number here is only a small fraction of the number of animals that washed ashore.

Discussion

Beached bird surveys are a vital part of both the Oiled-Guillemot EcoQO as well as for the plastic particle monitoring conducted by using Northern Fulmar carcasses around the North Sea (Van Franeker & SNS Fulmar Study Group 2013 and numerous other reports). Seabird densities in recent winters tended to be low so that volunteers refrained from searching systematically. On top of that, more and more people prefer to post their findings directly online on the internet as a way of rapid communication. Therefore, to complete the overview over strandings in The Netherlands, more opportunistic reports from www.waarneming.nl, and especially those reports that include clear photographic material were screened for double counts and identification errors, to enhance the sample size of stranded Common Guillemots and several other seabirds. Fox predation, beach-clean-up operations by NGOs (litter) and the more and more frequent 'sand suppletions' and large scale erosion are issues that hinder regular beached bird surveys in various ways.

In winter 2016/17, oil rates were again very low, signaling a further improvement in marine ecosystems for as far as chronic oil pollution is concerned. The 5-year running (arithmetic) mean oil rate in Common Guillemots for North Sea coasts in OSPAR areas 8 and 9 combined is the only trends that is still linear (Fig. 14), but the latest results (including a sneak preview into the next season, 2017/18), suggests an acceleration of the decline in oil rates in the southern Bight. A prediction is therefore difficult to provide. More importantly, however, if the current oil rates can be maintained in years to come, the fairly conservative OSPAR target has been reached with ease and will even be surpassed by lower oil rates than we have foreseen as feasible.

The Dutch data collected for OSPAR regions 8 and 9 must be seen as contributions to the data set. An international co-ordinator, or OSPAR itself, will have to combine Dutch, Belgian and German data for these areas in order to arrive at OSPAR area specific oil rates for Common Guillemots in the southeastern North Sea.

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Appendix 1

Species	Scientific name	Unknown	Unoiled	Oiled	Entangled	Total	Sample	% oiled
Red-throated Diver	<i>Gavia stellata</i>		3			3	3	
Great Northern Diver	<i>Gavia immer</i>	1				1	0	
Unidentified diver	<i>Gavia spec.</i>	1				1	0	
Great Crested Grebe	<i>Podiceps cristatus</i>		1			1	1	
Black-necked grebe	<i>Podiceps nigricollis</i>	1				1	0	
Northern Fulmar	<i>Fulmarus glacialis</i>	22	27			49	27	0
Northern Gannet	<i>Sula bassana</i>	32	30		5	67	35	0
Great Cormorant	<i>Phalacrocorax carbo</i>	4	1			5	1	
Bean Goose	<i>Anser fabalis</i>	1				1	0	
Tundra Goose	<i>Anser fabalis rossicus</i>	1				1	0	
Pink-footed Goose	<i>Anser brachyrhynchus</i>	1				1	0	
White-fronted Goose	<i>Anser albifrons</i>		2			2	2	
Greylag Goose	<i>Anser anser</i>	10	2			12	2	
Barnacle Goose	<i>Branta leucopsis</i>	4				4	0	
Brent	<i>Branta bernicla</i>	8	2			10	2	
Egyptian Goose	<i>Alopochen aegyptiaca</i>	1				1	0	
Shelduck	<i>Tadorna tadorna</i>	35	10			45	10	0
Wigeon	<i>Anas penelope</i>	4				4	0	
Teal	<i>Anas crecca</i>	2				2	0	
Mallard	<i>Anas platyrhynchos</i>	3				3	0	
Pintail	<i>Anas acuta</i>	2				2	0	
Pochard	<i>Aythya ferina</i>	1				1	0	
Tufted Duck	<i>Aythya fuligula</i>	2				2	0	
Eider	<i>Somateria mollissima</i>	53	18			71	18	0
Common Scoter	<i>Melanitta nigra</i>	6	5			11	5	
Coot	<i>Fulica atra</i>	1				1	0	
Oystercatcher	<i>Haematopus ostralegus</i>	6	5			11	5	
Lapwing	<i>Vanellus vanellus</i>	2				2	0	
Knot	<i>Calidris canutus</i>	2				2	0	
Woodcock	<i>Scolopax rusticola</i>	8				8	0	
Curlew	<i>Numenius arquata</i>	5	2			7	2	
Turnstone	<i>Arenaria interpres</i>	2				2	0	
Unidentified wader	<i>unidentified wader</i>	1				1	0	
Great Skua	<i>Stercorarius skua</i>	3	3			6	3	
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	13	2			15	2	
Common Gull	<i>Larus canus</i>	16	3			19	3	
Lesser Bl-backed Gull	<i>Larus fuscus</i>	6	1			7	1	
Herring Gull	<i>Larus argentatus</i>	66	51			117	51	0
Glaucous Gull	<i>Larus hyperboreus</i>		2			2	2	
Great Bl-backed Gull	<i>Larus marinus</i>	51	51	1		103	52	1.9
Black-legged Kittiwake	<i>Rissa tridactyla</i>	8	2			10	2	
Unidentified gull	<i>Larus spec.</i>	1				1	0	
Common Guillemot	<i>Uria aalge</i>	22	68	5		95	73	5.3
Razorbill	<i>Alca torda</i>	3	9			12	9	0
Little Auk	<i>Alle alle</i>	13	14			27	14	0
Atlantic Puffin	<i>Fratercula arctica</i>		1			1	1	
Wood Pigeon	<i>Columba palumbus</i>	1				1	0	
Long-eared Owl	<i>Asio otus</i>	1				1	0	
Blackbird	<i>Turdus merula</i>	19				19	0	
Fieldfare	<i>Turdus pilaris</i>	24	1			25	1	
Redwing	<i>Turdus iliacus</i>	20				20	0	
Goldcrest	<i>Regulus regulus</i>		1			1	1	
Carrion Crow	<i>Corvus corone corone</i>	1				1	0	
Starling	<i>Sturnus vulgaris</i>	4	1			5	1	
Unidentified bird	<i>unidentified bird</i>	5				5	0	
Harbour Porpoise	<i>Phocoena phocoena</i>	1	1			2	1	
Harbour Seal	<i>Phoca vitulina</i>	1	2			3	2	
Brown Hare	<i>Lepus capensis</i>	1	1			2	1	
Feral Cat	<i>Felis domesticus</i>		1			1	1	

Appendix 2

Species specific oil-rates, including a 2017/18 preview

Common Guillemot *Uria aalge* - Zeekoet

pelagic seabird

Found oiled in OSPAR regions				Sample size (intact/scored)				Percentage oiled (%)						
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea			
1976/77	37	8	45	1976/77	38	8	46	1976/77	97.4	100.0	97.8			
1977/78	79	22	101	1977/78	82	23	105	1977/78	96.3	95.7	96.2			
1978/79	78	42	120	1978/79	93	46	139	1978/79	83.9	91.3	86.3			
1979/80	111	55	166	1979/80	118	64	182	1979/80	94.1	85.9	66.7			
1980/81	2766	430	214	3196	1980/81	3061	448	233	3509	1980/81	90.4	96.0	91.8	
1981/82	586	193	106	779	1981/82	676	202	115	878	1981/82	86.7	95.5	92.2	
1982/83	2184	1385	399	3569	1982/83	2495	1449	434	3944	1982/83	87.5	95.6	91.9	
1983/84	1420	628	127	2048	1983/84	1625	660	163	2285	1983/84	87.4	95.2	77.9	
1984/85	659	424	41	1083	1984/85	855	474	47	1329	1984/85	77.1	89.5	87.2	
1985/86	629	341	129	970	1985/86	803	378	159	1181	1985/86	78.3	90.2	81.1	
1986/87	96	49	15	145	1986/87	107	51	17	158	1986/87	89.7	96.1	88.2	
1987/88	1131	267	65	1398	1987/88	1177	288	86	1465	1987/88	96.1	92.7	75.6	
1988/89	893	205	66	1098	1988/89	1243	290	133	1533	1988/89	71.8	70.7	49.6	
1989/90	1006	121	61	1127	1989/90	1271	158	83	1429	1989/90	79.2	76.6	73.5	
1990/91	1562	123	15	1685	1990/91	1862	145	35	2007	1990/91	83.9	84.8	42.9	
1991/92	464	247	6	711	1991/92	522	268	6	790	1991/92	88.9	92.2	100.0	
1992/93	329	43	50	372	1992/93	817	150	136	967	1992/93	40.3	28.7	36.8	
1993/94	340	101	56	441	1993/94	560	179	107	739	1993/94	60.7	56.4	52.3	
1994/95	170	94	59	264	1994/95	247	124	83	371	1994/95	68.8	75.8	71.1	
1995/96	65	38	4	103	1995/96	111	61	7	172	1995/96	58.6	62.3	57.1	
1996/97	123	55	4	178	1996/97	146	71	6	217	1996/97	84.2	77.5	66.7	
1997/98	198	93	13	291	1997/98	305	146	21	451	1997/98	64.9	63.7	61.9	
1998/99	456	325	99	781	1998/99	1287	664	414	1951	1998/99	35.4	48.9	23.9	
1999/00	531	238	90	769	1999/00	678	310	149	988	1999/00	78.3	76.8	60.4	
2000/01	52	125	21	177	2000/01	113	198	49	311	2000/01	46.0	63.1	42.9	
2001/02	213	176	70	389	2001/02	344	320	138	664	2001/02	61.9	55.0	50.7	
2002/03	1911	185	36	2096	2002/03	1998	314	77	2312	2002/03	95.6	58.9	46.8	
2003/04	118	149	28	267	2003/04	142	215	61	357	2003/04	83.1	69.3	45.9	
2004/05	163	124	44	287	2004/05	271	312	103	583	2004/05	60.1	39.7	42.7	
2005/06	44	75	34	119	2005/06	85	132	71	217	2005/06	51.8	56.8	47.9	
2006/07	101	36	10	137	2006/07	375	154	79	529	2006/07	26.9	23.4	12.7	
2007/08	9	21	7	30	2007/08	18	43	20	61	2007/08	50.0	48.8	35.0	
2008/09	19	52	6	71	2008/09	22	68	9	90	2008/09	86.4	76.5	66.7	
2009/10	3	8	6	11	2009/10	23	30	10	53	2009/10	13.0	26.7	60.0	
2010/11	5	9		14	2010/11	9	24		33	2010/11	55.6	37.5		
2011/12	31	25		56	2011/12	107	101	30	208	2011/12	29.0	24.8		
2012/13	1	5	1	6	2012/13	28	27	3	55	2012/13	3.6	18.5	33.3	
2013/14		23	2	23	2013/14	16	43	16	59	2013/14		53.5	12.5	
2014/15	10	2		12	2014/15	18	19		37	2014/15	55.6	10.5		
2015/16	2	3	1	5	2015/16	19	122	25	141	2015/16	10.5	2.5	4.0	
2016/17	1	3	1	4	2016/17	37	30	6	67	2016/17	2.7	10.0	16.7	
2017/18		2		2	2017/18	16	24	11	40	2017/18		8.3		5.0

NOTE THAT OIL RATES ARE ONLY CONSIDERED RELIABLE IF AT LEAST 25 CORPSES^(CHECK SAMPLE SIZE) COULD BE EXAMINED IN A REGION

Northern Fulmar *Fulmarus glacialis*- Noordse Stormvogel

pelagic seabird

Found oiled in OSPAR region				Sample size (intact/scored)				Percentage oiled (%)					
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea		
1976/77	7	4	11	1976/77	9	4	13	1976/77	77.8	100.0	84.6		
1977/78	19	3	22	1977/78	25	5	30	1977/78	76.0	60.0	73.3		
1978/79	20	6	26	1978/79	34	8	42	1978/79	58.8	75.0	61.9		
1979/80	16	3	19	1979/80	27	9	36	1979/80	59.3	33.3	52.8		
1980/81	209	39	32	248	1980/81	256	61	38	317	1980/81	81.6	63.9	84.2
1981/82	32	7	15	39	1981/82	52	19	23	71	1981/82	61.5	36.8	65.2
1982/83	42	13	8	55	1982/83	58	20	12	78	1982/83	72.4	65.0	66.7
1983/84	137	12	10	149	1983/84	169	16	15	185	1983/84	81.1	75.0	66.7
1984/85	16	12	1	28	1984/85	24	18	1	42	1984/85	66.7	66.7	100.0
1985/86	35	16	3	51	1985/86	80	30	8	110	1985/86	43.8	53.3	37.5
1986/87	2	3		5	1986/87	9	6	1	15	1986/87	22.2	50.0	
1987/88	106	36	10	142	1987/88	166	77	28	243	1987/88	63.9	46.8	35.7
1988/89	50	26	4	76	1988/89	82	38	16	120	1988/89	61.0	68.4	25.0
1989/90	17	4		21	1989/90	35	6	1	41	1989/90	48.6	66.7	
1990/91	4			4	1990/91	11			11	1990/91	36.4		
1991/92	28	41	1	69	1991/92	44	52	3	96	1991/92	63.6	78.8	33.3
1992/93	11	1	4	12	1992/93	27	8	12	35	1992/93	40.7	12.5	33.3
1993/94	4	6	1	10	1993/94	17	9	2	26	1993/94	23.5	66.7	50.0
1994/95	12	4	7	16	1994/95	21	13	11	34	1994/95	57.1	30.8	63.6
1995/96	6	2	1	8	1995/96	12	8	1	20	1995/96	50.0	25.0	100.0
1996/97	5	4		9	1996/97	13	6		19	1996/97	38.5	66.7	
1997/98	9	6		15	1997/98	34	31	2	65	1997/98	26.5	19.4	
1998/99	105	104	29	209	1998/99	407	280	100	687	1998/99	25.8	37.1	29.0
1999/00	30	25	7	55	1999/00	69	57	13	126	1999/00	43.5	43.9	53.8
2000/01	2	6		8	2000/01	16	28	4	44	2000/01	12.5	21.4	
2001/02	52	24	7	76	2001/02	244	78	28	322	2001/02	21.3	30.8	25.0
2002/03	19	3		22	2002/03	28	24	5	52	2002/03	67.9	12.5	
2003/04	19	17	1	36	2003/04	103	163	28	266	2003/04	18.4	10.4	3.6
2004/05	5	6	3	11	2004/05	34	40	18	74	2004/05	14.7	15.0	16.7
2005/06	1	3		4	2005/06	24	20	4	44	2005/06	4.2	15.0	
2006/07	3			3	2006/07	26	10	10	36	2006/07	11.5		
2007/08		4	1	4	2007/08	5	20	13	25	2007/08		20.0	7.7
2008/09	2	6		8	2008/09	27	55	7	82	2008/09	7.4	10.9	
2009/10	1	1	1	2	2009/10	9	19	3	28	2009/10	11.1	5.3	33.3
2010/11					2010/11	4	5		9	2010/11	0.0	0.0	
2011/12	3	1		4	2011/12	78	52	13	130	2011/12	3.8	1.9	
2012/13					2012/13	2	3		5	2012/13	0.0	0.0	
2013/14					2013/14	2		1	2	2013/14	0.0		0.0
2014/15					2014/15		2		2	2014/15		0.0	
2015/16					2015/16	3	10		13	2015/16	0.0	0.0	
2016/17					2016/17	11	13	3	24	2016/17	0.0	0.0	0.0
2017/18					2017/18	8	2	2	10	2017/18	0.0	0.0	0.0

Northern Gannet *Morus bassanus*- Jan van Gent

pelagic seabird

Found oiled in OSPAR region				Sample size (intact/scored)				Percentage oiled (%)			
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea
1976/77	4	2	6	1976/77	7	2	9	1976/77	57.1	100.0	66.7
1977/78	6	4	10	1977/78	6	4	10	1977/78	100.0		100.0
1978/79	6	2	8	1978/79	9	2	11	1978/79	66.7		72.7
1979/80	13	1	14	1979/80	14	5	19	1979/80	92.9	20.0	73.7
1980/81	39	7	2 46	1980/81	41	7	4 48	1980/81	95.1		50.0 95.8
1981/82	27	10	6 37	1981/82	28	11	6 39	1981/82	96.4	90.9	100.0 94.9
1982/83	74	16	7 90	1982/83	81	18	9 99	1982/83	91.4	88.9	77.8 90.9
1983/84	34	8	6 42	1983/84	42	9	6 51	1983/84	81.0	88.9	100.0 82.4
1984/85	18	7	2 25	1984/85	18	8	2 26	1984/85	100.0	87.5	100.0 96.2
1985/86	17	6	5 23	1985/86	24	7	6 31	1985/86	70.8	85.7	83.3 74.2
1986/87	11	3	14	1986/87	16	4	20	1986/87	68.8	75.0	70.0
1987/88	13	2	1 15	1987/88	15	9	1 24	1987/88	86.7	22.2	100.0 62.5
1988/89	9	6	3 15	1988/89	11	6	5 17	1988/89	81.8		60.0 88.2
1989/90	38	8	2 46	1989/90	51	8	4 59	1989/90	74.5		50.0 78.0
1990/91	42	6	1 48	1990/91	52	7	1 59	1990/91	80.8	85.7	100.0 81.4
1991/92	21	12	33	1991/92	25	14	39	1991/92	84.0	85.7	84.6
1992/93	24	2	1 26	1992/93	27	4	3 31	1992/93	88.9	50.0	33.3 83.9
1993/94	21	7	3 28	1993/94	24	8	3 32	1993/94	87.5	87.5	100.0 87.5
1994/95	18	6	5 24	1994/95	23	8	5 31	1994/95	78.3	75.0	100.0 77.4
1995/96	4	2	6	1995/96	5	6	11	1995/96	80.0	33.3	54.5
1996/97	12	5	17	1996/97	15	8	23	1996/97	80.0	62.5	73.9
1997/98	10	4	14	1997/98	13	11	24	1997/98	76.9	36.4	58.3
1998/99	30	21	8 51	1998/99	45	34	12 79	1998/99	66.7	61.8	66.7 64.6
1999/00	24	20	3 44	1999/00	36	22	5 58	1999/00	66.7	90.9	60.0 75.9
2000/01	5	18	1 23	2000/01	7	25	3 32	2000/01	71.4	72.0	33.3 71.9
2001/02	8	5	13	2001/02	16	12	28	2001/02	50.0	41.7	46.4
2002/03	26	3	29	2002/03	30	6	1 36	2002/03	86.7	50.0	80.6
2003/04	3	7	10	2003/04	5	8	1 13	2003/04	60.0	87.5	76.9
2004/05	7	11	1 18	2004/05	21	20	4 41	2004/05	33.3	55.0	25.0 43.9
2005/06	1	4	4 5	2005/06	3	16	6 19	2005/06	33.3	25.0	66.7 26.3
2006/07	6	1	2 7	2006/07	21	8	5 29	2006/07	28.6	12.5	40.0 24.1
2007/08	2	10	2 12	2007/08	3	12	3 15	2007/08	66.7	83.3	66.7 80.0
2008/09	1	4	5	2008/09	8	11	2 19	2008/09	12.5	36.4	26.3
2009/10	1	2	3	2009/10	2	10	1 12	2009/10	50.0	20.0	25.0
2010/11				2010/11	2	2		2010/11	0.0		0.0
2011/12	2	1	3	2011/12	37	12	7 49	2011/12	5.4	8.3	6.1
2012/13				2012/13	4	5	1 9	2012/13	0.0	0.0	0.0 0.0
2013/14				2013/14	3	3	2 6	2013/14	0.0	0.0	0.0 0.0
2014/15				2014/15	2	3	5	2014/15	0.0	0.0	0.0 0.0
2015/16				2015/16	1	18	1 19	2015/16	0.0	0.0	0.0 0.0
2016/17				2016/17	14	13	8 27	2016/17	0.0	0.0	0.0 0.0
2017/18	1	1	3 2	2017/18	31	7	8 38	2017/18	3.2	14.3	37.5 5.3

Common Eider *Somateria mollissima*- Eider

coastal species

Found oiled in OSPAR region				Sample size (intact/scored)				Percentage oiled (%)				
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea	
1976/77			6	1976/77			6	1976/77		100.0		100.0
1977/78	10	3	13	1977/78	14	4	3 18	1977/78	71.4	75.0		72.2
1978/79	8	8	16	1978/79	15	29	44	1978/79	53.3	27.6		36.4
1979/80	5	17	1 22	1979/80	7	31	4 38	1979/80	71.4	54.8	25.0	57.9
1980/81	16	39	24 55	1980/81	21	56	61 77	1980/81	76.2	69.6	39.3	71.4
1981/82	8	22	44 30	1981/82	22	50	119 72	1981/82	36.4	44.0	37.0	41.7
1982/83	16	98	162 114	1982/83	34	169	392 203	1982/83	47.1	58.0	41.3	56.2
1983/84	30	21	67 51	1983/84	52	122	379 174	1983/84	57.7	17.2	17.7	29.3
1984/85	22	45	73 67	1984/85	96	287	509 383	1984/85	22.9	15.7	14.3	17.5
1985/86	4	17	12 21	1985/86	8	107	211 115	1985/86	50.0	15.9	5.7	18.3
1986/87	22	279	131 301	1986/87	35	355	174 390	1986/87	62.9	78.6	75.3	77.2
1987/88	552	170	41 722	1987/88	555	322	237 877	1987/88	99.5	52.8	17.3	82.3
1988/89	20	99	57 119	1988/89	50	217	523 267	1988/89	40.0	45.6	10.9	44.6
1989/90	7	11	37 18	1989/90	8	68	209 76	1989/90	87.5	16.2	17.7	23.7
1990/91	47	4	4 51	1990/91	429	204	200 633	1990/91	11.0	2.0	2.0	8.1
1991/92	96	26	21 122	1991/92	261	340	155 601	1991/92	36.8	7.6	13.5	20.3
1992/93	42	13	8 55	1992/93	123	154	343 277	1992/93	34.1	8.4	2.3	19.9
1993/94	8	2	13 10	1993/94	28	58	111 86	1993/94	28.6	3.4	11.7	11.6
1994/95	12	4	43 16	1994/95	41	66	533 107	1994/95	29.3	6.1	8.1	15.0
1995/96	5	16	5 21	1995/96	108	178	121 286	1995/96	4.6	9.0	4.1	7.3
1996/97	3	21	9 24	1996/97	31	81	206 112	1996/97	9.7	25.9	4.4	21.4
1997/98	5	3	10 8	1997/98	27	78	105 105	1997/98	18.5	3.8	9.5	7.6
1998/99	1	16	19 17	1998/99	16	55	172 71	1998/99	6.3	29.1	11.0	23.9
1999/00	92	77	167 169	1999/00	456	1631	4982 2087	1999/00	20.2	4.7	3.4	8.1
2000/01	6	7	2 13	2000/01	91	377	965 468	2000/01	6.6	1.9	0.2	2.8
2001/02	5	24	43 29	2001/02	323	613	2723 936	2001/02	1.5	3.9	1.6	3.1
2002/03	42	10	5 52	2002/03	57	232	474 289	2002/03	73.7	4.3	1.1	18.0
2003/04	2	3	3 5	2003/04	10	71	209 81	2003/04	20.0	4.2	1.4	6.2
2004/05		5	8 5	2004/05	14	170	480 184	2004/05		2.9	1.7	2.7
2005/06	2	4	4 6	2005/06	12	101	268 113	2005/06	16.7	4.0	1.5	5.3
2006/07			2 0	2006/07	4	38	130 42	2006/07			1.5	0.0
2007/08		1	1	2007/08		24	59 24	2007/08		4.2		4.2
2008/09		1	1	2008/09	1	67	82 68	2008/09		1.5		1.5
2009/10			2 0	2009/10		51	71 51	2009/10			2.8	0.0
2010/11				2010/11	3	16	13 19	2010/11	0.0	0.0	0.0	0.0
2011/12		1	1	2011/12	6	112	61 118	2011/12		0.9		0.8
2012/13				2012/13		5	5 5	2012/13	0.0	0.0	0.0	0.0
2013/14				2013/14		9	6 9	2013/14	0.0	0.0	0.0	0.0
2014/15				2014/15		5	12 5	2014/15	0.0	0.0	0.0	0.0
2015/16				2015/16		7	14 7	2015/16	0.0	0.0	0.0	0.0
2016/17				2016/17		11	7 11	2016/17	0.0	0.0	0.0	0.0
2017/18				2017/18		3	0	2017/18			0.0	0.0

Herring Gull *Larus argentatus*- Zilvermeeuw

coastal species

Found oiled in OSPAR region				Sample size (intact/scored)				Percentage oiled (%)			
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea
1976/77	33	3	36	1976/77	43	3	46	1976/77	76.7	100.0	78.3
1977/78	44	5	49	1977/78	64	7	71	1977/78	68.8	71.4	69.0
1978/79	82	7	89	1978/79	211	19	230	1978/79	38.9	36.8	38.7
1979/80	39	7	46	1979/80	122	38	160	1979/80	32.0	18.4	28.8
1980/81	258	56	314	1980/81	350	88	438	1980/81	73.7	63.6	25.0
1981/82	134	23	157	1981/82	257	84	341	1981/82	52.1	27.4	13.2
1982/83	145	37	182	1982/83	237	60	297	1982/83	61.2	61.7	20.1
1983/84	191	18	209	1983/84	412	38	450	1983/84	46.4	47.4	12.3
1984/85	70	22	92	1984/85	224	82	306	1984/85	31.3	26.8	17.4
1985/86	42	14	56	1985/86	181	95	276	1985/86	23.2	14.7	10.9
1986/87	42	17	59	1986/87	113	81	194	1986/87	37.2	21.0	9.3
1987/88	50	17	67	1987/88	106	46	152	1987/88	47.2	37.0	5.2
1988/89	43	11	54	1988/89	174	56	230	1988/89	24.7	19.6	5.1
1989/90	46	6	52	1989/90	215	23	238	1989/90	21.4	26.1	8.0
1990/91	24	3	27	1990/91	169	5	174	1990/91	14.2	60.0	15.5
1991/92	27	10	37	1991/92	105	20	125	1991/92	25.7	50.0	29.6
1992/93	11	3	14	1992/93	105	30	135	1992/93	10.5	10.0	9.7
1993/94	28	6	34	1993/94	92	13	105	1993/94	30.4	46.2	32.4
1994/95	22	4	26	1994/95	70	50	120	1994/95	31.4	8.0	6.8
1995/96	8	4	12	1995/96	83	36	119	1995/96	9.6	11.1	10.1
1996/97	4	4	8	1996/97	64	31	95	1996/97	6.3	12.9	8.4
1997/98	7	4	11	1997/98	81	23	104	1997/98	8.6	17.4	5.0
1998/99	18	7	25	1998/99	102	26	128	1998/99	17.6	26.9	12.2
1999/00	15	9	24	1999/00	84	35	119	1999/00	17.9	25.7	9.1
2000/01	2	1	3	2000/01	40	46	86	2000/01	5.0	2.2	3.5
2001/02	2	3	5	2001/02	74	32	106	2001/02	2.7	9.4	3.6
2002/03	21	3	24	2002/03	51	45	96	2002/03	41.2	6.7	0.7
2003/04	4	4	8	2003/04	24	28	52	2003/04	16.7	14.3	15.4
2004/05	4	2	4	2004/05	37	25	62	2004/05	10.8		2.2
2005/06	1	1	2	2005/06	14	19	33	2005/06	7.1	5.3	3.4
2006/07		1	1	2006/07	10	17	27	2006/07		5.9	3.7
2007/08				2007/08	6	8	14	2007/08	0.0	0.0	0.0
2008/09		1	1	2008/09	13	26	39	2008/09		3.8	2.6
2009/10		1	1	2009/10	7	44	51	2009/10		2.3	2.0
2010/11				2010/11	11	18	29	2010/11	0.0	0.0	0.0
2011/12				2011/12	26	30	56	2011/12	0.0	0.0	0.0
2012/13	2		2	2012/13	7	7	14	2012/13	28.6		14.3
2013/14			0	2013/14	3	14	17	2013/14			12.5
2014/15		1		2014/15	5	6	11	2014/15	0.0	0.0	0.0
2015/16				2015/16	2	21	23	2015/16	0.0	0.0	0.0
2016/17				2016/17	37	14	51	2016/17	0.0	0.0	0.0
2017/18				2017/18	40		40	2017/18	0.0		0.0

Great Black-backed Gull *Larus marinus*- Grote Mantelmeeuw

coastal species

Found oiled in OSPAR region				Sample size (intact/scored)				Percentage oiled (%)			
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea
1976/77	8	2	10	1976/77	13	2	15	1976/77	61.5	100.0	66.7
1977/78	16		16	1977/78	27		27	1977/78	59.3		59.3
1978/79	24	2	26	1978/79	63	11	74	1978/79	38.1	18.2	35.1
1979/80	12	1	13	1979/80	38	8	46	1979/80	31.6	12.5	28.3
1980/81	70	13	83	1980/81	95	24	119	1980/81	73.7	54.2	50.0
1981/82	63	9	72	1981/82	95	34	129	1981/82	66.3	26.5	35.7
1982/83	51	14	65	1982/83	77	19	96	1982/83	66.2	73.7	39.6
1983/84	48	8	56	1983/84	77	15	92	1983/84	62.3	53.3	11.3
1984/85	7	2	9	1984/85	36	15	51	1984/85	19.4	13.3	12.5
1985/86	10	1	11	1985/86	29	16	45	1985/86	34.5	6.3	12.1
1986/87	4	9	13	1986/87	27	15	42	1986/87	14.8	60.0	31.0
1987/88	3	11	14	1987/88	7	18	25	1987/88	42.9	61.1	15.0
1988/89	5	2	7	1988/89	13	8	21	1988/89	38.5	25.0	4.8
1989/90	4	2	6	1989/90	22	7	29	1989/90	18.2	28.6	25.0
1990/91	5	1	6	1990/91	28	4	32	1990/91	17.9	25.0	18.8
1991/92	9	1	10	1991/92	40	3	43	1991/92	22.5	33.3	23.3
1992/93	4		4	1992/93	13	3	16	1992/93	30.8		25.0
1993/94	2	2	4	1993/94	8	6	14	1993/94	25.0	33.3	28.6
1994/95	2	3	5	1994/95	13	12	25	1994/95	15.4	25.0	12.5
1995/96	1		1	1995/96	14	7	21	1995/96	7.1		4.8
1996/97	2	1	3	1996/97	6	7	13	1996/97	33.3	14.3	23.1
1997/98	2	2	4	1997/98	12	7	19	1997/98	16.7	28.6	21.1
1998/99	8	5	13	1998/99	27	17	44	1998/99	29.6	29.4	29.5
1999/00	1	2	3	1999/00	13	11	24	1999/00	7.7	18.2	11.8
2000/01		2	2	2000/01	18	23	41	2000/01		11.1	11.1
2001/02	1	1	2	2001/02	12	9	21	2001/02	8.3	11.1	9.5
2002/03	4	1	5	2002/03	8	15	23	2002/03	50.0	6.7	9.5
2003/04	2	2	4	2003/04	8	14	22	2003/04	25.0	14.3	18.2
2004/05	3	3	6	2004/05	13	10	23	2004/05	23.1	30.0	26.1
2005/06				2005/06	7	10	17	2005/06	0.0	0.0	0.0
2006/07				2006/07	4	15	19	2006/07	0.0	0.0	0.0
2007/08				2007/08	3	15	18	2007/08	0.0	0.0	0.0
2008/09				2008/09	6	11	17	2008/09	0.0	0.0	0.0
2009/10				2009/10	5	14	19	2009/10	0.0	0.0	0.0
2010/11				2010/11	2	5	7	2010/11	0.0	0.0	0.0
2011/12	2		3	2011/12	24	19	43	2011/12	8.3	5.3	7.0
2012/13		1		2012/13	3	5	8	2012/13	0.0	0.0	0.0
2013/14				2013/14	4	2	6	2013/14	0.0	0.0	0.0
2014/15				2014/15	3	4	7	2014/15	0.0	0.0	0.0
2015/16				2015/16	2	12	14	2015/16	0.0	0.0	0.0
2016/17				2016/17	2	36	38	2016/17	0.0	0.0	0.0
2017/18				2017/18		3	3	2017/18	0.0		0.0

Black-legged Kittiwake *Rissa tridactyla* - **Drieteenmeeuw**

pelagic seabird

Found oiled in OSPAR region				Sample size (intact/scored)				Percentage oiled (%)					
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea		
1976/77	17	7	24	1976/77	20	7	27	1976/77	85.0	100.0	88.9		
1977/78	85	4	89	1977/78	102	8	110	1977/78	83.3	50.0	80.9		
1978/79	29	7	36	1978/79	54	7	61	1978/79	53.7		59.0		
1979/80	84	23	107	1979/80	114	30	144	1979/80	73.7	76.7	74.3		
1980/81	1228	193	155	1421	1374	209	184	1583	1980/81	89.4	92.3	84.2	
1981/82	113	42	58	155	1981/82	147	53	64	200	1981/82	76.9	79.2	90.6
1982/83	819	166	215	985	1982/83	969	202	262	1171	1982/83	84.5	82.2	82.1
1983/84	1554	96	117	1650	1983/84	1750	119	142	1869	1983/84	88.8	80.7	82.4
1984/85	119	52	11	171	1984/85	176	66	13	242	1984/85	67.6	78.8	84.6
1985/86	165	33	23	198	1985/86	254	44	31	298	1985/86	65.0	75.0	74.2
1986/87	60	7	1	67	1986/87	82	9	5	91	1986/87	73.2	77.8	20.0
1987/88	94	23	18	117	1987/88	124	33	33	157	1987/88	75.8	69.7	54.5
1988/89	68	11	7	79	1988/89	105	20	17	125	1988/89	64.8	55.0	41.2
1989/90	79	11	6	90	1989/90	132	16	16	148	1989/90	59.8	68.8	37.5
1990/91	80	10	3	90	1990/91	124	14	4	138	1990/91	64.5	71.4	75.0
1991/92	37	12	1	49	1991/92	55	14	2	69	1991/92	67.3	85.7	50.0
1992/93	59	9	14	68	1992/93	182	28	36	210	1992/93	32.4	32.1	38.9
1993/94	23	19	7	42	1993/94	44	31	15	75	1993/94	52.3	61.3	46.7
1994/95	35	11	10	46	1994/95	43	11	15	54	1994/95	81.4		66.7
1995/96	10	3		13	1995/96	20	3	2	23	1995/96	50.0		56.5
1996/97	21	4		25	1996/97	33	6		39	1996/97	63.6	66.7	64.1
1997/98	48	15	5	63	1997/98	114	26	15	140	1997/98	42.1	57.7	33.3
1998/99	67	38	14	105	1998/99	133	68	35	201	1998/99	50.4	55.9	40.0
1999/00	83	50	17	133	1999/00	134	83	40	217	1999/00	61.9	60.2	42.5
2000/01	13	6	1	19	2000/01	28	16	4	44	2000/01	46.4	37.5	25.0
2001/02	50	19	16	69	2001/02	108	74	47	182	2001/02	46.3	25.7	34.0
2002/03	91	12	11	103	2002/03	106	35	16	141	2002/03	85.8	34.3	68.8
2003/04	25	14	2	39	2003/04	37	31	10	68	2003/04	67.6	45.2	20.0
2004/05	24	13	4	37	2004/05	69	29	37	98	2004/05	34.8	44.8	10.8
2005/06	5	2		7	2005/06	13	7	5	20	2005/06	38.5	28.6	35.0
2006/07	3	7	1	10	2006/07	22	19	11	41	2006/07	13.6	36.8	9.1
2007/08			2	0	2007/08	4	12	17	16	2007/08			11.8
2008/09	2	6		8	2008/09	5	14	1	19	2008/09	40.0	42.9	42.1
2009/10					2009/10	8	6		14	2009/10	0.0	0.0	0.0
2010/11	1	2		3	2010/11	5	5		10	2010/11	20.0	40.0	30.0
2011/12	5	5		10	2011/12	151	49	28	200	2011/12	3.3	10.2	5.0
2012/13					2012/13	20	9	3	29	2012/13	0.0	0.0	0.0
2013/14		1		1	2013/14	1	5		6	2013/14		20.0	16.7
2014/15					2014/15				0	2014/15			
2015/16					2015/16	1	15	4	16	2015/16	0.0	0.0	0.0
2016/17					2016/17	1	1		2	2016/17	0.0	0.0	0.0
2017/18	1			1	2017/18	6	5	4	11	2017/18	20.0		9.1

Razorbill *Alca torda* – **Alk**

pelagic seabird

Found oiled in OSPAR region				Sample size (intact/scored)				Percentage oiled (%)						
Season	8	9	10 NSea	Season	8	9	10 NSea	Season	8	9	10 NSea			
1976/77	17	4		21	1976/77	18	4		22	1976/77	94.4	100.0	95.5	
1977/78	25	9		34	6360	1977/78	27	9		36	1977/78	92.6		94.4
1978/79	21	15		36	6360	1978/79	25	17		42	1978/79	84.0	88.2	85.7
1979/80	30	8		38	6360	1979/80	31	10		41	1979/80	96.8	80.0	92.7
1980/81	477	77	23	554	6360	1980/81	497	77	26	574	1980/81	96.0		88.5
1981/82	73	29	19	102	6360	1981/82	77	30	19	107	1981/82	94.8	96.7	100.0
1982/83	1100	267	121	1367	6360	1982/83	1299	311	141	1610	1982/83	84.7	85.9	85.8
1983/84	508	34	30	542	6360	1983/84	547	37	31	584	1983/84	92.9	91.9	96.8
1984/85	64	42	2	106	6360	1984/85	71	45	2	116	1984/85	90.1	93.3	100.0
1985/86	111	43	4	154	6360	1985/86	127	46	4	173	1985/86	87.4	93.5	100.0
1986/87	15	6		21	6360	1986/87	17	6		23	1986/87	88.2		91.3
1987/88	165	46	17	211	6360	1987/88	175	61	20	236	1987/88	94.3	75.4	85.0
1988/89	133	32	9	165	6360	1988/89	155	42	11	197	1988/89	85.8	76.2	81.8
1989/90	497	40	12	537	6360	1989/90	691	66	25	757	1989/90	71.9	60.6	48.0
1990/91	138	26	2	164	6360	1990/91	174	34	2	208	1990/91	79.3	76.5	100.0
1991/92	41	26	1	67	6360	1991/92	42	27	1	69	1991/92	97.6	96.3	100.0
1992/93	43	3	2	46	6360	1992/93	59	8	6	67	1992/93	72.9	37.5	33.3
1993/94	41	10		51	6360	1993/94	49	15	2	64	1993/94	83.7	66.7	79.7
1994/95	41	23	11	64	6360	1994/95	53	30	15	83	1994/95	77.4	76.7	73.3
1995/96	35	14	1	49	6360	1995/96	121	46	4	167	1995/96	28.9	30.4	25.0
1996/97	15	12	1	27	6360	1996/97	24	16	3	40	1996/97	62.5	75.0	33.3
1997/98	45	16	2	61	6360	1997/98	80	29	2	109	1997/98	56.3	55.2	100.0
1998/99	55	35	10	90	6360	1998/99	86	59	18	145	1998/99	64.0	59.3	55.6
1999/00	196	63	7	259	6360	1999/00	263	86	13	349	1999/00	74.5	73.3	53.8
2000/01	7	14	1	21	6360	2000/01	10	18	2	28	2000/01	70.0	77.8	50.0
2001/02	45	21	6	66	6360	2001/02	78	38	18	116	2001/02	57.7	55.3	33.3
2002/03	738	68	6	806	6360	2002/03	842	178	23	1020	2002/03	87.6	38.2	26.1
2003/04	26	31	4	57	6360	2003/04	58	49	6	107	2003/04	44.8	63.3	66.7
2004/05	47	27	3	74	6360	2004/05	135	119	23	254	2004/05	34.8	22.7	13.0
2005/06	12	29	32	41	6360	2005/06	24	52	35	76	2005/06	50.0	55.8	91.4
2006/07	37	8	4	45	6360	2006/07	153	50	18	203	2006/07	24.2	16.0	22.2
2007/08	1	1		2	6360	2007/08	6	7	4	13	2007/08	16.7	14.3	15.4
2008/09	3	3		6	6360	2008/09	5	6	11	11	2008/09	60.0	50.0	54.5
2009/10	2		1	2	6360	2009/10	10	3	1	13	2009/10	20.0		100.0
2010/11		1		1	6360	2010/11	4	3		7	2010/11		33.3	14.3
2011/12	4	6		10	6360	2011/12	209	147	36	356	2011/12	1.9	4.1	2.8
2012/13		1		1	6360	2012/13	10	5	1	15	2012/13		20.0	6.7
2013/14					6360	2013/14	10	7	2	17	2013/14	0.0	0.0	0.0
2014/15					6360	2014/15	7	1		7	2014/15	0.0	0.0	0.0
2015/16		1		1	6360	2015/16	2	20	5	22	2015/16	5.0	5.0	4.5
2016/17					6360	2016/17	4	5		9	2016/17	0.0	0.0	0.0
2017/18	1	1		2	6360	2017/18	7	6		13	2017/18	14.3	16.7	15.4