

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

annual update, winter 2017/18



C.J. Camphuysen 2018



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Front cover: Moulting adult male Common Guillemot found stranded in autumn 2017 (photo C.J. Camphuysen). In late summer, adult males accompany very young chicks that jump off the ledges while still in downy plumage to swim together across the North Sea, from their cliff colonies on the Scottish and English east coast to an area just to the north of the Dutch Wadden Sea islands. While swimming, the adults undergo a complete moult during which they shed all flight feathers simultaneously. While being flightless (see the short stubby wings of the bird on the photo in which all primaries are absent), their underwater diving performance is much enhanced, as if they temporarily are penguins. The young is fed by the male bird during this crossing and its underwater efficiency is important when that transverse a vast body of North Sea water with rather low densities of prey fish.

Summary - This is the annual update for OSPAR of the beached bird survey (BBS) results in The Netherlands winter 2017/18. 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 (1977/78-2016/17) and these declines were accelerating over the last 10-15 years. In recent seasons, consistently low oil rates are found in all species, and this includes the target species Common Guillemot *Uria aalge*.

In winter 2017/18, no major seabird wrecks have occurred, but around the turn of the year there was a mass-mortality that was expected to have been caused by avian flu affecting mostly Herring Gulls (*Larus argentatus*) on Texel and Vlieland (Wadden Sea islands). Veterinary inspections at the Erasmus University in Rotterdam revealed that this was in fact a case of avian cholera. Cold conditions in spring led to considerable mortality of waders within the Wadden Sea district.

The sample size for Common Guillemots was sufficient for the OSPAR subregions bordering the North Sea (52), and only just too small for the Wadden Sea region itself (20). The oil-rate (percentage of oiled Common Guillemots of all complete Common Guillemots found dead) reached a very low value of only 7.1% (n=56) for the North Sea coast of OSPAR areas 8 and 9 combined. This current figure, however, is the third lowest value ever measured within The Netherlands and it follows and confirms the sharp drop in oil-rates that occurred after 2015. The five-year running mean in (Dutch) national Common Guillemot oil rates (over 2013/14-2017/18) arrived at 17.5% (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. The OSPAR target of 20% over periods of at least 5 years for 2020 and even that of 2030 (10%) are clearly within reach.

Vaststelling van het percentage met olie besmeurde Zeekoeten in Nederland; jaarlijkse rapportage, winter 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 2017/18. 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. Over 2017/18 werd langs de Noordzeekust een niveau van slechts 7.1% olieslachtoffers gevonden (n= 56). Zoals het er nu naar uitziet wordt dit bijzonder lage niveau in 2017/18 geconsolideerd, waarmee de doelstellingen van OSPAR voor 2020 en zelfs die voor 2030 binnen bereik zijn gekomen.

Introduction

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).

This is the annual update for The Netherlands for winter 2017/18. 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 Herring Gull *Larus argentatus*, the Common Eider *Somateria mollissima* and the Common Scoter *Melanitta nigra*). 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 2017/18. 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

[Unchanged since the previous report] 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 2017/18, with over 126 strandings reports (counts and incidental reports combined) covering nearl 170km of coastline for OSPAR region 8, 84 (152 km) for region 9, and 94 (108km) for region 10. The entire coastline could be overseen with the collected data (Fig. 1). The observer effort peaked slowly decline in March and April 2018, but was otherwise continuously quite high with between 40-70 reports in most months (Nov-Apr; Fig. 2). A downside, reported also last year, is that genuine observer effort is no longer exactly known, for incidental reports are not coupled with indications of the length (km) of the search. Negative visits [no birds found] are also missing, except in the systematic data collected by

NZG/NSO itself. In future years, we might try and solve that problem in direct contact with the waarneming.nl database managers and developers.

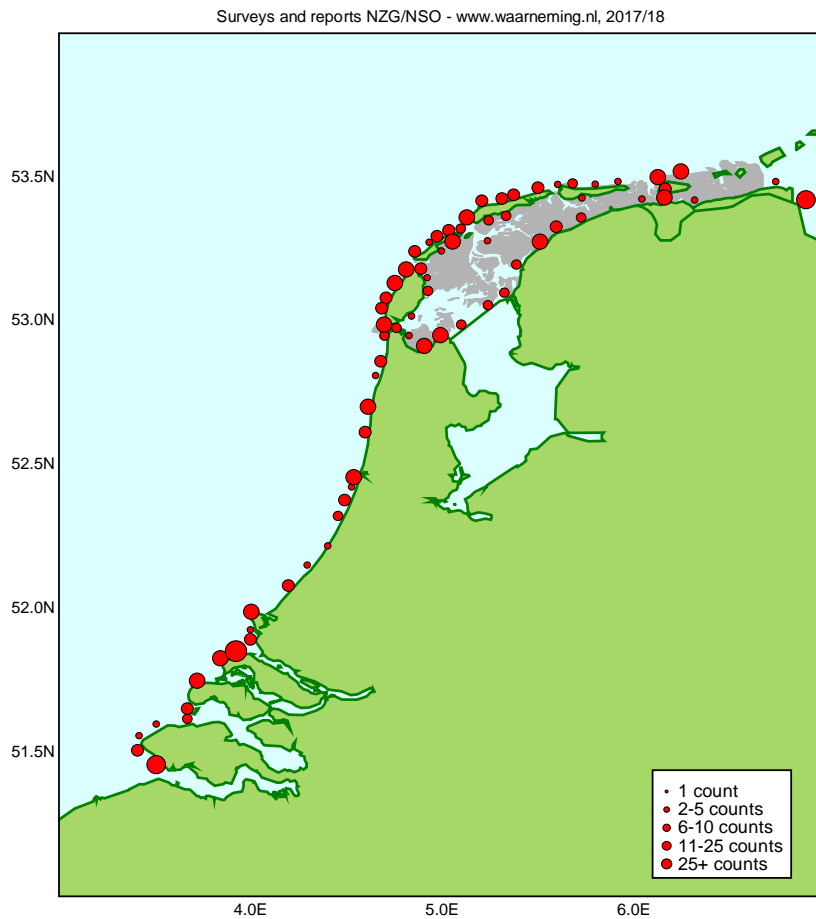


Figure 1. Spatial coverage of strandings reports based on a combination of systematic beached bird surveys (NZG/NSO) and accidental reports from named observers (www.waarneming.nl) in winter 2017/18.

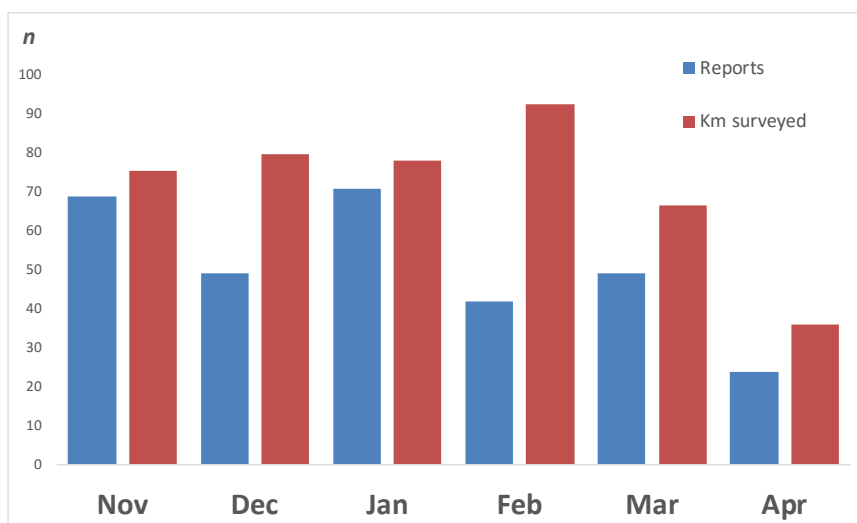


Figure 2. Seasonal pattern in observer effort (km surveyed) and strandings reports in winter 2017/18.

Observers

The following persons reported their finds, either directly and in full to the Dutch Seabird Group (working group beached bird surveys), or they have put their finds online at www.waarneming.nl: Niels Aagaard, Rick van den Akker, Bjorn Alards, Floor Arts, P Asbeek Brusse, W van Assche, Michael Bakker Paiva, Dick Bekker, Angelique Belfroid, Dick Belgers, Rob van Bemmelen, Han Benard, Martin Benard, Klaas van den Berg, T van den Berg, Ad van den Berge, Sander Bik, Han Blankert, Michael & Detlev Boeing, Egbert Boekema, Paul Böhre, J Bom, Greet Boomhouwer, L Boon, Vasco van der Boon, A. Boosman, Bart Bos, Jacob Bosma, W Bosma, Willem Bosma, Isabelle Bossuyt, Geert Braem, Bert van Broekhoven, Ellen de Bruin, Frans Bruinsma, P Bus, CJ Camphuysen, Sytske Dijkse, C Dijkshoorn, Niels van Doninck, Vincent Douwes, Menno van Duijn, L Elshout, Sander Elzerman, B Fey, JA van Franeker, Van Geel, Niels Godijn, Andre Goedhart, Zeezoogdierenhulp kop van Goeree, Valérie Goethals, Chris Grobbe, Jan de Groot, Klaas van Haeringen, Winant Halfwerk, R van der Ham, A Heikens, Arnoud Heikens, Lammert Heine, Johan Helpers, Y Hermes, P Heuseveldt, Paul Heuseveldt, Youp van den Heuvel, Marco Hillenaar, E van 't Hof, A Holzem, J ten Horn, Job ten Horn, Jan Jansen, Frank Jellema, Jacos Jes, A de Jong, Esther de Jong, Mirjam K, Guido Keijl, Leon Kelder, Wilbert Kerkhof, Theo Kiewiet, M Klemann, Marcel Klootwijk, T van der Knaap, Tjarda de Koe, Kas Koenraads, Wim Kolber, Jip Louwe Kooijmans, N de Kroon, S Kühn, E Lam, Jeftha Leeuwis, Jonathan Leeuwis, Ron Leeuwis, MF Leopold, Germen Lont, René van Loo, Hiele Lootsma, Robin van der Made, Annelies Marijnis, Els Marijs, F van der Meer, P van der Meer, R van der Meer, Marco Meeuwisse, Jan van der Mei, A van der Meulen, A & J Molenaar, Luc de Monte, Michiel Muller, G Nijs, Marc Nollet, M Olthoff, C Oskamp, Bep van Pelt-Verkuil, Guus Peterse, Giovanni Phantasos, Zeehondencentrum Pieterburen, S Prins, Frank van de Putte, Guido Rappé, J Reyniers, Lucette Robertson-Proot, Johan Roeland, M de Roij, Rutger Rotscheid, J Schagen, S Scholten, Wim van der Schot, H. Schouwenburg, TAW Schreurs, S Schuuring, Casimir Sels, Joas Sels, Jeroen Simmelink, Jesse Sinnema, Maarten Sluijter, Ben Smulders, P Snoeken, M van Soest, T van Spanje, Tom van Spanje, Jerker Spits, Marian Sponselee, Wiegert Steen, Jeroen Steenbergen, Raya Strikwerda, H Timans, Michiel Vaartjes, D Veenendaal, Bert Verboog, Hans Verdaat, Ruben Vermeer, erik-jan visser, A van Vliet, Rinse van der Vliet, Bob de Vries, Jacob Jan de Vries, Seth Walhout, Edwin de Weerd, Henk Werink, I Wessels, Gerard Westerhuis, Jacob Westerhuis, Jaap Westra, Rik Wever, W Wind, Harrie de With, Pim Wolf, Rob Wurster, Lenn van de Zande, G Zikken en Carl Zuhorn. Strandings data from the following observers have been used in this report: . 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.

Birds found stranded (species accounts)

In the species accounts below, some remarks are made to further explain the observations over winter 2017/18, 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. Monthly pattern in reports of strandings of commoner seabirds in winter 2017/18.

<i>Pelagic seabirds</i>		Nov	Dec	Jan	Feb	Mar	Apr	
Northern Fulmar	<i>Fulmarus glacialis</i>	10	7	3		3		23
Northern Gannet	<i>Morus bassanus</i>	33	10	27	11	8	4	93
Black-legged Kittiwake	<i>Rissa tridactyla</i>	7	11	17	9	10	1	55
Common Guillemot	<i>Uria aalge</i>	36	20	18	20	12	10	116
Razorbill	<i>Alca torda</i>	2	2	6	11	4	1	26
<i>Nearshore species</i>		Nov	Dec	Jan	Feb	Mar	Apr	
Common Eider	<i>Somateria mollissima</i>	1	10	9	2	64	6	92
Black Scoter	<i>Melanitta nigra</i>			1	1	11	6	19
Herring Gull	<i>Larus argentatus</i>		48	10	4	17		79

Divers Gaviidae and **Grebes** Podicipedidae

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). Grebes are all highly vulnerable species with regard to oil pollution, and numbers at sea are often very large in cold winters (Camphuysen & Derks). While wintering numbers of wintering divers (notably Red-throated Divers *Gavia stellata*) and also grebes (mostly Great Crested Grebes) have markedly increased in recent decades (www.trektellen.nl), only very rarely do we find them dead on the beach in recent years. As reported earlier, the mere *absence* of dead divers and grebes 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.

Eleven divers were reported in total this season; of which nine Red-throated Divers, and two confirmed Great Northern Diver *Gavia immer* (one of which reported twice). None were

reported as oiled, but the oil reporting was sloppy in most cases. Only three divers were properly checked for oiling. A single (un-oiled) reported Great Crested Grebe was probably an underrepresentation of this species on our shorelines in 2017/18, but the cold spell in spring 2018 (“the beast of the east” in England) has surely not resulted in excessive mortality.



Leach's Storm Petrel *Oceanodroma leucorhoa*, 23 October 2017, beach Meijendel (Michel Klemann)

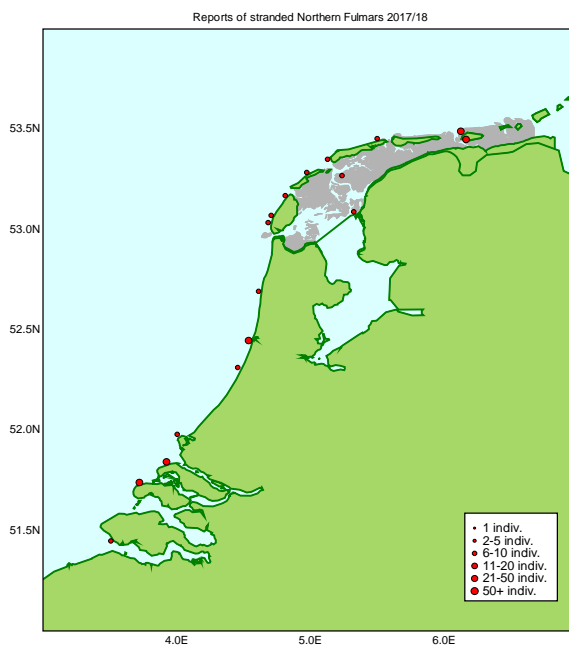


Figure 3a. Spatial pattern in strandings reports of **Northern Fulmars** (incomplete carcasses included), winter 2017/18 (n= 23).

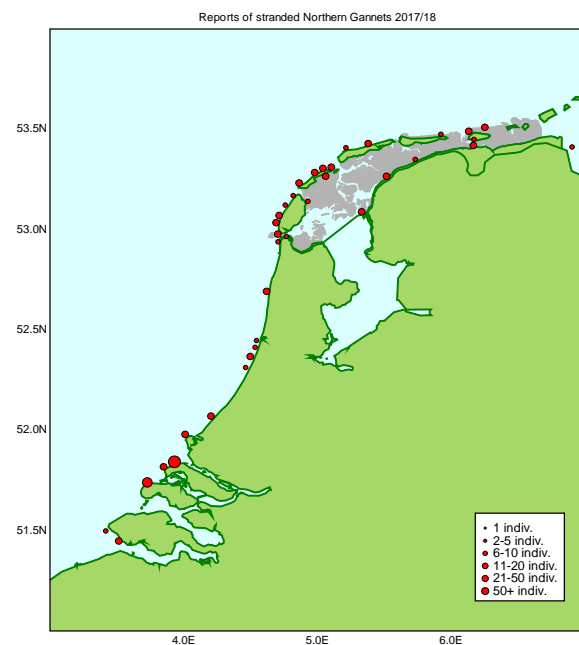


Figure 3b. Spatial pattern in strandings reports of **Northern Gannets** (incomplete carcasses included), winter 2017/18 (n= 93).

Northern Fulmar *Fulmarus glacialis*

Northern Fulmars were the only species found dead that represented the tube-noses Procellariiformes in winter 2017/18, apart from a Leach's Storm-petrel found late October 2017 near Meijendel, just outside the study period (shown above). In total, only 23 Northern Fulmars were reported, continuing the downward trends in abundance over the past decades. The birds were found scattered over the entire coastline and most were found in early winter (Fig. 3a).

There is no clear explanation for clusters in timing or locations: the occurrence of Northern Fulmars is invase and therefore irregular, occurrences often being weather-related. Northern Fulmars are collected to have their stomachs examined for their plastic contents (ongoing studies Jan Andries van Franeker, Wageningen Marine Research). Of 13 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).

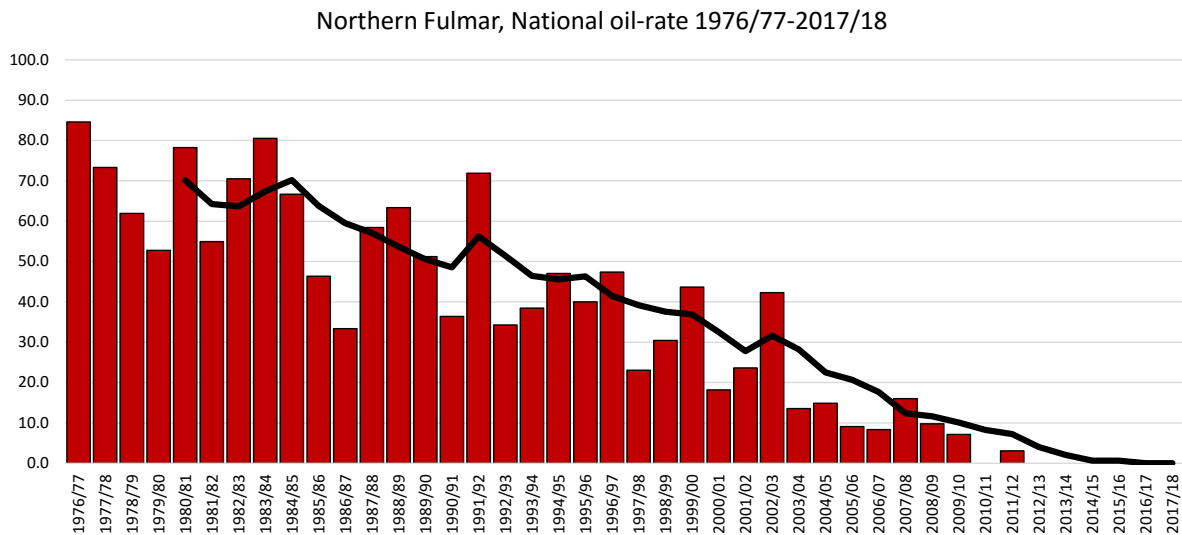


Figure 4. Annual oil rates in **Northern Fulmars** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. A total of 13 intact birds were checked in 2017/18, none of which were oiled.

Northern Gannet *Morus bassanus*

With 93 known strandings, rather many Northern Gannets were found in winter 2017/18, but modern strandings reports are biased by large, conspicuous and more ‘interesting’ species in a world full of twitchers. Strandings occurred scattered all over the Dutch coastline, as could be expected from a largely pelagic species that migrates through the English Channel (Fig. 3b). Of 72 properly aged individuals, 71% were adult birds, and 28% were first year individuals (juveniles). As so often, entanglements in fishing gear were reported, but with ‘only’ three cases (one depicted below) the incidence was fairly low this season. Two birds were entangled in nylon line, while one (shown illustrated below) was not even a genuine case of entanglement, but was scored as such because it had a fish (Sea Bass *Dicentrarchus labrax*) stuck in its throat. Five of the Northern Gannets found dead were reportedly oiled, which is not a lot, but a break in a serious of years during which no casualties were reported (Fig. 5; Appendix 2).

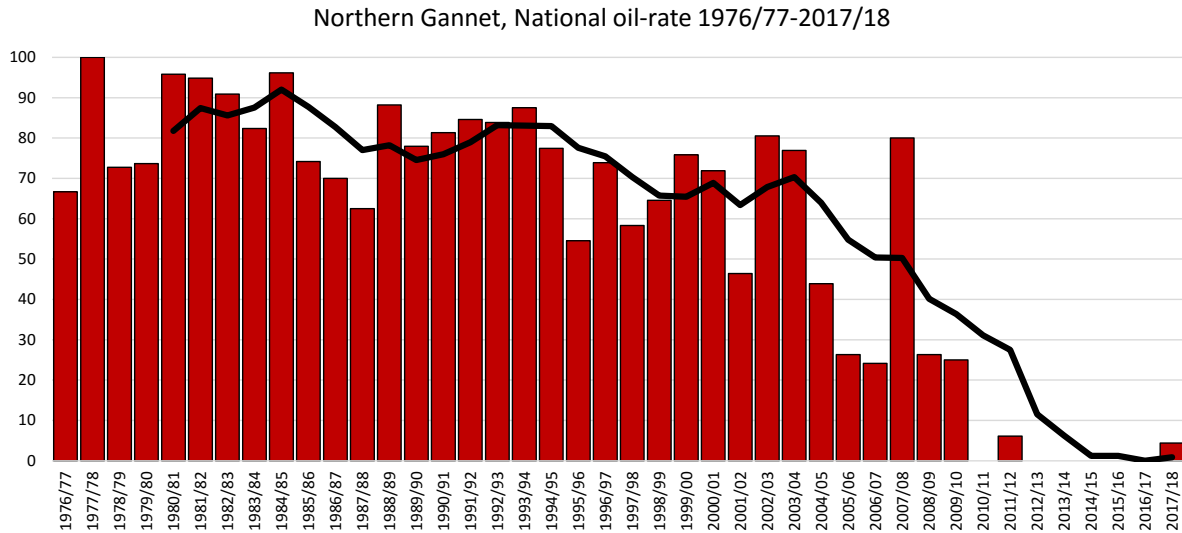


Figure 5. Annual oil rates in **Northern Gannets** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. A total of 53 birds were checked in 2017/18, five of which were oiled.



An unusual find: adult Northern Gannet *Morus bassanus*, suffocated, with a Sea Bass *Dicentrarchus labrax* stuck in its throat. The bird was recorded as 'entangled' even though this was technically untrue (entanglements are normally in litter or nylon), and this cause of death could also be seen as natural. Bergen aan Zee, 29 March 2018 (Peter Asbeek).

Telformulier olieslachteffer tellingen				Nederlandse Zeevogelgroep, werkgroep NSO (NZG/NSO)			
<i>Alle witte cellen invullen</i>				<i>Na het invullen bewaren onder een andere naam en e-mailen naar NZG/NSO:</i>			
<i>Kies steeds 1 van de groene cellen (plaats kruisje, X)</i>				e-mail: kees.camphuysen@wxs.nl			
<i>Lichtblauwe velden alleen in geval van bijzonderheden</i>				Zie voor meer info: http://home.planet.nl/~camphuysen/NZGNSO.html			
Traject:	Callantsoog-Julianadorp			Datum:	13-10-17	dd/mm/jaar	
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3	Kramsvogel	ad			ic	vv	Paal 10/500
4	Kopenwiek	ad			ic	vv	Paal 10/250
5	Jan van Gent	juv	x	100	c	v	Paal 9/250
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9	Stormmeeuw	ad	x	100	c	zv	Paal 8/000
10	Jan van Gent	ad	x	100	c	v	Paal 8/000
11	Jan van Gent	ad	x	100	c	v	Paal 8/000
12	Jan van Gent	ad	x	100	c	v	Paal 8/000
13	Merel	man ad			ic	vv	Paal 7/500
14	Jan van Gent	ad	x	100	c	v	Paal 7/500
15	Zeekoet	ad	x	100	c	vv	Paal 7/500
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A datasheet received in winter 2017/18 reporting a remarkable number of heavily contaminated seabirds, including five Northern Gannets. The birds weren't oiled but smothered in an unknown yellowish-green substance. The report was sent to an no longer used e-mail address and therefore, no adequate action could be undertaken to sample and collect the substance for chemical analysis. Similar incidents have been documented before, sometime with 'harmless' substances ding very much the same as mineral oil: invalidating and killing seabirds instantly.

Cormorants Phalacrocoracidae

Great Cormorants *Phalacrocorax carbo* are relative newcomers in Dutch coastal waters, but despite their large numbers and vulnerable plumage, very few get oiled, which is a further illustration of much improved chronic oil pollution levels along the Dutch coast in comparison with the 1970s and 1980s (when cormorants were still rare in coastal waters).

Waterfowl Anatidae

The list of reported waterfowl comprised 12 different species of ducks and geese (Appendix 1). Only Common Shelduck *Tadorna tadorna* (38), Common Eider *Somateria mollissima* (92),

and Common Scoter *Melanitta nigra* (19), but remarkably also Northern Shovelers (13) reached double figures and not a single duck or goose was recorded with oil in the feathers. Traditionally, only Common Eiders and Common Scoters are given full treatment in these reports. Common Eiders were exclusively found within and around the Wadden Sea district, apart from a single bird in Zeeland (Fig. 6). With not a single bird oiled, the long-term trend reflecting an almost or entirely clean Wadden Sea with regard to oil pollution is continued (Fig. 7). Of 70 properly aged and sexed individuals, 78.5% were male and only 4.5% were juveniles (2 females, one male). Common Eiders may tend to not be reported by ordinary bird watchers under www.waarneming.nl (too common to be of interest), so that the total number of strandings could well be underestimated.

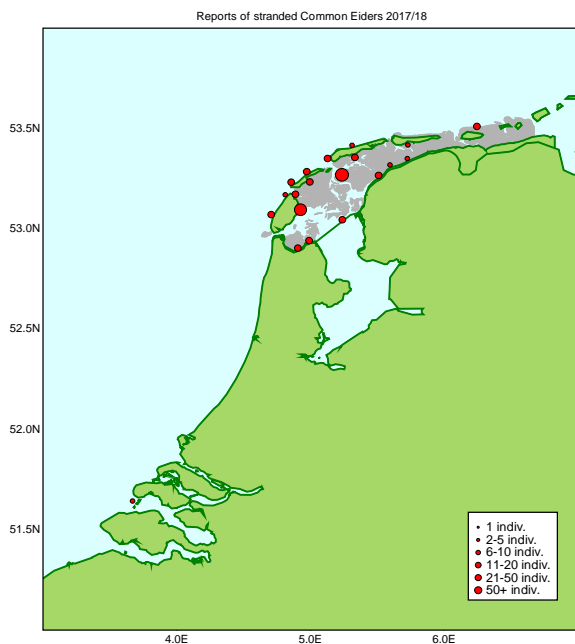


Figure 6a. Spatial pattern in strandings reports of **Common Eiders** (incomplete carcasses included), winter 2017/18 (n= 92).

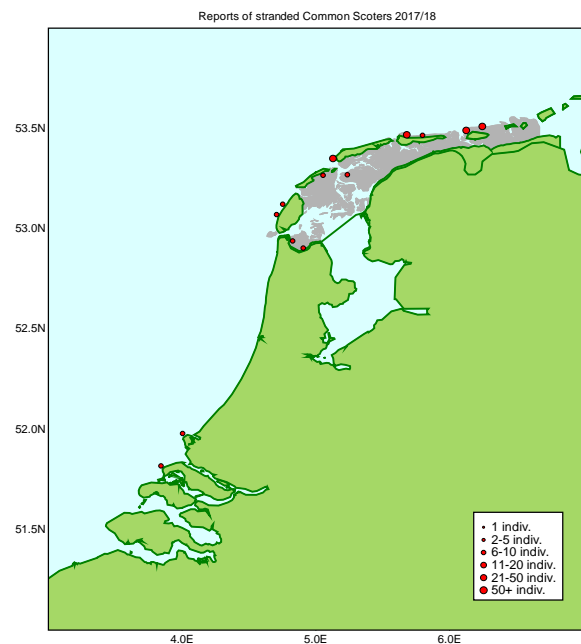


Figure 6b. Spatial pattern in strandings reports of **Common Scoters** (incomplete carcasses included), winter 2017/18 (n= 19).

Common Scoters are gregarious and in some years abundant, highly sensitive seabirds of which occasionally very large numbers were affected by oiling in the 1960s to 1980s (Swennen & Spaans 1970, Camphuysen *et al.* 1988). Nowadays, with chronic oil pollution at historically low levels, oiled Common Scoters are rarely found out shorelines and even just the number of dead birds is very low (despite high numbers wintering near our coasts), which 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. Most strandings occurred within the Wadden Sea area (Fig. 6b), and oil rates are extremely low for some years now (Fig. 8).

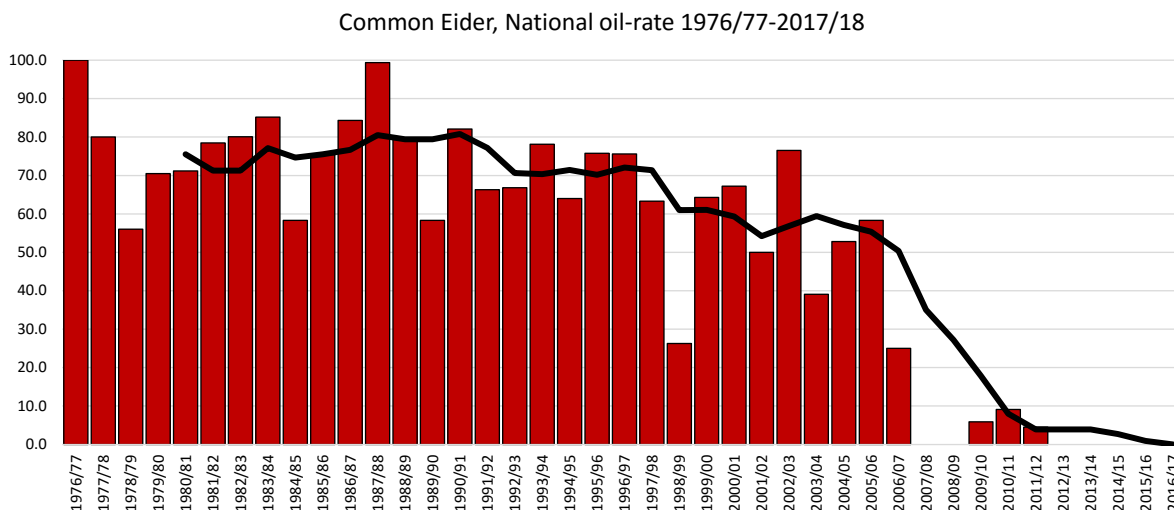


Figure 7. Annual oil rates in **Common Eiders** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. 45 intact birds were examined in 2017/18, none of which were oiled.

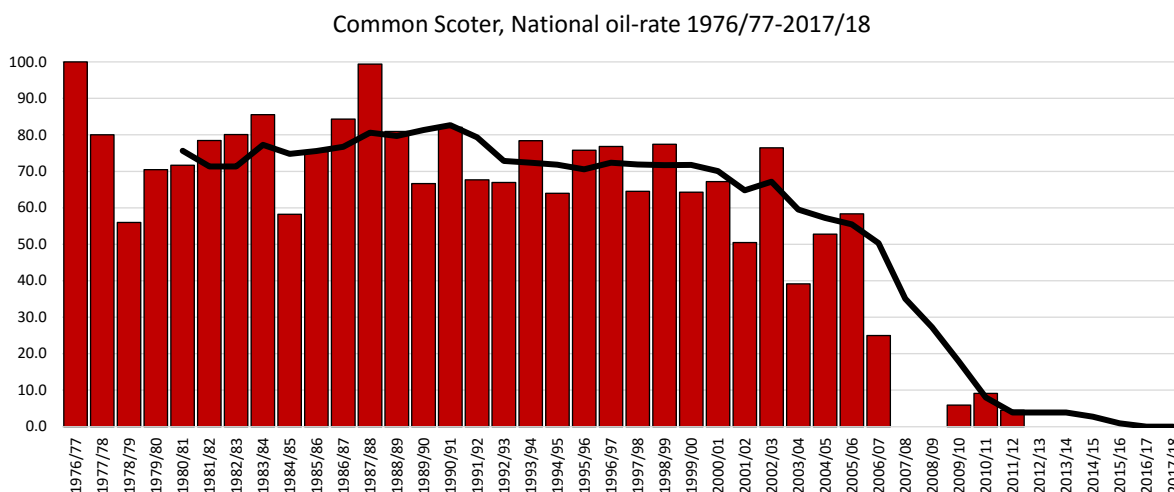


Figure 8. Annual oil rates in **Common Scoters** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. Only 8 intact birds were examined in 2017/18, none of which were oiled.

Waders

A mild winter, but with a very cold spell and ice formation in March. Small numbers of waders were listed, but quite some mortality must have been overlooked because it occurred within the icy Wadden Sea. Especially Icelandic Redshanks *Tringa totanus robusta*, Dunlins *Calidris alpina*, Sanderlings *Calidris alba* and Knots *Calidris canutus* were affected. None of which were reported as oiled (but few could be checked for many corpses were scavenged or largely eaten as usual). At least 11 wader species were found, all listed in Appendix 1.

Skuas Stercorariidae

Two Great Skuas *Stercorarius skua* were reported, but whether or not these birds were oiled is not clear. None of the smaller species of skuas were found dead this season, which is a repetition of what was seen as an all-time low in 2017/18.

Gulls Laridae

Five species of gulls were reported, two of which were common: the Herring Gull *Larus argentatus* (79) and the Black-legged Kittiwake *Rissa tridactyla* (55). In both species, most reports were clustered at and around Texel and Vlieland (Fig. 9ab), but this is an artefact caused by the ‘disinterest’ of regular birdwatchers factor, as highlighted before under the Common Eider and which would reduce the likelihood of reports under waarneming.nl. The number Herring Gulls was quite high in late December on the northwest tip of Texel and on the Vliehors (Vlieland). The apparent sudden and extra mortality of (mostly mature) Herring Gulls was suspect and therefore treated with care, given the memories of the bird flu outbreak one year earlier (of a highly pathogenic virus, H5N8, in November 2016 and subsequent



Herring Gull dissections using a glove box, Thijs Kuiken, Erasmus University Rotterdam, 13 February 2018 (C.J. Camphuysen)

months). At Vlieland and Texel, Herring Gulls were collected and under licence transferred to Rotterdam where the Wildlife Health research center headed by Thijs Kuiken (Erasmus University) led the autopsies. None of the checked and intact birds found dead were oiled and characteristics typical for avian cholera were found rather than bird flu. Another strange phenomenon were numerous fractures of the affected birds (broken bones and other trauma), plus a relatively heavy body mass and large fat stores.

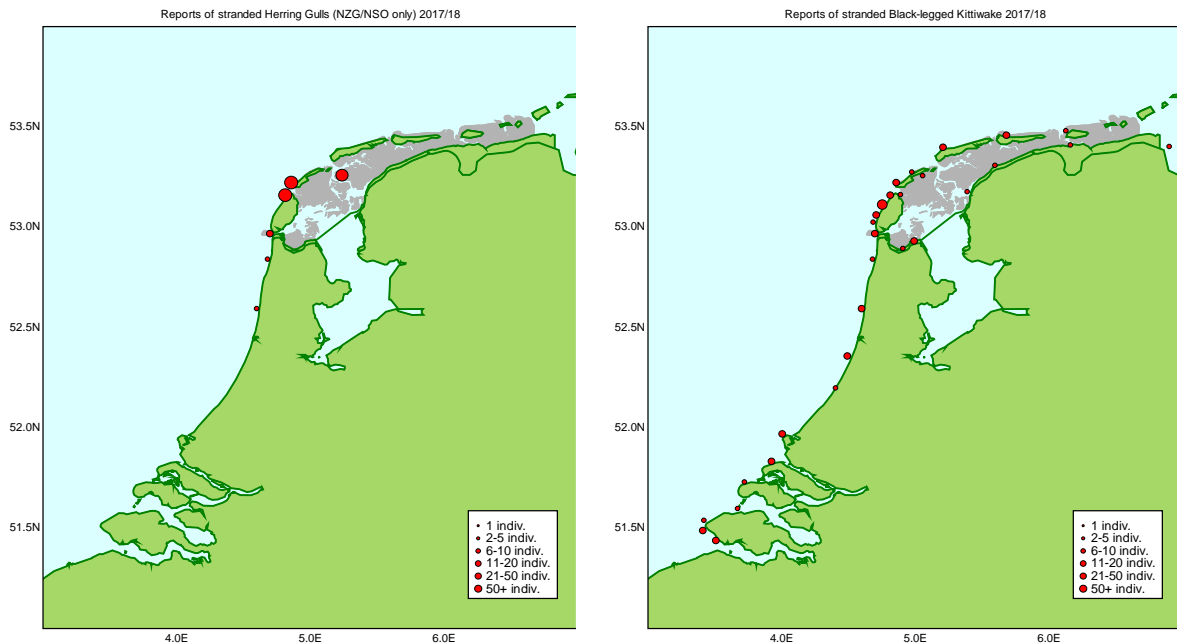


Figure 9a. Spatial pattern in strandings reports of **European Herring Gulls** (only from NZG/NSO beached bird surveys), winter 2017/18 (n= 79).

Figure 9b. Spatial pattern in strandings reports of **Black-backed Kittiwakes** (incomplete carcasses included), winter 2017/18 (n= 55).

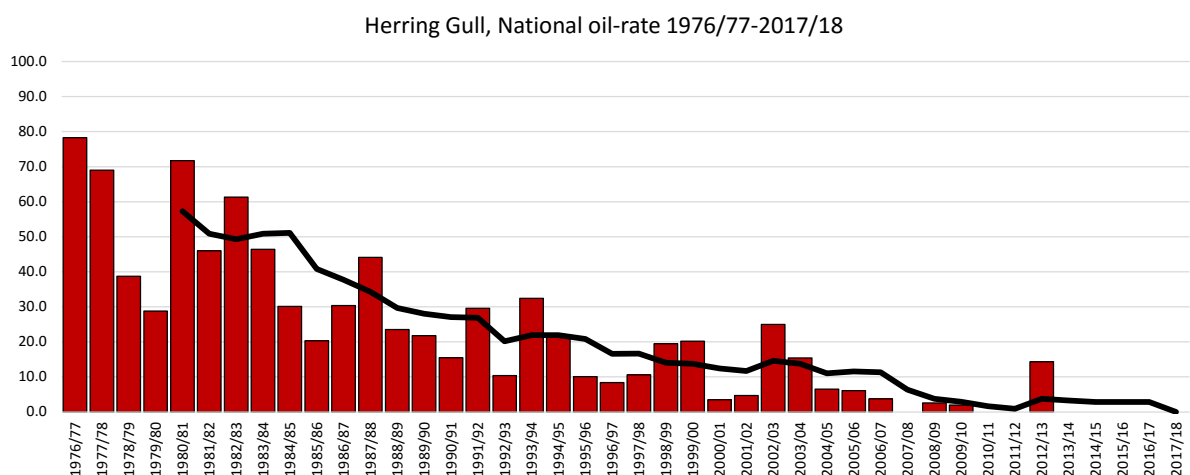


Figure 10. Annual oil rates in **European Herring Gulls** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. 49 intact birds were examined in 2017/18, none of which were oiled.

The oil rate in the large *Larus*-gulls and in Black-headed Gulls *Chroicocephalus ridibundus* was again zero, as so often in recent years (Fig. 10 for Herring Gulls only). In Black-legged Kittiwakes *Rissa tridactyla* two casualties were reported, but as a result of heavy predation levels, only 19 of the 55 birds found could be checked (10.5% oiled overall; Appendix 1, Fig. 11). Black-legged Kittiwakes 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. Details of the strandings are provided in Fig. 9b, 11, and Appendix 2).

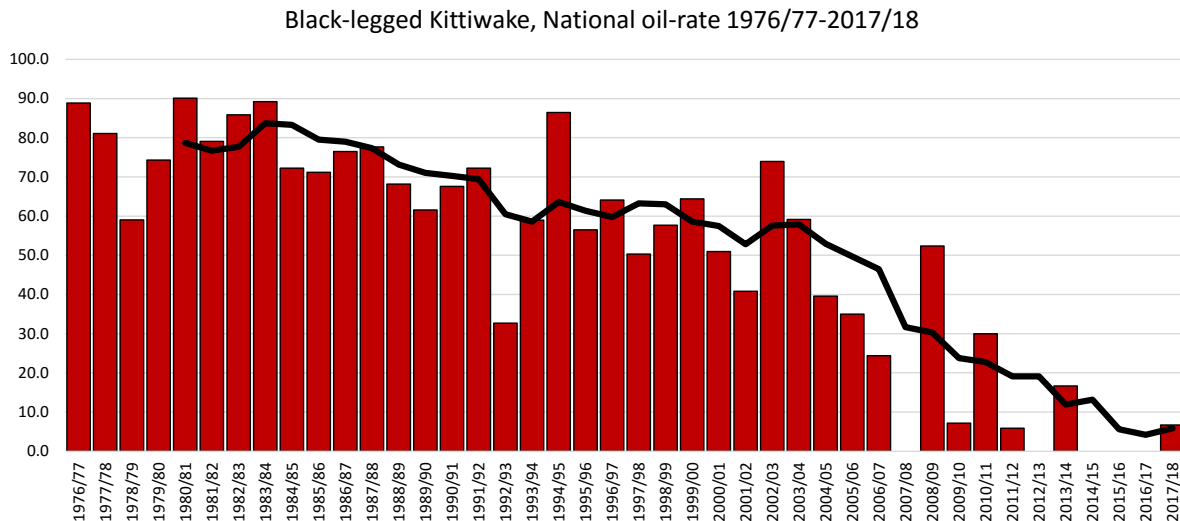


Figure 11. Annual oil rates in **Black-legged Kittiwakes** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. Only 19 intact birds were examined in 2017/18, two of which were oiled (10.5%).

Auks Alcidae

The auks are of prime importance for this study, for as mostly swimming and diving taxa, they most accurately reflect chronic oiling conditions in the open North Sea. Three 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 in so many years. Common Guillemots occurred less widespread along the coastline than in other years, with relatively many finds within the Wadden Sea region (North Sea coast and interior Wadden Sea combined), and enough birds were thoroughly checked to provide a reliable oil rate for 2017/18 for the North Sea coast. Of 20 birds reported within the Wadden Sea, not a single individual was oiled (Appendix 2). Some oiling was reported from the North Sea shoreline, but again, only a few incidences occurred, which is a fine continuation of the long-term decline that has been documented since the late 1970s (Figs. 13-14, Appendix 2).

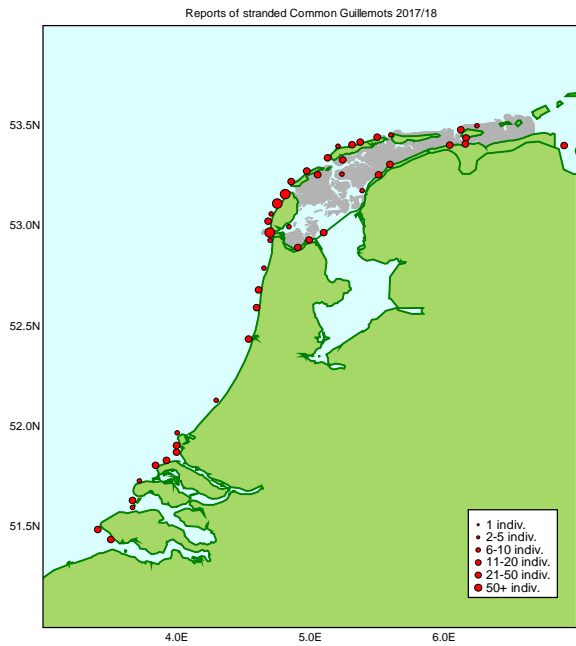


Figure 12a. Spatial pattern in strandings reports of **Common Guillemots** (incomplete carcasses included), winter 2017/18 (n= 116).

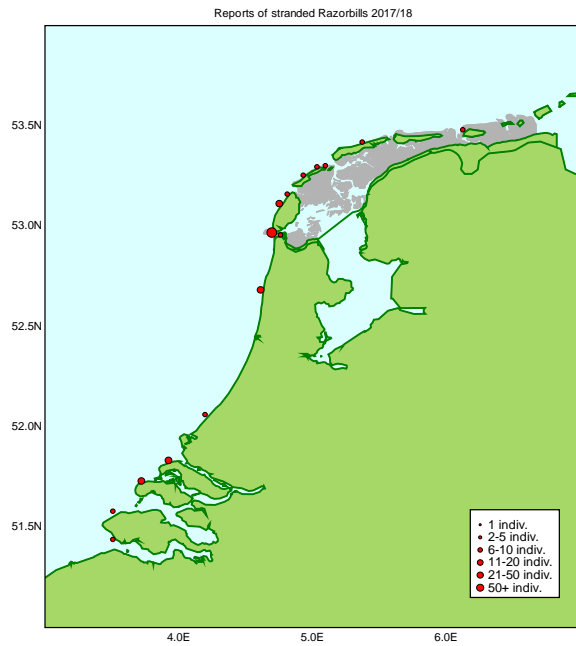


Figure 12b. Spatial pattern in strandings reports of **Razorbills** (incomplete carcasses included), winter 2017/18 (n= 26).

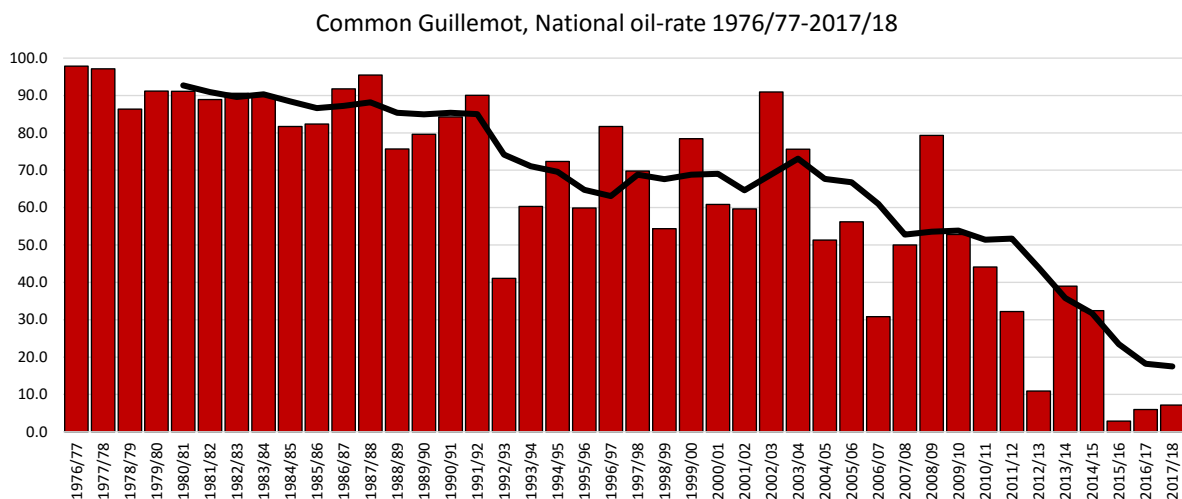


Figure 13. Annual oil rates in **Common Guillemots** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. In Appendix 2 can be seen that each season yielded a sufficient number of intact carcasses to evaluate oil rate reliably. In total 52 intact birds were examined in 2017/18, four of which were oiled. Twenty more intact birds within the Wadden were checked (not shown here), none of which were oiled.

The Common Guillemot oil rate has dropped markedly in recent years and with the current data at hand, we can only conclude that this marked decline is consistent. Only oil-incidents (no matter how small) can seriously inflate these numbers. The target level of the OSPAR EcoQO with less than 20% oiled over a period of five consecutive years is now almost reached and even the next target (10% oiled, scheduled for 2030) is no longer a fantastically unlikely figure.

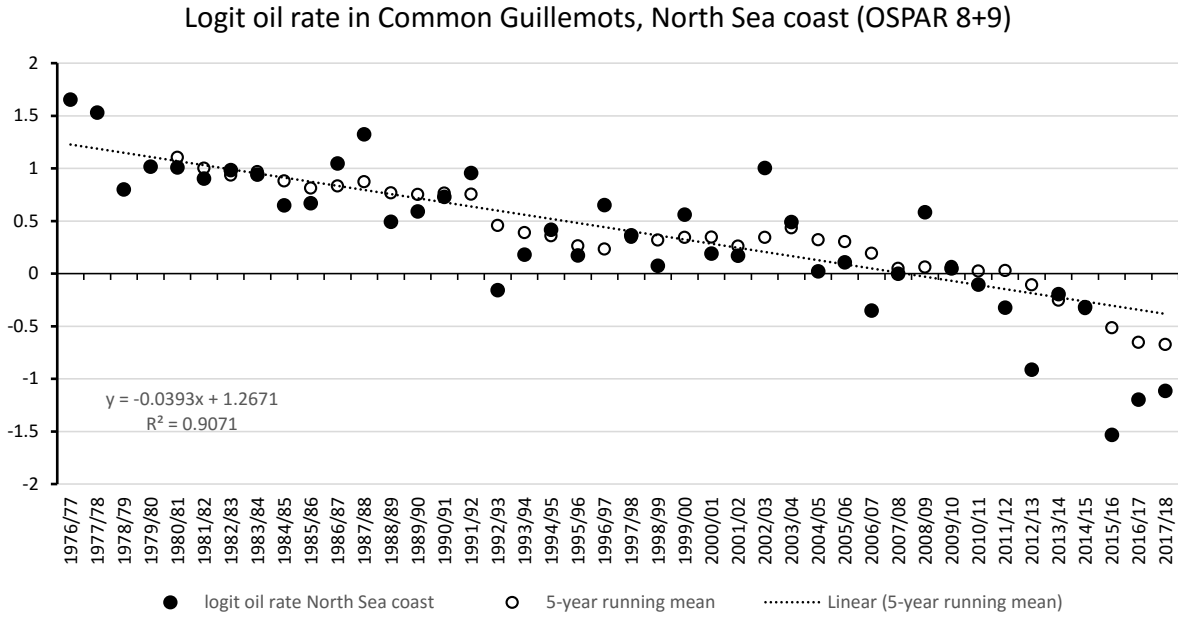


Figure 14. Logit-transformed annual oil rates in Common Guillemots ($n > 25$ complete carcasses) along the North Sea coast in The Netherlands (OSPAR areas 8, 9) and the 5-year running (arithmetic) mean oil rates since 1976/77. A linear regression was calculated over the running mean (dashed line; $P < 0.0001$).

The number of Razorbills found dead was rather low, and with only 17 intact birds examined along the North Sea coast, its oil rate of 11.8% must thus be considered unreliable (Fig. 15, Appendices 1-2). Of 20 Razorbills properly aged, 45% were juveniles, which is a rather high percentage in comparison with most earlier seasons, but the sample size is quite small..

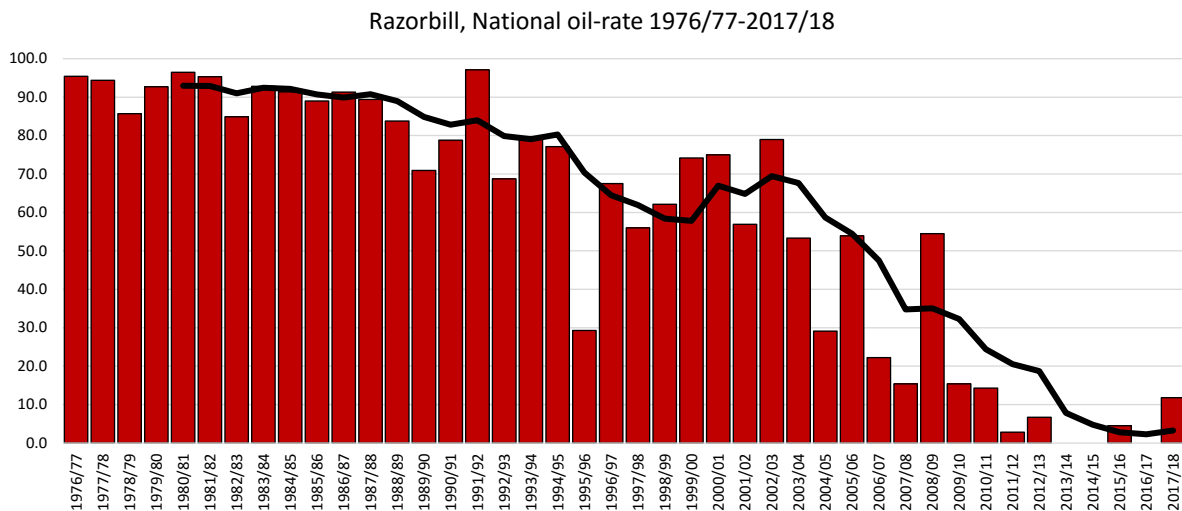


Figure 15. Annual oil rates in **Razorbills** along the North Sea coast in The Netherlands (OSPAR 8+9) and the 5-year running (arithmetic) mean oil rates since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. Only 17 intact birds were examined in 2016/17, 2 of which were oiled (11.8%).

Other species

There were no wrecks reported this winter, not even falls in autumn, but the cold spell in March generated some extra mortality of birds. 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

In winter 2017/18, 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 trend that is still linear (Fig. 14), but the latest results indicate an acceleration of the decline in oil rates in the southern Bight. The decline is similar in all OSPAR regions covered by The Netherlands (Fig. 16). If the current oil rates can be maintained in years to come, the fairly conservative OSPAR target will be reached with ease and will even be surpassed by lower oil rates than we have foreseen as feasible.

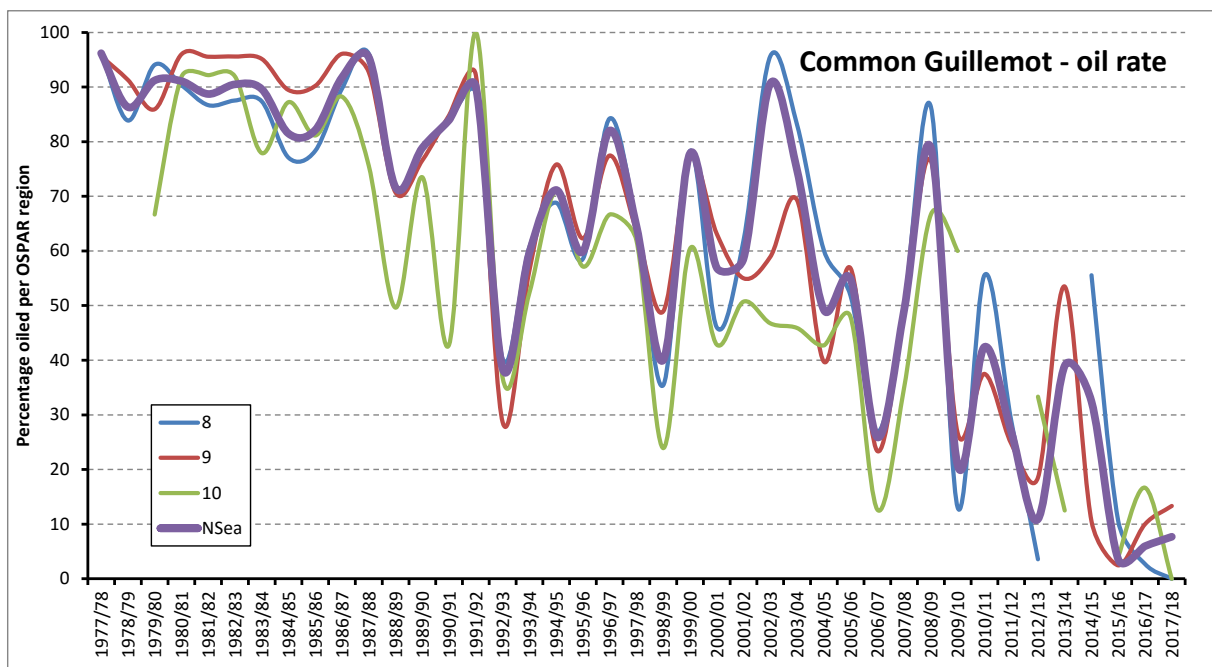


Figure 16. Smoothed curves of the annual oil rates in **Common Guillemots** for each of the OSPAR regions covered by The Netherlands and for the Dutch North Sea coast (OSPAR 8+9 since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. The undulating decline shows drops and gains that are very similar for each of the regions, starting from an almost stationary level of around 90% oiled in the late 1970s and early 1980s.

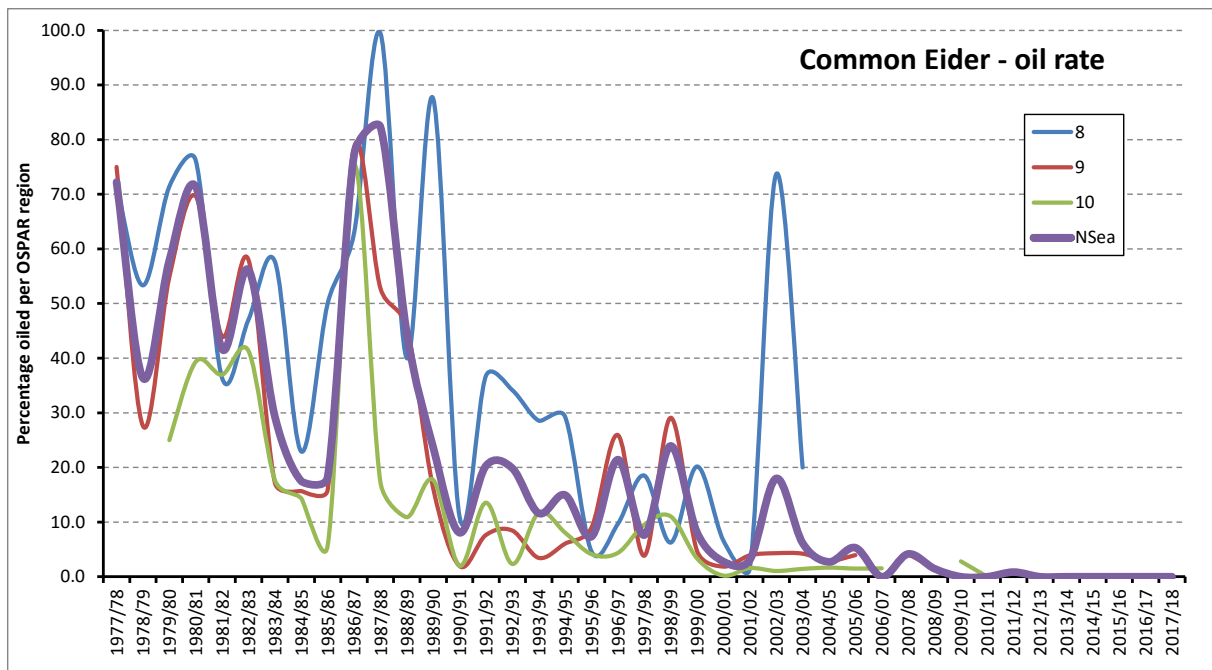


Figure 17. Smoothed curves of the annual oil rates in **Common Eiders** for each of the OSPAR regions covered by The Netherlands and for the Dutch North Sea coast (OSPAR 8+9 since the late 1970s. See Appendix 2 for the number of carcasses in each year to evaluate the quality of values. The undulating decline shows drops and gains are quite different for each of the regions, but it should be realised that in sector 8, only relatively few Eiders can be examined. Sample sizes in the more parallel trends of regions 9 and 10 are usually large enough. The graph shows that in recent years, chronic oil pollution is no longer a key issue for the Common Eider.

In the Common Eider, targets [even though no formal targets were set for this species!] were reached much earlier. As a coastal species, and with much higher attention of authorities to safeguard the coastal zone and the Wadden Sea in particular, Common Eiders have been confronted with practically clean water for the last 15 odd years or so.

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.

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

		Oiling				Totals	Sample	%oiled
		Unknown	None	Oiled	Entangled			
Red-throated Diver	<i>Gavia stellata</i>	6	3			9	3	
Great Northern Diver	<i>Gavia immer</i>	2				2	0	
Great Crested Grebe	<i>Podiceps cristatus</i>		1			1	1	
Northern Fulmar	<i>Fulmarus glacialis</i>	10	13			23	13	
Northern Gannet	<i>Morus bassanus</i>	40	45	5	3	93	53	9.4
Great Cormorant	<i>Phalacrocorax carbo</i>		6			6	6	
Brent Goose	<i>Branta bernicla</i>	2	1			3	1	
Common Shelduck	<i>Tadorna tadorna</i>	15	23			38	23	0.0
Eurasian Wigeon	<i>Anas penelope</i>	1	1			2	1	
Eurasian Teal	<i>Anas crecca</i>		1			1	1	
Mallard	<i>Anas platyrhynchos</i>	1				1	0	
Northern Pintail	<i>Anas acuta</i>		3			3	3	
Northern Shoveler	<i>Anas clypeata</i>	2	11			13	11	
Tufted Duck	<i>Aythya fuligula</i>	1	2			3	2	
Greater Scaup	<i>Aythya marila</i>	1	2			3	2	
Common Eider	<i>Somateria mollissima</i>	47	45			92	45	0
Black Scoter	<i>Melanitta nigra</i>	11	8			19	8	
Red-breasted Merganser	<i>Mergus serrator</i>		1			1	1	
unidentified duck	<i>unidentified duck</i>	1				1	0	
Water Rail	<i>Rallus aquaticus</i>	1				1	0	
Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	3	3		1	7	4	0.0
Grey Plover	<i>Pluvialis squatarola</i>	1	2			3	2	
Red Knot	<i>Calidris canutus</i>	19	10			29	10	
Sanderling	<i>Calidris alba</i>		4			4	4	
Dunlin	<i>Calidris alpina</i>	33	6			39	6	
Eurasian Woodcock	<i>Scolopax rusticola</i>	3				3	0	
Bar-tailed Godwit	<i>Limosa lapponica</i>	2				2	0	
Eurasian Curlew	<i>Numenius arquata</i>	7	9			16	9	
Common Redshank	<i>Tringa totanus</i>	4	1			5	1	
Icelandic Redshank	<i>Tringa totanus robusta</i>		2			2	2	
Ruddy Turnstone	<i>Arenaria interpres</i>	1				1	0	
Great Skua	<i>Stercorarius skua</i>	2				2	0	
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	1	1			2	1	
Mew Gull	<i>Larus canus</i>	4	5			9	5	
Herring Gull	<i>Larus argentatus</i>	30	49			79	49	0.0
Great Black-backed Gull	<i>Larus marinus</i>	9	3			12	3	
Black-legged Kittiwake	<i>Rissa tridactyla</i>	35	18	2		55	19	10.5
Common Guillemot	<i>Uria aalge</i>	44	67	4	1	116	72	5.6
Razorbill	<i>Alca torda</i>	9	15	2		26	17	11.8
Atlantic Puffin	<i>Fratercula arctica</i>		1			1	1	
Common Wood Pigeon	<i>Columba palumbus</i>	1				1	0	
Short-eared Owl	<i>Asio flammeus</i>	1				1	0	
Common Blackbird	<i>Turdus merula</i>	1				1	0	
Common Starling	<i>Sturnus vulgaris</i>	1				1	0	
Harbour Porpoise	<i>Phocoena phocoena</i>	2	1			3	1	
Common Seal	<i>Phoca vitulina</i>		1			1	1	

Appendix 2

Species specific oil-rates 1976/77 - 2017/18

Northern Fulmar *Fulmarus glacialis*- Noordse Stormvogel

pelagic seabird

Season	Found and scored				Oiled				% Oiled per OSPAR			
	8	9	10	NSea	8	9	10	NSea	8	9	10	NSea
1977/78	25	5		30	19	3		22	76.0	60.0		73.3
1978/79	34	8		42	20	6		26	58.8	75.0		61.9
1979/80	27	9		36	16	3		19	59.3	33.3		52.8
1980/81	256	61	38	317	209	39	32	248	81.6	63.9	84.2	78.2
1981/82	52	19	23	71	32	7	15	39	61.5	36.8	65.2	54.9
1982/83	58	20	12	78	42	13	8	55	72.4	65.0	66.7	70.5
1983/84	169	16	15	185	137	12	10	149	81.1	75.0	66.7	80.5
1984/85	24	18	1	42	16	12	1	28	66.7	66.7	100.0	66.7
1985/86	80	30	8	110	35	16	3	51	43.8	53.3	37.5	46.4
1986/87	9	6	1	15	2	3		5	22.2	50.0		33.3
1987/88	166	77	28	243	106	36	10	142	63.9	46.8	35.7	58.4
1988/89	82	38	16	120	50	26	4	76	61.0	68.4	25.0	63.3
1989/90	35	6	1	41	17	4		21	48.6	66.7		51.2
1990/91	11			11	4			4	36.4			36.4
1991/92	44	52	3	96	28	41	1	69	63.6	78.8	33.3	71.9
1992/93	27	8	12	35	11	1	4	12	40.7	12.5	33.3	34.3
1993/94	17	9	2	26	4	6	1	10	23.5	66.7	50.0	38.5
1994/95	21	13	11	34	12	4	7	16	57.1	30.8	63.6	47.1
1995/96	12	8	1	20	6	2	1	8	50.0	25.0	100.0	40.0
1996/97	13	6		19	5	4		9	38.5	66.7		47.4
1997/98	34	31	2	65	9	6		15	26.5	19.4		23.1
1998/99	407	280	100	687	105	104	29	209	25.8	37.1	29.0	30.4
1999/00	69	57	13	126	30	25	7	55	43.5	43.9	53.8	43.7
2000/01	16	28	4	44	2	6		8	12.5	21.4		18.2
2001/02	244	78	28	322	52	24	7	76	21.3	30.8	25.0	23.6
2002/03	28	24	5	52	19	3		22	67.9	12.5		42.3
2003/04	103	163	28	266	19	17	1	36	18.4	10.4	3.6	13.5
2004/05	34	40	18	74	5	6	3	11	14.7	15.0	16.7	14.9
2005/06	24	20	4	44	1	3		4	4.2	15.0		9.1
2006/07	26	10	10	36	3			3	11.5			8.3
2007/08	5	20	13	25		4	1	4		20.0	7.7	16.0
2008/09	27	55	7	82	2	6		8	7.4	10.9		9.8
2009/10	9	19	3	28	1	1	1	2	11.1	5.3	33.3	7.1
2010/11	4	5		9				0	0.0	0.0		0.0
2011/12	78	52	13	130	3	1		4	3.8	1.9		3.1
2012/13	2	3		5				0	0.0	0.0		0.0
2013/14	2		1	2				0	0.0		0.0	0.0
2014/15		2		2				0		0.0		0.0
2015/16	3	10		13				0	0.0	0.0		0.0
2016/17	11	13	3	24				0	0.0	0.0	0.0	0.0
2017/18	8	2	3	10				0	0.0	0.0	0.0	0.0

Season	Found and scored				Oiled				% Oiled per OSPAR			
	8	9	10	NSea	8	9	10	NSea	8	9	10	NSea
1977/78	6	4		10	6	4		10	100.0	100.0		100.0
1978/79	9	2		11	6	2		8	66.7	100.0		72.7
1979/80	14	5		19	13	1		14	92.9	20.0		73.7
1980/81	41	7	4	48	39	7	2	46	95.1	100.0	50.0	95.8
1981/82	28	11	6	39	27	10	6	37	96.4	90.9	100.0	94.9
1982/83	81	18	9	99	74	16	7	90	91.4	88.9	77.8	90.9
1983/84	42	9	6	51	34	8	6	42	81.0	88.9	100.0	82.4
1984/85	18	8	2	26	18	7	2	25	100.0	87.5	100.0	96.2
1985/86	24	7	6	31	17	6	5	23	70.8	85.7	83.3	74.2
1986/87	16	4		20	11	3		14	68.8	75.0		70.0
1987/88	15	9	1	24	13	2	1	15	86.7	22.2	100.0	62.5
1988/89	11	6	5	17	9	6	3	15	81.8	100.0	60.0	88.2
1989/90	51	8	4	59	38	8	2	46	74.5	100.0	50.0	78.0
1990/91	52	7	1	59	42	6	1	48	80.8	85.7	100.0	81.4
1991/92	25	14		39	21	12		33	84.0	85.7		84.6
1992/93	27	4	3	31	24	2	1	26	88.9	50.0	33.3	83.9
1993/94	24	8	3	32	21	7	3	28	87.5	87.5	100.0	87.5
1994/95	23	8	5	31	18	6	5	24	78.3	75.0	100.0	77.4
1995/96	5	6		11	4	2		6	80.0	33.3		54.5
1996/97	15	8		23	12	5		17	80.0	62.5		73.9
1997/98	13	11		24	10	4		14	76.9	36.4		58.3
1998/99	45	34	12	79	30	21	8	51	66.7	61.8	66.7	64.6
1999/00	36	22	5	58	24	20	3	44	66.7	90.9	60.0	75.9
2000/01	7	25	3	32	5	18	1	23	71.4	72.0	33.3	71.9
2001/02	16	12		28	8	5		13	50.0	41.7		46.4
2002/03	30	6	1	36	26	3		29	86.7	50.0		80.6
2003/04	5	8	1	13	3	7		10	60.0	87.5		76.9
2004/05	21	20	4	41	7	11	1	18	33.3	55.0	25.0	43.9
2005/06	3	16	6	19	1	4	4	5	33.3	25.0	66.7	26.3
2006/07	21	8	5	29	6	1	2	7	28.6	12.5	40.0	24.1
2007/08	3	12	3	15	2	10	2	12	66.7	83.3	66.7	80.0
2008/09	8	11	2	19	1	4		5	12.5	36.4		26.3
2009/10	2	10	1	12	1	2		3	50.0	20.0		25.0
2010/11	2			2				0	0.0			0.0
2011/12	37	12	7	49	2	1		3	5.4	8.3		6.1
2012/13	4	5	1	9				0	0.0	0.0	0.0	0.0
2013/14	3	3	2	6				0	0.0	0.0	0.0	0.0
2014/15	2	3		5				0	0.0	0.0		0.0
2015/16	1	18	1	19				0	0.0	0.0	0.0	0.0
2016/17	14	13	8	27				0	0.0	0.0	0.0	0.0
2017/18	35	10	8	45	1	1	3	2	2.9	10.0	37.5	4.4

Common Eider *Somateria mollissima*- Eider

coastal species

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

Common Scoter *Melanitta nigra*- Zwarte zee-eend

coastal species

Season	Found and scored				Oiled				% Oiled per OSPAR			
	8	9	10	NSea	8	9	10	NSea	8	9	10	NSea
1977/78	8	2		10	6	2		8	75.0	100.0		80.0
1978/79	221	56		277	121	34		155	54.8	60.7		56.0
1979/80	38	6		44	29	2		31	76.3	33.3		70.5
1980/81	36	23	41	59	23	19	36	42	63.9	82.6	87.8	71.2
1981/82	121	88	65	209	101	63	53	164	83.5	71.6	81.5	78.5
1982/83	122	89	52	211	97	72	40	169	79.5	80.9	76.9	80.1
1983/84	100	35	32	135	86	29	19	115	86.0	82.9	59.4	85.2
1984/85	118	88	25	206	68	52	14	120	57.6	59.1	56.0	58.3
1985/86	187	45	43	232	148	27	23	175	79.1	60.0	53.5	75.4
1986/87	108	45	29	153	92	37	22	129	85.2	82.2	75.9	84.3
1987/88	1523	64	32	1587	1517	60	14	1577	99.6	93.8	43.8	99.4
1988/89	66	18	16	84	50	17	5	67	75.8	94.4	31.3	79.8
1989/90	9	3	7	12	6	1	3	7	66.7	33.3	42.9	58.3
1990/91	127	46	17	173	105	37	4	142	82.7	80.4	23.5	82.1
1991/92	64	34	8	98	54	11	7	65	84.4	32.4	87.5	66.3
1992/93	49	198	62	247	40	125	20	165	81.6	63.1	32.3	66.8
1993/94	65	8	37	73	55	2	14	57	84.6	25.0	37.8	78.1
1994/95	55	45	137	100	53	11	100	64	96.4	24.4	73.0	64.0
1995/96	101	27	16	128	79	18	7	97	78.2	66.7	43.8	75.8
1996/97	54	28	17	82	46	16	8	62	85.2	57.1	47.1	75.6
1997/98	17	13	6	30	16	3	5	19	94.1	23.1	83.3	63.3
1998/99	122	64	78	186	23	26	60	49	18.9	40.6	76.9	26.3
1999/00	30	40	53	70	26	19	28	45	86.7	47.5	52.8	64.3
2000/01	4	57	18	61	2	39	6	41	50.0	68.4	33.3	67.2
2001/02	45	57	89	102	27	24	35	51	60.0	42.1	39.3	50.0
2002/03	62	57	25	119	58	33	14	91	93.5	57.9	56.0	76.5
2003/04	7	16	14	23	4	5	8	9	57.1	31.3	57.1	39.1
2004/05	23	13	16	36	19		4	19	82.6		25.0	52.8
2005/06	12	12	13	24	8	6	5	14	66.7	50.0	38.5	58.3
2006/07		4	9	4		1	2	1		25.0	22.2	25.0
2007/08		4	16	4			4	0			25.0	0.0
2008/09		10		10				0		0.0		0.0
2009/10		17	6	17		1	1	1		5.9	16.7	5.9
2010/11	3	8	1	11		1		1		12.5		9.1
2011/12	13	9	6	22		1		1		11.1		4.5
2012/13		5	3	5				0		0.0	0.0	0.0
2013/14	6		3	6				0	0.0		0.0	0.0
2014/15	3	3	2	6				0	0.0	0.0	0.0	0.0
2015/16		2		2				0		0.0		0.0
2016/17	1	2	2	3				0	0.0	0.0	0.0	0.0
2017/18	2	3	3	5				0	0.0	0.0	0.0	0.0

Herring Gull *Larus argentatus*- Zilvermeeuw

coastal species

Season	Found and scored				Oiled				% Oiled per OSPAR			
	8	9	10	NSea	8	9	10	NSea	8	9	10	NSea
1977/78	64	7	3	71	44	5		49	68.8	71.4		69.0
1978/79	211	19		230	82	7		89	38.9	36.8		38.7
1979/80	122	38	4	160	39	7		46	32.0	18.4		28.8
1980/81	350	88	40	438	258	56	10	314	73.7	63.6	25.0	71.7
1981/82	257	84	121	341	134	23	16	157	52.1	27.4	13.2	46.0
1982/83	237	60	134	297	145	37	27	182	61.2	61.7	20.1	61.3
1983/84	412	38	162	450	191	18	20	209	46.4	47.4	12.3	46.4
1984/85	224	82	144	306	70	22	25	92	31.3	26.8	17.4	30.1
1985/86	181	95	119	276	42	14	13	56	23.2	14.7	10.9	20.3
1986/87	113	81	75	194	42	17	7	59	37.2	21.0	9.3	30.4
1987/88	106	46	116	152	50	17	6	67	47.2	37.0	5.2	44.1
1988/89	174	56	137	230	43	11	7	54	24.7	19.6	5.1	23.5
1989/90	215	23	50	238	46	6	4	52	21.4	26.1	8.0	21.8
1990/91	169	5	9	174	24	3		27	14.2	60.0		15.5
1991/92	105	20	4	125	27	10		37	25.7	50.0		29.6
1992/93	105	30	72	135	11	3	7	14	10.5	10.0	9.7	10.4
1993/94	92	13	24	105	28	6		34	30.4	46.2		32.4
1994/95	70	50	73	120	22	4	5	26	31.4	8.0	6.8	21.7
1995/96	83	36	54	119	8	4		12	9.6	11.1		10.1
1996/97	64	31	29	95	4	4		8	6.3	12.9		8.4
1997/98	81	23	20	104	7	4	1	11	8.6	17.4	5.0	10.6
1998/99	102	26	41	128	18	7	5	25	17.6	26.9	12.2	19.5
1999/00	84	35	44	119	15	9	4	24	17.9	25.7	9.1	20.2
2000/01	40	46	99	86	2	1		3	5.0	2.2		3.5
2001/02	74	32	166	106	2	3	6	5	2.7	9.4	3.6	4.7
2002/03	51	45	135	96	21	3	1	24	41.2	6.7	0.7	25.0
2003/04	24	28	74	52	4	4		8	16.7	14.3		15.4
2004/05	37	25	91	62	4		2	4	10.8		2.2	6.5
2005/06	14	19	116	33	1	1	4	2	7.1	5.3	3.4	6.1
2006/07	10	17	63	27		1		1		5.9		3.7
2007/08	6	8	47	14				0	0.0	0.0	0.0	0.0
2008/09	13	26	61	39		1		1		3.8		2.6
2009/10	7	44	40	51		1		1		2.3		2.0
2010/11	11	18	39	29				0	0.0	0.0	0.0	0.0
2011/12	26	30	37	56				0	0.0	0.0	0.0	0.0
2012/13	7	7	8	14	2			2	28.6			14.3
2013/14	3	14	8	17			1	0			12.5	0.0
2014/15	5	6	14	11				0	0.0	0.0	0.0	0.0
2015/16	2	21	25	23				0	0.0	0.0	0.0	0.0
2016/17		37	15	37				0		0.0	0.0	0.0
2017/18		40	9	40				0		0.0	0.0	0.0

Black-legged Kittiwake *Rissa tridactyla* - Drieteenmeeuw

pelagic seabird

Season	Found and scored				Oiled				% Oiled per OSPAR			
	8	9	10	NSea	8	9	10	NSea	8	9	10	NSea
1977/78	102	8		110	85	4		89	83.3	50.0		80.9
1978/79	54	7		61	29	7		36	53.7	100.0		59.0
1979/80	114	30		144	84	23		107	73.7	76.7		74.3
1980/81	1374	209	184	1583	1228	193	155	1421	89.4	92.3	84.2	89.8
1981/82	147	53	64	200	113	42	58	155	76.9	79.2	90.6	77.5
1982/83	969	202	262	1171	819	166	215	985	84.5	82.2	82.1	84.1
1983/84	1750	119	142	1869	1554	96	117	1650	88.8	80.7	82.4	88.3
1984/85	176	66	13	242	119	52	11	171	67.6	78.8	84.6	70.7
1985/86	254	44	31	298	165	33	23	198	65.0	75.0	74.2	66.4
1986/87	82	9	5	91	60	7	1	67	73.2	77.8	20.0	73.6
1987/88	124	33	33	157	94	23	18	117	75.8	69.7	54.5	74.5
1988/89	105	20	17	125	68	11	7	79	64.8	55.0	41.2	63.2
1989/90	132	16	16	148	79	11	6	90	59.8	68.8	37.5	60.8
1990/91	124	14	4	138	80	10	3	90	64.5	71.4	75.0	65.2
1991/92	55	14	2	69	37	12	1	49	67.3	85.7	50.0	71.0
1992/93	182	28	36	210	59	9	14	68	32.4	32.1	38.9	32.4
1993/94	44	31	15	75	23	19	7	42	52.3	61.3	46.7	56.0
1994/95	43	11	15	54	35	11	10	46	81.4	100.0	66.7	85.2
1995/96	20	3	2	23	10	3		13	50.0	100.0		56.5
1996/97	33	6		39	21	4		25	63.6	66.7		64.1
1997/98	114	26	15	140	48	15	5	63	42.1	57.7	33.3	45.0
1998/99	133	68	35	201	67	38	14	105	50.4	55.9	40.0	52.2
1999/00	134	83	40	217	83	50	17	133	61.9	60.2	42.5	61.3
2000/01	28	16	4	44	13	6	1	19	46.4	37.5	25.0	43.2
2001/02	108	74	47	182	50	19	16	69	46.3	25.7	34.0	37.9
2002/03	106	35	16	141	91	12	11	103	85.8	34.3	68.8	73.0
2003/04	37	31	10	68	25	14	2	39	67.6	45.2	20.0	57.4
2004/05	69	29	37	98	24	13	4	37	34.8	44.8	10.8	37.8
2005/06	13	7	5	20	5	2		7	38.5	28.6		35.0
2006/07	22	19	11	41	3	7	1	10	13.6	36.8	9.1	24.4
2007/08	4	12	17	16			2	0			11.8	0.0
2008/09	5	14	1	19	2	6		8	40.0	42.9		42.1
2009/10	8	6		14				0	0.0	0.0		0.0
2010/11	5	5		10	1	2		3	20.0	40.0		30.0
2011/12	151	49	28	200	5	5		10	3.3	10.2		5.0
2012/13	20	9	3	29				0	0.0	0.0	0.0	0.0
2013/14	1	5		6		1		1		20.0		16.7
2014/15				n.d.				n.d.				n.d.
2015/16	1	15	4	16				0	0.0	0.0	0.0	0.0
2016/17	1	1		2				0	0.0	0.0		0.0
2017/18	9	6	4	15		1		1		16.7		6.7

Razorbill *Alca torda* – Alk

pelagic seabird

Season	Found and scored				Oiled				% Oiled per OSPAR			
	8	9	10	NSea	8	9	10	NSea	8	9	10	NSea
1977/78	27	9		36	25	9		34	92.6	100.0		94.4
1978/79	25	17		42	21	15		36	84.0	88.2		85.7
1979/80	31	10		41	30	8		38	96.8	80.0		92.7
1980/81	497	77	26	574	477	77	23	554	96.0	100.0	88.5	96.5
1981/82	77	30	19	107	73	29	19	102	94.8	96.7	100.0	95.3
1982/83	1299	311	141	1610	1100	267	121	1367	84.7	85.9	85.8	84.9
1983/84	547	37	31	584	508	34	30	542	92.9	91.9	96.8	92.8
1984/85	71	45	2	116	64	42	2	106	90.1	93.3	100.0	91.4
1985/86	127	46	4	173	111	43	4	154	87.4	93.5	100.0	89.0
1986/87	17	6		23	15	6		21	88.2	100.0		91.3
1987/88	175	61	20	236	165	46	17	211	94.3	75.4	85.0	89.4
1988/89	155	42	11	197	133	32	9	165	85.8	76.2	81.8	83.8
1989/90	691	66	25	757	497	40	12	537	71.9	60.6	48.0	70.9
1990/91	174	34	2	208	138	26	2	164	79.3	76.5	100.0	78.8
1991/92	42	27	1	69	41	26	1	67	97.6	96.3	100.0	97.1
1992/93	59	8	6	67	43	3	2	46	72.9	37.5	33.3	68.7
1993/94	49	15	2	64	41	10		51	83.7	66.7		79.7
1994/95	53	30	15	83	41	23	11	64	77.4	76.7	73.3	77.1
1995/96	121	46	4	167	35	14	1	49	28.9	30.4	25.0	29.3
1996/97	24	16	3	40	15	12	1	27	62.5	75.0	33.3	67.5
1997/98	80	29	2	109	45	16	2	61	56.3	55.2	100.0	56.0
1998/99	86	59	18	145	55	35	10	90	64.0	59.3	55.6	62.1
1999/00	263	86	13	349	196	63	7	259	74.5	73.3	53.8	74.2
2000/01	10	18	2	28	7	14	1	21	70.0	77.8	50.0	75.0
2001/02	78	38	18	116	45	21	6	66	57.7	55.3	33.3	56.9
2002/03	842	178	23	1020	738	68	6	806	87.6	38.2	26.1	79.0
2003/04	58	49	6	107	26	31	4	57	44.8	63.3	66.7	53.3
2004/05	135	119	23	254	47	27	3	74	34.8	22.7	13.0	29.1
2005/06	24	52	35	76	12	29	32	41	50.0	55.8	91.4	53.9
2006/07	153	50	18	203	37	8	4	45	24.2	16.0	22.2	22.2
2007/08	6	7	4	13	1	1		2	16.7	14.3		15.4
2008/09	5	6		11	3	3		6	60.0	50.0		54.5
2009/10	10	3	1	13	2		1	2	20.0		100.0	15.4
2010/11	4	3		7		1		1		33.3		14.3
2011/12	209	147	36	356	4	6		10	1.9	4.1		2.8
2012/13	10	5	1	15		1		1		20.0		6.7
2013/14	10	7	2	17				0	0.0	0.0	0.0	0.0
2014/15		7	1	7				0		0.0	0.0	0.0
2015/16	2	20	5	22		1		1		5.0		4.5
2016/17	4	5		9				0	0.0	0.0		0.0
2017/18	8	9		17	1	1		2	12.5	11.1		11.8

Common Guillemot *Uria aalge* - Zeekoet

pelagic seabird

Season	Found and scored				Oiled				% Oiled per OSPAR			
	8	9	10	NSea	8	9	10	NSea	8	9	10	NSea
1977/78	82	23		105	79	22		101	96.3	95.7		96.2
1978/79	93	46		139	78	42		120	83.9	91.3		86.3
1979/80	118	64	3	182	111	55	2	166	94.1	85.9	66.7	91.2
1980/81	3061	448	233	3509	2766	430	214	3196	90.4	96.0	91.8	91.1
1981/82	676	202	115	878	586	193	106	779	86.7	95.5	92.2	88.7
1982/83	2495	1449	434	3944	2184	1385	399	3569	87.5	95.6	91.9	90.5
1983/84	1625	660	163	2285	1420	628	127	2048	87.4	95.2	77.9	89.6
1984/85	855	474	47	1329	659	424	41	1083	77.1	89.5	87.2	81.5
1985/86	803	378	159	1181	629	341	129	970	78.3	90.2	81.1	82.1
1986/87	107	51	17	158	96	49	15	145	89.7	96.1	88.2	91.8
1987/88	1177	288	86	1465	1131	267	65	1398	96.1	92.7	75.6	95.4
1988/89	1243	290	133	1533	893	205	66	1098	71.8	70.7	49.6	71.6
1989/90	1271	158	83	1429	1006	121	61	1127	79.2	76.6	73.5	78.9
1990/91	1862	145	35	2007	1562	123	15	1685	83.9	84.8	42.9	84.0
1991/92	522	268	6	790	464	247	6	711	88.9	92.2	100.0	90.0
1992/93	817	150	136	967	329	43	50	372	40.3	28.7	36.8	38.5
1993/94	560	179	107	739	340	101	56	441	60.7	56.4	52.3	59.7
1994/95	247	124	83	371	170	94	59	264	68.8	75.8	71.1	71.2
1995/96	111	61	7	172	65	38	4	103	58.6	62.3	57.1	59.9
1996/97	146	71	6	217	123	55	4	178	84.2	77.5	66.7	82.0
1997/98	305	146	21	451	198	93	13	291	64.9	63.7	61.9	64.5
1998/99	1287	664	414	1951	456	325	99	781	35.4	48.9	23.9	40.0
1999/00	678	310	149	988	531	238	90	769	78.3	76.8	60.4	77.8
2000/01	113	198	49	311	52	125	21	177	46.0	63.1	42.9	56.9
2001/02	344	320	138	664	213	176	70	389	61.9	55.0	50.7	58.6
2002/03	1998	314	77	2312	1911	185	36	2096	95.6	58.9	46.8	90.7
2003/04	142	215	61	357	118	149	28	267	83.1	69.3	45.9	74.8
2004/05	271	312	103	583	163	124	44	287	60.1	39.7	42.7	49.2
2005/06	85	132	71	217	44	75	34	119	51.8	56.8	47.9	54.8
2006/07	375	154	79	529	101	36	10	137	26.9	23.4	12.7	25.9
2007/08	18	43	20	61	9	21	7	30	50.0	48.8	35.0	49.2
2008/09	22	68	9	90	19	52	6	71	86.4	76.5	66.7	78.9
2009/10	23	30	10	53	3	8	6	11	13.0	26.7	60.0	20.8
2010/11	9	24		33	5	9		14	55.6	37.5		42.4
2011/12	107	101	30	208	31	25		56	29.0	24.8		26.9
2012/13	28	27	3	55	1	5	1	6	3.6	18.5	33.3	10.9
2013/14	16	43	16	59		23	2	23		53.5	12.5	39.0
2014/15	18	19		37	10	2		12	55.6	10.5		32.4
2015/16	19	122	25	141	2	3	1	5	10.5	2.5	4.0	3.5
2016/17	37	30	6	67	1	3	1	4	2.7	10.0	16.7	6.0
2017/18	22	30	20	52		4		4	0.0	13.3	0.0	7.7

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