

Beach bird surveys in The Netherlands

winter 2019/20



C.J. Camphuysen 2020



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Front cover: Feather remains of Woodcock *Scolopax rusticola* on Vlieland, 7 March 2020. The feathers were the leftover of a prey captured and plucked by a Peregrine Falcon, *Falco peregrinus*, a winter resident at the Vliehors (photo C.J. Camphuysen).

Summary - This is the annual report for OSPAR on the beached bird survey (BBS) results in The Netherlands winter 2019/20, including OSPAR area's 8, 9 and 10. 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 in recent decades (especially since ~2005). In recent seasons, consistently low oil rates are found in all species, and this includes the target species Common Guillemot *Uria aalge*. The sample size for Common Guillemots was smaller than one year earlier, sufficient for the OSPAR subregions covered in this study that are bordering the North Sea. The sample was just a bit too small for the interior Wadden Sea, as in most seasons. 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= 70) for the North Sea coast of OSPAR areas 8 and 9 combined. This current figure is the fifth value ever measured within The Netherlands below 10%, and it consolidates the sharp drop in oil-rates that occurred after winter 2014/2015. The most recent data conform the declining trend once more, as a result of which the 5-year running mean of oil rates in Common Guillemots has now arrived at $5.8 \pm 1.5\%$ (mean \pm S.D.) for all North Sea beaches combined. The OSPAR target of 20% over periods of at least 5 years for 2020 has evidently been exceeded and that for 2030 (10%) has been reached.

Winter 2019/20 was again an exceptionally mild season (no winter mortality) and no seabird wrecks, for example following periods of violent weather were known to have occurred. Several Northern Gannets were found entangled in fishing gear, three Great Cormorants were found with freshly caught fish sticking out their beaks. Unusual finds include Leach Storm Petrel *Oceanodroma leucorhoa*, three Black-throated Divers *Gavia arctica* and two Great Cormorants of the Atlantic form *Phalacrocorax carbo carbo*.

Vogelstrandingen langs de Nederlandse kust, winter 2019/20

Samenvatting - Dit is de jaarlijkse weergave voor OSPAR van de resultaten van systematische strandtellingen langs de Nederlandse kust, met een verslag over het seizoen 2019/20. 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 alle laatste seizoenen hebben bijzonder lage waarden laten zien. Over 2019/20 werd langs de Noordzeekust een niveau van slechts 7.1% olieslachtoffers gevonden (n= 70). Het meerjarig gemiddelde is inmiddels op een niveau van 5.8/% beland, waarmee de doelstellingen van OSPAR voor 2020 ruimschoots overschreden en die voor 2030 bereikt zijn.

Introduction

The Marine Strategy Framework Directive demanded 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). To monitor levels of chronic marine oil pollution, beached bird surveys have been suggested in the late 1990s (Camphuysen & Heubeck 2001), but the information need for the monitoring and assessment of oil fouling of seabirds was established much later in the form of an Ecological Quality Objective (EcoQO) for OSPAR. 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 2019/20. As always, the emphasis of this study is on Common Guillemots, but details are provided for several other pelagic species (the Northern Fulmar *Fulmarus glacialis*, the Northern Gannet *Morus bassanus*, the Black-legged Kittiwake *Rissa tridactyla* and the Razorbill *Alca torda*). Three coastal species, including the often-highlighted Common Eider *Somateria mollissima*, Herring Gull *Larus argentatus*, and Great Black-backed Gull *Larus marinus*, have not produced indications that oil pollution is a current threat in nearshore waters (see for details the last 5-10 annual reports, or the summary provided in Camphuysen 2019). Only the first group, the pelagic seabirds, are therefore analysed in depth and these should highlight trends in chronic oil pollution at greater distances from the nearest coast. Densities span the entire ~60 years period for which solid data are available (winter 1959/60 – winter 2019/20), whereas the analysis of oil rates spans a period of the most recent 43 winters (winter 1977/78 to 2019/20).

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. Given the nature of the underlying database (historical data can be merged with earlier published material whenever they are provided by volunteers walking our beaches to enlarge earlier sample sizes), the exact values may deviate slightly from earlier publications.

Observer effort

In winter 2019/20, beached bird survey reports were received from Jelle Abma (1), Rino Abrahamse (1), Patrick Agterber (1), Henk Alards (1), Rik Bak (1), Fiet van Beek (2), Dick Belgers (1), S vd Berg-Blok (4), Ad van den Berge (3), Ruud van Beusekom (1), Frank Biesboer (1), Bert Biesemans (1), Marcel Bingley (1), P de Boer (1), T de Boer (4), Joris Bolder (1), Ruurd Boonstra (1), Willem Bosma (6), H Bouma (1), Jaap Bouwman (1), Geert Braem (1), Peter van Brandwijk (1), Wim Breedveld (1), Eric Brinkman (1), Martijn Bunskoek (1), T. Buren (3), Jarno van Bussel (1), CJ Camphuysen (10), Ruud Costers (4), Walter Das (2), Deborah (3), Bert van Dijk (1), J. van Dillen-Staal (9), Donny Dolman (1), Dick Dooyewaard (3), Henk van Duijn (1), Enno Ebels (1), E. Eilander (1), B Fey (1), JA van Franeker (4), Gerben van Geest (1), Marco Glastra (1), Andre Goedhart (1), L de Graaf (1), Ries van Griensven (1), Joël Haasnoot (1), Jeltje Heideman (1), Ralf Heijmans (1), Chris Van Hoecke (1), Bert van 't Holt (1), Willem Hoogland (1), Job ten Horn (3), Peter van Horssen (1), Ruben van der Horst (1), Dirk Hylebos (1), Nicole Janinhoff - Verdaat (1), Erik Jansen (1), Geert Janssen (1), Saskia Janssen (1), Jacos Jes (2), Johan de Jong (2), Fabian Karwinkel (1), Luc Van Keer (1), Leon Kelder (1), Wilbert Kerkhof (9), Maurice Knijnsberg (1), Marieke Kooiman (1), Zeezoogdierenhulp Kop van Goeree (1), Jos van Koppen (1), Lars Korzelius (1), Suse Kühn (5), Kustnieuws Nederland & Europa (1), Sandra Lamberts (2), Sandra Lamberts (1), Rob de Langen (1), Karel Leeftink (1), Marco Leloux (1), Tjeerd Lemstra (1), Sander Lilipaly (1), Peter Lindenburg (2), Merijn Loeve (1), Frank London (1), Bernard Lucas (1), Petra Manche (1), Els Marijs (1), Harm Meek (1), Jaap van der Meer (1), Petra van der Meer (1), Wouter Monster (1), Stefan muller (1), Paul van Nuys (1), Wouter Oe (1), Mick Peerdeman (1), Nick Peeters (1), Arno Piek (2), Zeehondencentrum Pieterburen (1), Henk Plat (1), Sara Poppelaars (1), B.J.H.M. Possen (1), Luuk Punt (2), Dorothee Rabe (1), Jasper Rennen (1), Willem van Rij (1), Lucette Robertson-Proot (1), Karin De Roode (1), Marianne Rots (1), Jurgen Rotteveel (1), Jorg Schagen (1), Sjouke Scholten (1), Wim van der Schot (1), TAW Schreurs (10), Djurre Siccama (1), Jauke Sies (1), Arien Slagt (1), Maarten Sluijter (3), Henry Soyer (1), Tom van Spanje (4), Bianca Spierings (1), Fennie Steenhuis (1), Bert Stegeman (1), Karlijn Stet (1), Marchel Stienstra (1), Vincent Stork (2), Paula Swinkels (2), Jos Tramper (1), Sven Valkenburg (1), Koen van Veen (1), D Veenendaal (7), Martijn Veenstra (9), Martin Verbeeten (1), Hans Verdaat (3), Jeroen Vinke (1), Harry de Visser (1), Ria Vogels (2), Arnout W.R. de Vries (5), Christiaan de Vries (1), Jacob Jan de Vries (2), Mark de Vries (1), Jan Vrijlink (1), Lodewijk van Walraven (4), Edwin De Weerd (1), Gerard Westerhuis (8), Arnold Wijker (2), Marcel Wijnalda (3), Willem Wind (1), Albert-Erik de Winter (1), Pim Wolf (3), Louis H. Zandbergen (3), Mark Zekhuis (1) & Carl Zuhorn (3).

Total observer effort comprised 249 reports of stranded wildlife which reflected ~362km surveyed between 1 November 2019 and 30 April 2020 (Table 1).

Table 1. Beached surveys (n counts) and overall coverage (km surveyed) in winter (Nov-Apr) over the last 61 years. The effort since 1977/78 was used for the analysis of trends in oiling. All effort was used to assess fluctuations in densities over the entire period.

Winter	Reports	km	Winter	Reports	km	Winter	Reports	km
1959/60	7	43	1979/80	88	721	1999/00	350	1979
1960/61	38	452	1980/81	313	2125	2000/01	316	1730
1961/62	17	41	1981/82	287	1968	2001/02	397	1969
1962/63	48	145	1982/83	388	3126	2002/03	370	1869
1963/64	19	92	1983/84	336	2448	2003/04	262	1310
1964/65	7	28	1984/85	298	1869	2004/05	299	1499
1965/66	28	300	1985/86	287	1833	2005/06	241	1250
1966/67	19	164	1986/87	189	1420	2006/07	270	1109
1967/68	30	322	1987/88	207	1839	2007/08	246	934
1968/69	23	541	1988/89	231	1671	2008/09	204	921
1969/70	60	832	1989/90	237	1506	2009/10	164	776
1970/71	21	510	1990/91	215	1406	2010/11	126	685
1971/72	25	605	1991/92	164	1208	2011/12	310	1030
1972/73	19	465	1992/93	147	1182	2012/13	124	463
1973/74	30	138	1993/94	167	1128	2013/14	164	555
1974/75	49	393	1994/95	130	923	2014/15	151	482
1975/76	35	255	1995/96	138	956	2015/16	169	528
1976/77	20	244	1996/97	121	833	2016/17	301	529
1977/78	49	408	1997/98	141	953	2017/18	312	482
1978/79	93	579	1998/99	318	1795	2018/19	410	1065
						2019/20	249	362
	637	6555		4402	30910		5435	21526

Table 2. Species found and reported, winter 2019/20.

Euring	Soortnaam	Scientific name	Species name	Number
20	Roodkeelduiker	<i>Gavia stellata</i>	Red-throated Diver	3
30	Parelduiker	<i>Gavia arctica</i>	Black-throated Diver	3
90	Fuut	<i>Podiceps cristatus</i>	Great Crested Grebe	1
220	Noordse Stormvogel	<i>Fulmarus glacialis</i>	Northern Fulmar	13
550	Vaal Stormvogeltje	<i>Oceanodroma leucorhoa</i>	Leach's Storm-petrel	1
710	Jan van Gent	<i>Sula bassana</i>	Northern Gannet	43
720	Aalscholver	<i>Phalacrocorax carbo</i>	Great Cormorant	21
721	Grote Aalscholver	<i>Phalacrocorax carbo carbo</i>	Great Cormorant	2
1570	Rietgans	<i>Anser fabalis</i>	Bean Goose	1
1590	Kolgans	<i>Anser albifrons</i>	Greater White-fronted Goose	17
1670	Brandgans	<i>Branta leucopsis</i>	Barnacle Goose	2
1680	Rotgans	<i>Branta bernicla</i>	Brent Goose	1
1730	Bergeend	<i>Tadorna tadorna</i>	Common Shelduck	6
1790	Smient	<i>Anas penelope</i>	Eurasian Wigeon	1
2060	Eidereend	<i>Somateria mollissima</i>	Common Eider	66
2130	Zwarte Zeeëend	<i>Melanitta nigra</i>	Black Scoter	17
2269	ongedeterm. eend	<i>unidentified duck</i>	unidentified duck	1
4500	Scholekster	<i>Haematopus ostralegus</i>	Eurasian Oystercatcher	2
4960	Kanoetstrandloper	<i>Calidris canutus</i>	Red Knot	1
5290	Houtsnip	<i>Scolopax rusticola</i>	Eurasian Woodcock	3
5410	Wulp	<i>Numenius arquata</i>	Eurasian Curlew	1
5690	Grote Jager	<i>Stercorarius skua</i>	Great Skua	4
5820	Kokmeeuw	<i>Chroicocephalus ridibundus</i>	Black-headed Gull	2
5900	Stormmeeuw	<i>Larus canus</i>	Mew Gull	2
5910	Kleine Mantelmeeuw	<i>Larus fuscus</i>	Lesser Black-backed Gull	1

Euring	Soortnaam	Scientific name	Species name	Number
5920	Zilvermeeuw	<i>Larus argentatus</i>	Herring Gull	13
6000	Grote Mantelmeeuw	<i>Larus marinus</i>	Great Black-backed Gull	9
6020	Drieteenmeeuw	<i>Rissa tridactyla</i>	Black-legged Kittiwake	22
6340	Zeekoet	<i>Uria aalge</i>	Common Guillemot	88
6360	Alk	<i>Alca torda</i>	Razorbill	27
6470	Kleine Alk	<i>Alle alle</i>	Little Auk	5
6540	Papegaaiduiker	<i>Fratercula arctica</i>	Atlantic Puffin	1
6655	Postduif	<i>Columba 'domestica'</i>	domestic pigeon	3
6680	Holeduif	<i>Columba oenas</i>	Stock Pigeon	1
6700	Houtduif	<i>Columba palumbus</i>	Common Wood Pigeon	3
11980	Kramsvogel	<i>Turdus pilaris</i>	Fieldfare	3
15600	Kauw	<i>Corvus monedula</i>	Eurasian Jackdaw	1
15820	Spreeuw	<i>Sturnus vulgaris</i>	Common Starling	2
23510	Bruinvis	<i>Phocoena phocoena</i>	Harbour Porpoise	3
24320	Grijze Zeehond	<i>Halichoerus grypus</i>	Grey Seal	2
24330	Gewone Zeehond	<i>Phoca vitulina</i>	Common Seal	2

Results

Numbers of pelagic seabirds washing ashore

The Common Guillemot is the indicator species for as far as oil contamination on European beaches is concerned, but it is always useful to evaluate the results in the context of other species of the open seas: the pelagic seabirds. The long-term fluctuations in densities are shown in **Fig. 1**, and it can be seen that the densities in winter 2019/20 were again lower than in the previous winter when a small wreck of guillemots had occurred (Jan-Feb 2019). Oil rates are expectedly low during wrecks, for most of the mortality is largely ‘food driven’ (the result of starvation of the birds involved), but there were no indications for higher oil rates in 2019/20. Two birds were contaminated with an unknown, transparent ‘fatty substance’, super visually similar to casualties contaminated with Nonylphenol or Dodecylphenol (Engelen 1987, Zoun & Boshuizen 1992, Camphuysen & De Leeuw 2011). The substance has not been sampled and its chemical properties will therefore remain unknown. The few oiled Guillemots encountered in winter 2019/20 were all only slightly contaminated and had starved to death as a result of hypothermia.

Guillemots, Razorbills and Black-legged Kittiwakes share particular resources within the North Sea ecosystem and can often be seen feeding in the same or in similar habitats, if not even in close association. Razorbills and Kittiwakes did not produce peak numbers in strandings during the guillemot wreck in winter 2018/19, and densities remained low in the season under study in this report. More aerial pelagic seabirds, the Northern Fulmar and the Northern Gannet, less prone to oil contamination simply as a result of their lifestyle, tend to have much lower densities than the three species mentioned earlier (**Fig. 2**). Numbers of gannets washing ashore tend to be fairly consistent, whereas densities of Northern Fulmar may fluctuate more widely, sometimes as a result of influxes of birds from elsewhere (e.g. from Arctic regions) into the North Sea. In recent years, however, numbers of Northern Gannets washing ashore were relatively high, and densities were again relatively high in 2019/20. Given the larger than ever dependence on opportunistic reports of stranded seabirds, and assuming a higher incentive to report ‘charismatic’ (and large!) gannets than most other common seabirds, this could be seen as an artefact. Evidently, mineral oil played only a minor role in the strandings of these seabirds.

As in earlier years, several Northern Gannets were found entangled in fishing gear and this included one bird entangled in a monofilament gillnet and another with hooks and lines of a sports fishermen attached to its bill and head.



Monofilament gillnet entanglement in an adult Northern Gannet, 27 March 2020, De Hors, Texel, Fiet van Beek www.waarneming.nl

Fish hooks and line entanglement in an adult Northern Gannet, 26 April 2020, Zandkes, Texel, Willem Wind www.waarneming.nl

Uncommon seabirds found ashore were one Leach's Storm Petrel *Oceanodroma leucorhoa* (21 Jan 2020, Callantsog-Groote Keeten), 4 Great Skuas *Catharacta skua* (2x Feb, 2x Apr), 5 Little Auks *Alle alle* (4x Nov, 1x Feb), and a single Atlantic Puffin *Fratercula arctica* (19 Jan 2020, Terschelling). None of these were found with oil in their feathers. None of the smaller skuas or jaegers were reported.

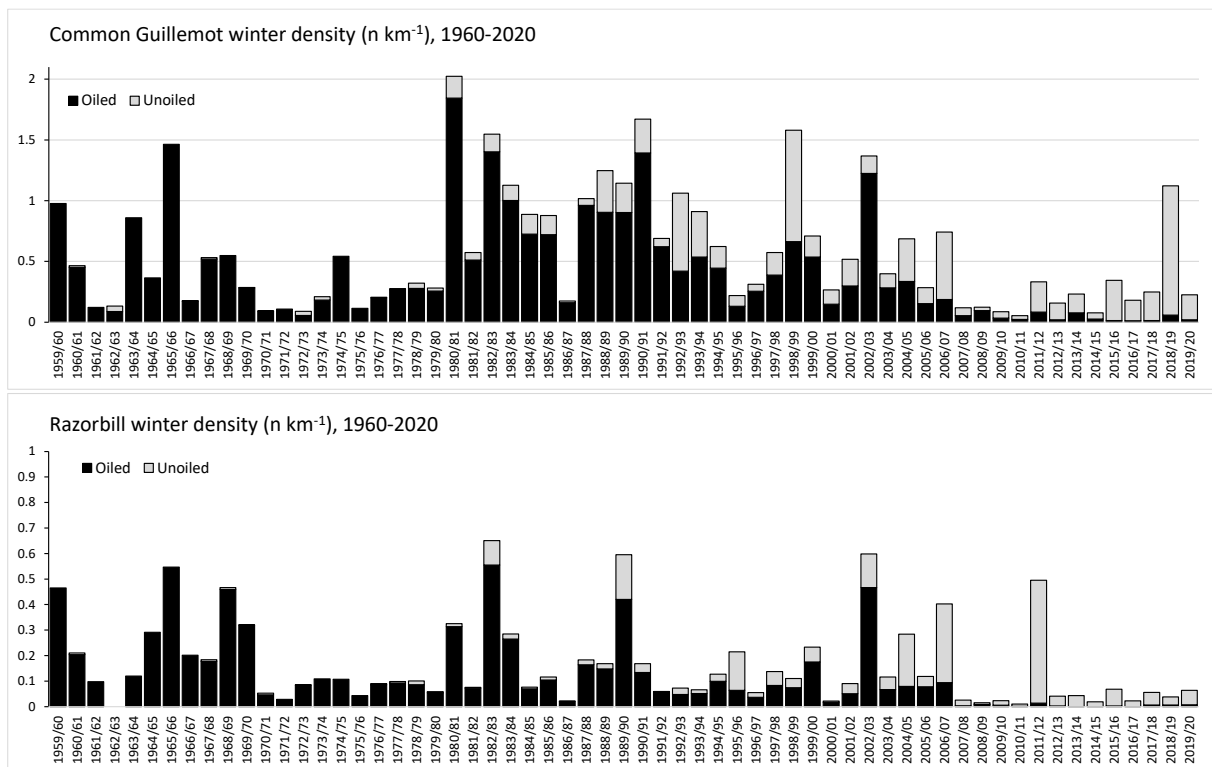


Figure 1. Densities (n km⁻¹) of Common Guillemots and Razorbills washing ashore in winter, 1959/60-2019/20 along the North Sea coast in The Netherlands.

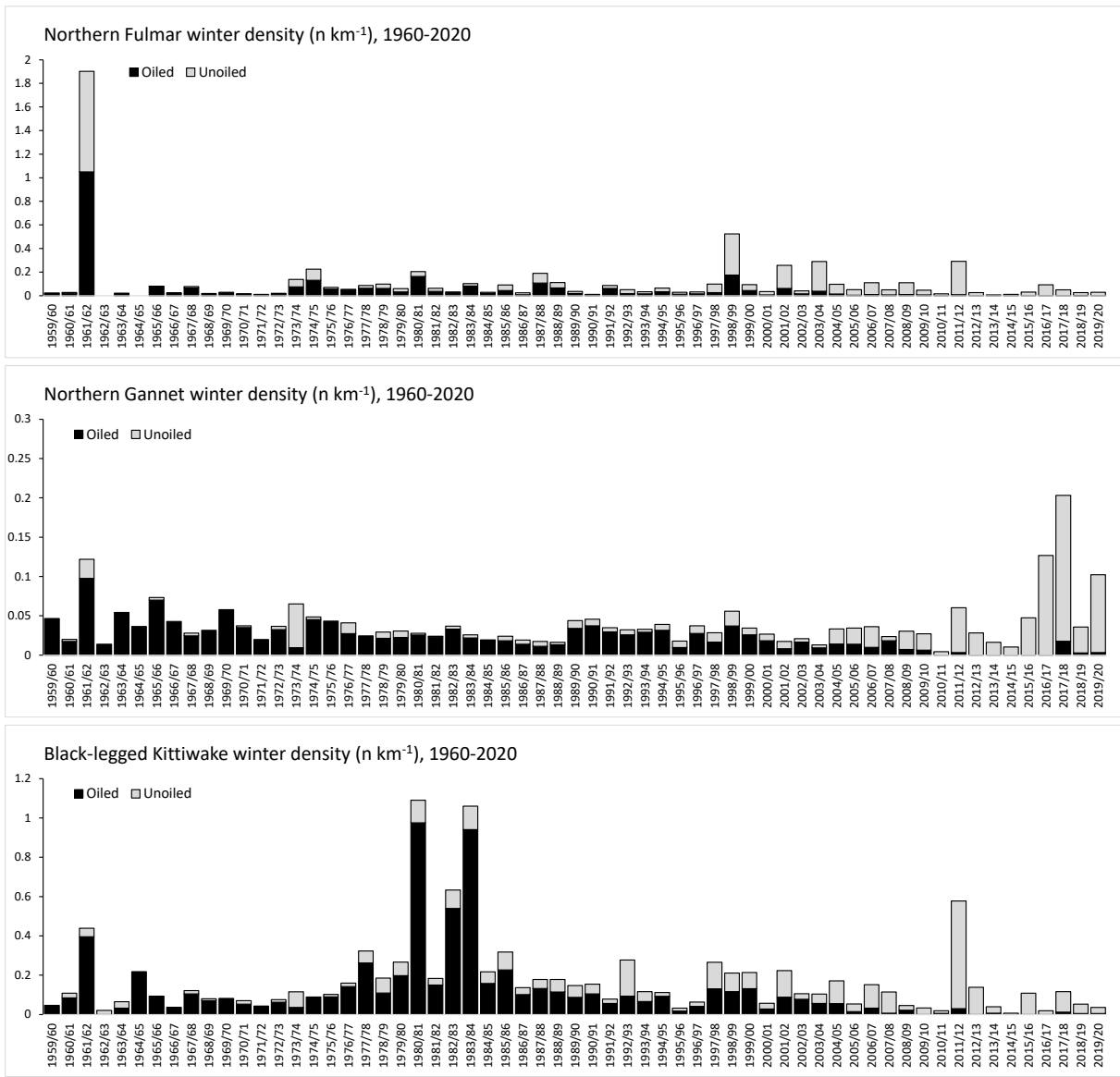
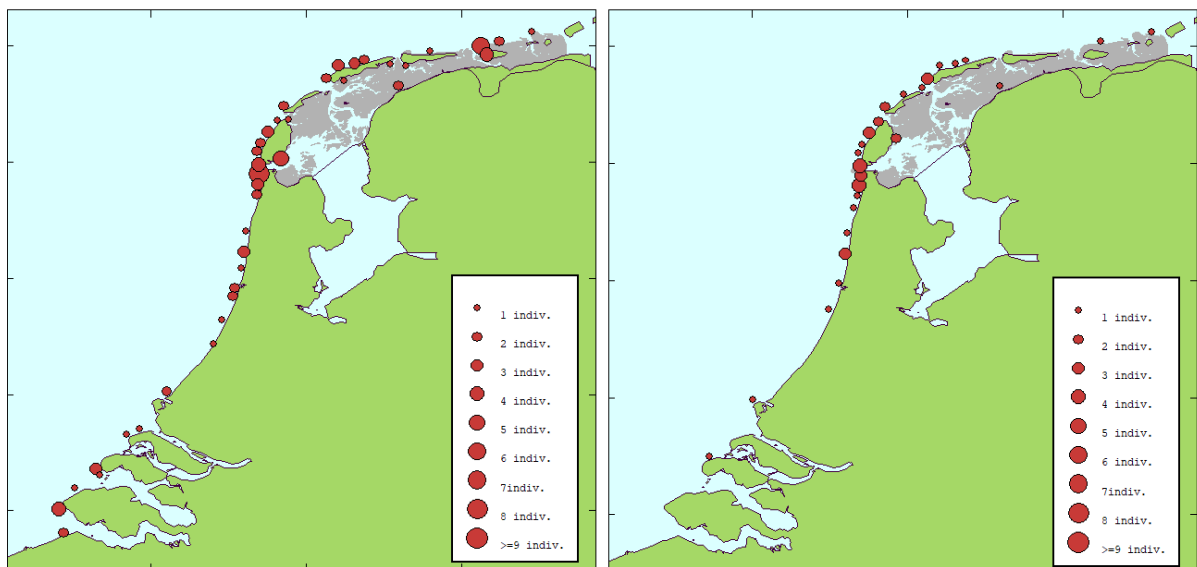


Figure 2. Densities (n km⁻¹) of some more aerial pelagic seabirds washing ashore in winter, 1959/60-2019/20 along the North Sea coast in The Netherlands.



Common Guillemots *Uria aalge* found dead, winter 2019/20 Northern Gannets *Morus bassanus* found dead, winter 2019/20

Numbers of coastal seabirds washing ashore

For nearshore seabirds, winter 2019/20 was not a particular season in any respect. In the absence of cold weather, most inland water birds remained in fresh water areas as in most mild winters and mass mortality events as a result of frost did not occur. Divers Gaviidae were not commonly found, as in most recent winters and in the absence of chronic oil pollution, but the three Black-throated Divers *Gavia arctica* were unusual and noteworthy. None of these birds was oiled and the identification has been checked for all stranded divers.

Serious oil-related events all date back to the 1960s-1980s, while some other and more recent mortality events were food- or disease rather than oil related. It should be noted that an important modern source of information for recent bird strandings (<https://waarneming.nl>) is a poor source for strandings data of commoner species such as Herring Gulls and Greater Black-backed Gulls, so that several strandings will have been overlooked and densities are compromised by a lack of reporting. Yet, there is no evidence for oil-related mortality in any of the species shown in **Fig. 3**, let alone other coastal species and the trend of partly black (*i.e.* oiled) bars to predominantly pale grey (*i.e.* unoiled) bars is evident in all species depicted.



Black-throated Diver *Gavia arctica*, 29 Dec 2019
Brouwersdam, Sara Poppelaars, www.waarneming.nl

Red-throated Diver *Gavia stellata*, 23 March 2020,
Oostvoornse meer, Koen van Veen, www.waarneming.nl

Unusual causes of death included three Great Cormorants (including one of the nominate race *Ph. c. carbo*) with too large an appetite: each of these birds had died because a Sea Bass *Dicentrarchus labrax* got stuck in their throat. Another unusual frequency was 17 White-fronted Geese *Anser albifrons*, 12 of which were found 21 Jan 2020 between Callantsoog and Groote Keeten (Noord-Holland).



Great Cormorants *Phalacrocorax carbo* choked in Sea bass *Dicentrarchus labrax*

22 Feb 2020 Oostvoorne, Ruud
Boonstra, www.waarneming.nl

29 April 2020, Maasvlakte, Ad van den
Berge, www.waarneming.nl

3 March 2020, Zandvoort, Arnoud de
Vries, www.waarneming.nl

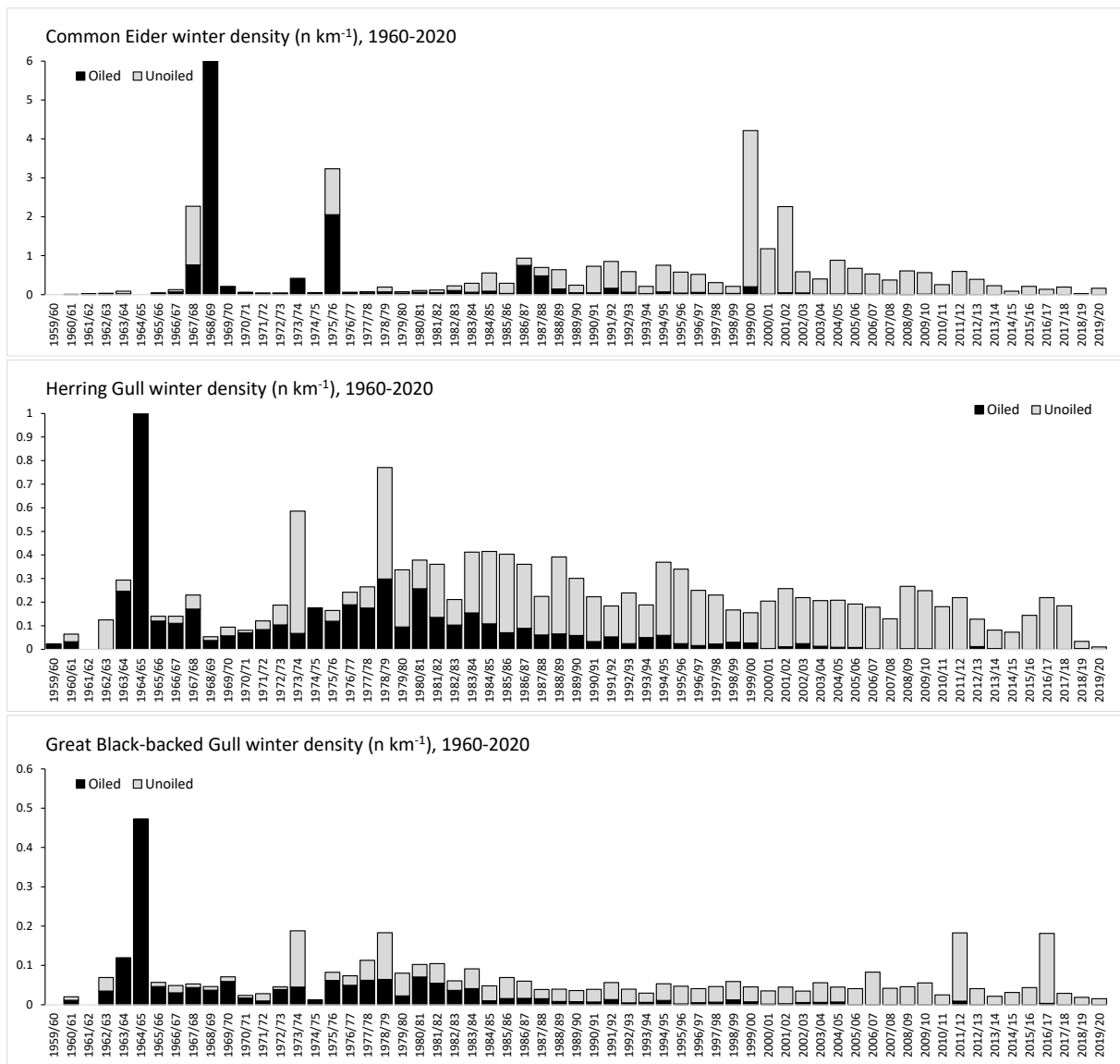


Figure 3. Densities (n km⁻¹) of some coastal waterbirds washing ashore in winter, 1959/60-2019/20 along the North Sea coast in The Netherlands.

Oil rates updated

For the analysis, only intact carcasses were selected, since only these were considered fit for purpose: to assess the fraction of birds washing ashore that was, or was not, contaminated with mineral oil. The values produced are all tabulated in the Appendix, whereas the proportions and a long-term running mean and a logit-transformed presentation of the oil rates allowing a linear regression to examine the trends are shown in this chapter.

A warning beforehand, is that the logit transformation is impossible for any values equal to 100% or 0% (e.g. all birds oiled, or none of the birds oiled), for a logit transformation would lead to $+\infty$ or $-\infty$ respectively. In cases where 0% of the birds found were oiled, the outcome was therefore transformed to logit -2 (e.g. ~1% oiled), as a more reliable and workable guesstimate of the actual oil rate to be used in the regression analysis. The problem of 'no oil' is increasingly common in recent years, now that chronic oil pollution is really pushed back.

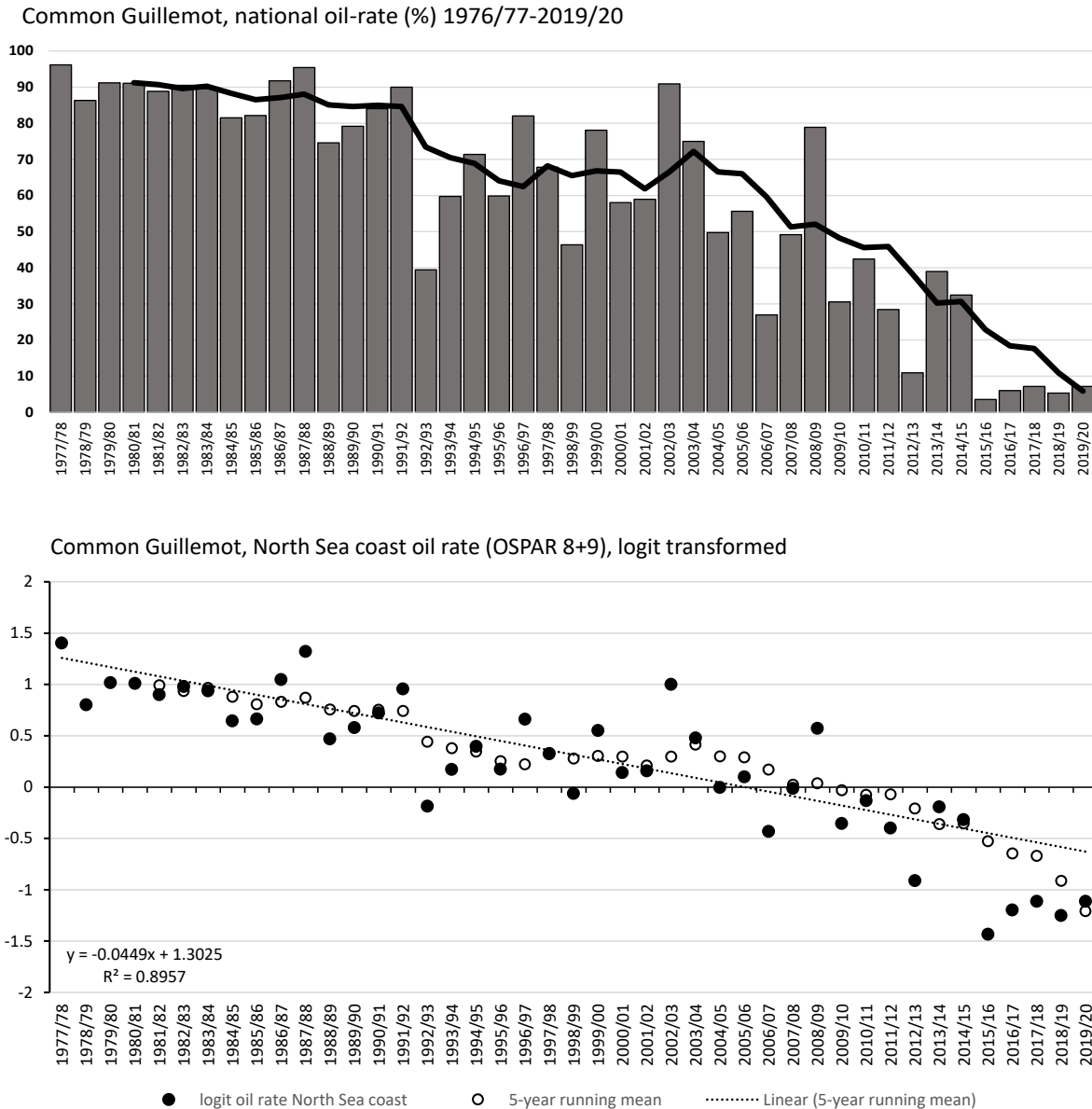


Fig. 3. Proportions oiled and 5-year running mean in oil rates (top panel) and a significant decline in logit-transformed oil rates in Common Guillemots, 1977/78-2019/20.

The significant decline in oil rates in Common Guillemots continued, and in winter 2019/20 yet another season, in fact the fifth season in a row, in which the oil rate did not exceed 10% (**Fig. 3**). The five-year running mean ($5.8 \pm 1.5\%$) is well below what has to be achieved by 2030 according to OSPAR and much exceeded earlier, conservative expectations for 2020.

For the other pelagic seabirds (**Fig. 4**) highly similar trends and patterns were found, although the data were slightly more erratic in species in which the sample size was small. Oil rates in recent years were often nihil (0%), something that never occurred prior to 2008. Oil rates (including 5-year running means) tend on average to be lower in the aerial species than in the more sensitive auks, but the difference is small (**Table 2**).

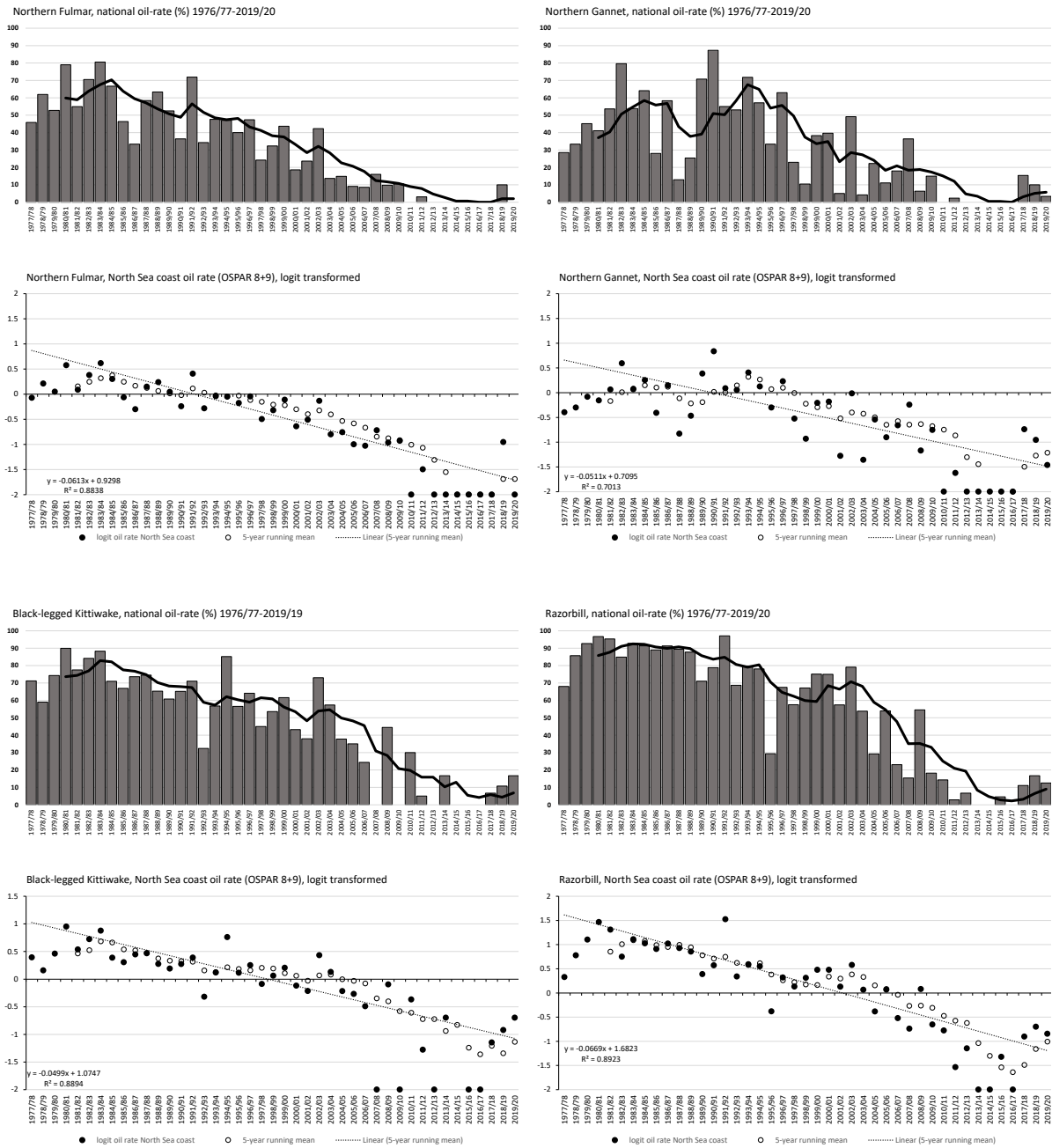


Fig. 4. Proportions oiled and 5-year running mean in oil rates (top panels) and a significant decline in logit-transformed oil rates (lower panels) in the four commoner pelagic species: Northern Fulmar, Northern Gannet, Black-legged Kittiwake, and Razorbill, 1977/78-2019/20.

Table 2. Proportions oiled and 5-year running means (\pm SD) in pelagic seabirds in 2019/20. () = small sample.

Species	Oiled (%)	n=	Mean	SD
Common Guillemot	7.1	70	5.8	\pm 1.5
Razorbill	(12.5)	16	9.0	\pm 6.6
Northern Fulmar	(0.0)	7	2.0	\pm 4.5
Northern Gannet	3.3	30	5.7	\pm 6.8
Black-legged Kittiwake	(16.7)	6	6.8	\pm 7.2

For the more coastal species, a trend analysis is in fact pointless in recent years, for the oil rates are essential nihil with occasional casualties every now and then. For these species, in this part of the world, chronic oil pollution is no longer an issue of concern, even though an accidental spill could still kill thousands of birds on a single occasion. Oil rates equalling 0% predominate in recent years.

Discussion

In winter 2019/20, overall densities and 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 suggests that not even the 2020 target of 20% of individuals oiled has been surpassed, but that even the better target (10% in 2030) has been reached. The Dutch data collected for OSPAR regions 8 and 9 must be seen as contributions to the data set. An international coordinator, 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.

As said in previous reports, beached bird surveys are a vital part of both the Oiled-Guillemot EcoQO, but also for the plastic particle monitoring conducted by using Northern Fulmar carcasses around the North Sea (Van Franeker & SNS Fulmar Study Group). Unfortunately, more and more people prefer to post their findings directly online on internet as a way of rapid communication and data storage (without logging observer effort). Hence, to complete the overview over strandings in The Netherlands, more opportunistic reports from www.waarneming.nl, and especially reports that include clear photographic material were screened for double counts and identification errors, even though the sample size of stranded seabirds didn't need to be enhanced. The first contacts to enhance waarneming.nl applications have now been established, so that systematic beached bird surveys are better accommodated, and that as a result studies of the variability in and the backgrounds of seabird strandings will remain intact.

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Appendices

The tables below show raw data underlying the graphs in this report, except the long-term trends in densities. Shown are the oil rates (%), in parentheses when the sample size was <25 intact carcasses in a given winter and/or area, and the sample size (n), for each of the OSPAR regions (8-10) and for the North Sea coast as a whole (8+9).

(1) Common Guillemot

	Subregion 8		Subregion 9		subregion 10		National (8+9)			
	ratio	n=	ratio	n=	ratio	n=	ration	n=	mean	
1977/78	96.3	82	(100.0)	23			1977/78	96.2	105	
1978/79	83.9	93	91.3	46			1978/79	86.3	139	
1979/80	94.1	118	85.9	64	(66.7)	3	1979/80	91.2	182	
1980/81	90.4	3061	96.0	448	91.8	233	1980/81	91.1	3509	91.2
1981/82	86.8	675	95.5	202	92.2	115	1981/82	88.8	877	90.7
1982/83	87.6	2494	95.6	1449	91.9	434	1982/83	90.5	3943	89.6
1983/84	87.4	1625	95.2	660	77.9	163	1983/84	89.6	2285	90.3
1984/85	77.1	855	89.5	474	87.2	47	1984/85	81.5	1329	88.3
1985/86	78.3	803	90.2	378	81.1	159	1985/86	82.1	1181	86.5
1986/87	89.7	107	96.1	51	(88.2)	17	1986/87	91.8	158	87.1
1987/88	96.1	1177	92.7	288	78.3	83	1987/88	95.4	1465	88.1
1988/89	73.0	1224	82.7	248	49.6	133	1988/89	74.6	1472	85.1
1989/90	79.5	1266	76.6	158	73.5	83	1989/90	79.1	1424	84.6
1990/91	83.9	1861	85.4	144	42.9	35	1990/91	84.0	2005	85.0
1991/92	88.9	522	92.2	268	(100.0)	6	1991/92	90.0	790	84.6
1992/93	41.4	794	28.7	150	40.7	123	1992/93	39.4	944	73.4
1993/94	60.8	559	56.4	179	52.8	106	1993/94	59.8	738	70.5
1994/95	69.1	246	75.8	124	71.1	83	1994/95	71.4	370	68.9
1995/96	58.6	111	62.3	61	(57.1)	7	1995/96	59.9	172	64.1
1996/97	84.2	146	77.5	71	(66.7)	6	1996/97	82.0	217	62.5
1997/98	69.5	285	64.6	144	(61.9)	21	1997/98	67.8	429	68.2
1998/99	43.3	1054	51.5	631	24.1	411	1998/99	46.4	1685	65.5
1999/00	78.7	675	76.8	310	60.4	149	1999/00	78.1	985	66.8
2000/01	48.1	108	63.5	197	42.9	49	2000/01	58.0	305	66.5
2001/02	62.6	340	55.0	320	50.7	138	2001/02	58.9	660	61.8
2002/03	95.9	1992	58.9	314	46.8	77	2002/03	90.9	2306	66.5
2003/04	83.7	141	69.3	215	45.9	61	2003/04	75.0	356	72.2
2004/05	61.5	265	39.7	312	42.7	103	2004/05	49.7	577	66.5
2005/06	53.7	82	56.8	132	47.9	71	2005/06	55.6	214	66.0
2006/07	28.4	356	23.5	153	13.2	76	2006/07	26.9	509	59.6
2007/08	(50.0)	18	48.8	43	(35.0)	20	2007/08	49.2	61	51.3
2008/09	(86.4)	22	76.5	68	(66.7)	9	2008/09	78.9	90	52.1
2009/10	(23.1)	13	34.8	23	(66.7)	9	2009/10	30.6	36	48.2
2010/11	(55.6)	9	37.5	24	()	0	2010/11	42.4	33	45.6
2011/12	29.2	106	27.5	91	0.0	28	2011/12	28.4	197	45.9
2012/13	3.6	28	18.5	27	(33.3)	3	2012/13	10.9	55	38.2
2013/14	(0.0)	16	53.5	43	(12.5)	16	2013/14	39.0	59	30.3
2014/15	(55.6)	18	(10.5)	19	()	0	2014/15	32.4	37	30.6
2015/16	(10.5)	19	2.5	122	4.0	25	2015/16	3.5	141	22.9
2016/17	2.7	37	10.0	30	(16.7)	6	2016/17	6.0	67	18.4
2017/18	0.0	26	13.3	30	(0.0)	20	2017/18	7.1	56	17.6
2018/19	9.8	51	4.7	382	(0.0)	15	2018/19	5.3	433	10.9
2019/20	7.7	39	6.5	31	(14.3)	14	2019/20	7.1	70	5.8

5.8 5yr mean
1.5 SD

(2) Razorbill

	Subregion 8		Subregion 9		subregion 10		National (8+9)			
	ratio	n=	ratio	n=	ratio	n=	ratio	n=		
1977/78	92.6	27	(100.0)	23			1977/78	68.0	50	
1978/79	84.0	25	(88.2)	17			1978/79	85.7	42	
1979/80	96.8	31	(80.0)	10	(0.0)	0	1979/80	92.7	41	
1980/81	96.2	496	100.0	77	88.5	26	1980/81	96.7	573	85.8
1981/82	94.8	77	96.7	30	(100.0)	19	1981/82	95.3	107	87.7
1982/83	84.7	1299	85.9	311	85.8	141	1982/83	84.9	1610	91.1
1983/84	92.9	547	91.9	37	96.8	31	1983/84	92.8	584	92.5
1984/85	90.1	71	93.3	45	(100.0)	2	1984/85	91.4	116	92.2
1985/86	87.4	127	93.5	46	(100.0)	4	1985/86	89.0	173	90.7
1986/87	(88.2)	17	(100.0)	6	(0.0)	0	1986/87	91.3	23	89.9
1987/88	94.3	175	75.4	61	(85.0)	20	1987/88	89.4	236	90.8
1988/89	87.5	152	88.9	36	(81.8)	11	1988/89	87.8	188	89.8
1989/90	72.0	690	60.6	66	48.0	25	1989/90	71.0	756	85.7
1990/91	79.3	174	76.5	34	(100.0)	2	1990/91	78.8	208	83.7
1991/92	97.6	42	96.3	27	(100.0)	6	1991/92	97.1	69	84.8
1992/93	72.9	59	(37.5)	8	(33.3)	6	1992/93	68.7	67	80.7
1993/94	83.7	49	(66.7)	15	(0.0)	2	1993/94	79.7	64	79.1
1994/95	77.4	53	79.3	29	(73.3)	15	1994/95	78.0	82	80.5
1995/96	28.9	121	30.4	46	(25.0)	4	1995/96	29.3	167	70.6
1996/97	62.5	24	75.0	16	(33.3)	3	1996/97	67.5	40	64.6
1997/98	58.4	77	55.2	29	(100.0)	2	1997/98	57.5	106	62.4
1998/99	71.4	77	61.4	57	(55.6)	18	1998/99	67.2	134	59.9
1999/00	75.7	259	73.3	86	(53.8)	13	1999/00	75.1	345	59.3
2000/01	(70.0)	10	77.8	18	(50.0)	2	2000/01	75.0	28	68.5
2001/02	58.4	77	55.3	38	(33.3)	18	2001/02	57.4	115	66.4
2002/03	87.8	841	38.2	178	(26.1)	23	2002/03	79.1	1019	70.7
2003/04	45.6	57	63.3	49	(66.7)	6	2003/04	53.8	106	68.1
2004/05	34.8	135	22.9	118	(13.0)	23	2004/05	29.2	253	58.9
2005/06	50.0	24	55.8	52	91.4	35	2005/06	53.9	76	54.7
2006/07	25.5	145	16.0	50	(22.2)	18	2006/07	23.1	195	47.8
2007/08	(16.7)	6	(14.3)	7	(0.0)	4	2007/08	15.4	13	35.1
2008/09	(60.0)	5	(50.0)	6	()	0	2008/09	54.5	11	35.2
2009/10	(25.0)	8	(0.0)	3	(100.0)	1	2009/10	18.2	11	33.0
2010/11	(0.0)	4	(33.3)	3	()	0	2010/11	14.3	7	25.1
2011/12	1.9	209	4.1	145	0.0	36	2011/12	2.8	354	21.0
2012/13) 0.0)	10	(20.0)	5	(0.0)	1	2012/13	6.7	15	19.3
2013/14) 0.0)	10	(0.0)	7	(0.0)	2	2013/14	0.0	17	8.4
2014/15	()	0	(0.0)	7	()	0	2014/15	0.0	7	4.8
2015/16	(0.0)	2	(5.0)	20	(0.0)	5	2015/16	4.5	22	2.8
2016/17	(0.0)	4	(0.0)	5	(0.0)	0	2016/17	0.0	9	2.2
2017/18	(11.1)	9	(11.1)	9	(0.0)	0	2017/18	11.1	18	3.1
2018/19	(0.0)	2	17.9	28	(0.0)	1	2018/19	16.7	30	6.5
2019/20	(7.7)	13	(33.3)	3	(0.0)	2	2019/20	12.5	16	9.0

9.0 Final 5yr average
6.6 SD

(3) Kittiwake

	Subregion 8		Subregion 9		subregion 10		National (8+9)			
	ratio	n=	ratio	n=	ratio	n=	ratio	n=		
1977/78	83.3	102	(50.0)	23			1977/78	71.2	125	
1978/79	53.7	54	(100.0)	7			1978/79	59.0	61	
1979/80	73.7	114	76.7	30	(0.0)	0	1979/80	74.3	144	
1980/81	89.6	1371	92.3	209	84.2	184	1980/81	89.9	1580	73.6
1981/82	76.9	147	79.2	53	90.6	64	1981/82	77.5	200	74.4
1982/83	84.5	969	82.2	202	82.1	262	1982/83	84.1	1171	77.0
1983/84	88.8	1750	80.7	119	82.4	142	1983/84	88.3	1869	82.8
1984/85	68.0	175	78.8	66	(84.6)	13	1984/85	71.0	241	82.2
1985/86	65.5	252	75.0	44	74.2	31	1985/86	66.9	296	77.5
1986/87	73.2	82	(77.8)	9	(20.0)	5	1986/87	73.6	91	76.8
1987/88	75.8	124	69.7	33	54.5	33	1987/88	74.5	157	74.9
1988/89	66.7	102	(57.9)	19	(41.2)	17	1988/89	65.3	121	70.3
1989/90	59.8	132	(68.8)	16	(37.5)	16	1989/90	60.8	148	68.2
1990/91	64.5	124	(71.4)	14	(75.0)	4	1990/91	65.2	138	67.9
1991/92	67.3	55	(85.7)	14	(50.0)	6	1991/92	71.0	69	67.4
1992/93	32.4	182	32.1	28	38.9	36	1992/93	32.4	210	58.9
1993/94	53.5	43	61.3	31	(46.7)	15	1993/94	56.8	74	57.2
1994/95	81.4	43	(100.0)	11	(66.7)	15	1994/95	85.2	54	62.1
1995/96	(50.0)	20	(100.0)	3	(0.0)	2	1995/96	56.5	23	60.4
1996/97	63.6	33	(66.7)	6	(0.0)	0	1996/97	64.1	39	59.0
1997/98	42.1	114	57.7	26	(33.3)	15	1997/98	45.0	140	61.5
1998/99	51.1	131	58.5	65	40.0	35	1998/99	53.6	196	60.9
1999/00	61.9	134	61.0	82	42.5	40	1999/00	61.6	216	56.2
2000/01	46.4	28	37.5	16	(25.0)	4	2000/01	43.2	44	53.5
2001/02	46.3	108	25.7	74	34.0	47	2001/02	37.9	182	48.2
2002/03	85.8	106	34.3	35	(68.8)	16	2002/03	73.0	141	53.9
2003/04	67.6	37	45.2	31	(20.0)	10	2003/04	57.4	68	54.6
2004/05	34.8	69	44.8	29	10.8	37	2004/05	37.8	98	49.9
2005/06	(38.5)	13	(28.6)	7	(0.0)	5	2005/06	35.0	20	48.2
2006/07	(13.6)	22	(36.8)	19	(9.1)	11	2006/07	24.4	41	45.5
2007/08	(0.0)	4	(0.0)	12	(11.8)	17	2007/08	0.0	16	30.9
2008/09	(50.0)	4	(42.9)	14	(0.0)	1	2008/09	44.4	18	28.3
2009/10	(0.0)	7	(0.0)	6	(0.0)	0	2009/10	0.0	13	20.8
2010/11	(20.0)	5	(40.0)	5	(0.0)	0	2010/11	30.0	10	19.8
2011/12	3.3	151	10.2	49	0.0	28	2011/12	5.0	200	15.9
2012/13	(0.0)	20	(0.0)	9	(0.0)	3	2012/13	0.0	29	15.9
2013/14	(0.0)	1	(20.0)	5	(0.0)	0	2013/14	16.7	6	10.3
2014/15	(0.0)	0	(0.0)	0	(0.0)	0	2014/15		0	12.9
2015/16	(0.0)	1	(0.0)	15	(0.0)	4	2015/16	0.0	16	5.4
2016/17	(0.0)	1	(0.0)	1	(0.0)	0	2016/17	0.0	2	4.2
2017/18	(0.0)	9	(16.7)	6	(0.0)	4	2017/18	6.7	15	5.8
2018/19	(0.0)	7	(14.3)	21	(0.0)	3	2018/19	10.7	28	4.3
2019/20	(25.0)	4	(0.0)	2	(0.0)	2	2019/20	16.7	6	6.8

6.8 5yr average
7.2 SD

(4) Northern Fulmar

	Subregion 8		Subregion 9		subregion 10		National (8+9)			
	ratio	n=	ratio	n=	ratio	n=	ratio	n=		
1977/78	76.0	25	(60.0)	23		0	1977/78	45.8	48	
1978/79	58.8	34	(75.0)	8		0	1978/79	61.9	42	
1979/80	59.3	27	(33.3)	9	()	0	1979/80	52.8	36	
1980/81	81.6	256	67.2	58	84.2	38	1980/81	79.0	314	59.9
1981/82	61.5	52	(36.8)	19	(65.2)	23	1981/82	54.9	71	58.9
1982/83	72.4	58	(65.0)	20	(66.7)	12	1982/83	70.5	78	63.8
1983/84	81.1	169	(75.0)	16	(66.7)	15	1983/84	80.5	185	67.5
1984/85	(66.7)	24	(66.7)	18	(100.0)	1	1984/85	66.7	42	70.3
1985/86	43.8	80	53.3	30	(37.5)	8	1985/86	46.4	110	63.8
1986/87	(22.2)	9	(50.0)	6	(0.0)	1	1986/87	33.3	15	59.5
1987/88	63.9	166	46.8	77	35.7	28	1987/88	58.4	243	57.1
1988/89	61.0	82	68.4	38	(25.0)	16	1988/89	63.3	120	53.6
1989/90	50.0	34	(66.7)	6	(0.0)	1	1989/90	52.5	40	50.8
1990/91	(36.4)	11	()	0	()	0	1990/91	36.4	11	48.8
1991/92	63.6	44	78.8	52	(33.3)	6	1991/92	71.9	96	56.5
1992/93	40.7	27	(12.5)	8	(33.3)	12	1992/93	34.3	35	51.7
1993/94	(33.3)	12	(66.7)	9	(50.0)	2	1993/94	47.6	21	48.5
1994/95	(57.1)	21	(30.8)	13	(63.6)	11	1994/95	47.1	34	47.4
1995/96	(50.0)	12	(25.0)	8	(100.0)	1	1995/96	40.0	20	48.2
1996/97	(38.5)	13	(66.7)	6	()	0	1996/97	47.4	19	43.3
1997/98	29.0	31	19.4	31	(0.0)	2	1997/98	24.2	62	41.2
1998/99	26.3	399	42.1	247	29.9	97	1998/99	32.4	646	38.2
1999/00	43.5	69	43.9	57	(53.8)	13	1999/00	43.7	126	37.5
2000/01	(12.5)	16	22.2	27	(0.0)	4	2000/01	18.6	43	33.2
2001/02	21.3	244	30.8	78	25.0	28	2001/02	23.6	322	28.5
2002/03	67.9	28	(12.5)	24	(0.0)	4	2002/03	42.3	52	32.1
2003/04	18.4	103	10.6	161	3.6	28	2003/04	13.6	264	28.4
2004/05	14.7	34	15.0	40	(16.7)	18	2004/05	14.9	74	22.6
2005/06	4.2	24	(15.0)	20	(0.0)	4	2005/06	9.1	44	20.7
2006/07	12.0	25	(0.0)	10	(0.0)	10	2006/07	8.6	35	17.7
2007/08	(0.0)	5	(20.0)	20	(7.7)	13	2007/08	16.0	25	12.4
2008/09	(7.4)	27	10.9	55	(0.0)	7	2008/09	9.8	82	11.7
2009/10	(33.3)	3	(6.3)	16	(33.3)	3	2009/10	10.5	19	10.8
2010/11	(0.0)	4	(0.0)	5	()	0	2010/11	0.0	9	9.0
2011/12	3.8	78	1.9	52	(0.0)	13	2011/12	3.1	130	7.9
2012/13	(0.0)	2	(0.0)	3	()	0	2012/13	0.0	5	4.7
2013/14	(0.0)	2	()	0	(0.0)	1	2013/14	0.0	2	2.7
2014/15	(0.0)	0	(0.0)	2	()	0	2014/15	0.0	2	0.6
2015/16	(0.0)	3	(0.0)	10	()	0	2015/16	0.0	13	0.6
2016/17	(0.0)	11	(0.0)	13	(0.0)	3	2016/17	0.0	24	0.0
2017/18	(0.0)	9	(0.0)	2	(0.0)	3	2017/18	0.0	11	0.0
2018/19	(0.0)	4	(12.5)	16	(0.0)	0	2018/19	10.0	20	2.0
2019/20	(0.0)	3	(0.0)	4		0	2019/20	0.0	7	2.0

2.0 5yr average
4.5 SD

(5) Northern Gannet

	Subregion 8		Subregion 9		subregion 10		National (8+9)			
	ratio	n=	ratio	n=	ratio	n=	ratio	n=		
1977/78	(50.0)	12	(66.7)	23			1977/78	28.6	35	
1978/79	(30.0)	20	(50.0)	4			1978/79	33.3	24	
1979/80	(54.2)	24	(14.3)	7	()	0	1979/80	45.2	31	
1980/81	45.3	86	26.9	26	(25.0)	8	1980/81	41.1	112	37.0
1981/82	57.4	47	(45.5)	22	(42.9)	14	1981/82	53.6	69	40.4
1982/83	82.2	90	(69.6)	23	(63.6)	11	1982/83	79.6	113	50.6
1983/84	51.5	66	(66.7)	12	(54.5)	11	1983/84	53.8	78	54.7
1984/85	69.2	26	(53.8)	13	(100.0)	2	1984/85	64.1	39	58.5
1985/86	27.4	62	(30.0)	20	(50.0)	10	1985/86	28.0	82	55.9
1986/87	(61.1)	18	(50.0)	6	(0.0)	1	1986/87	58.3	24	56.8
1987/88	17.8	73	4.7	43	(5.3)	19	1987/88	12.9	116	43.5
1988/89	22.0	41	(33.3)	18	(20.0)	15	1988/89	25.4	59	37.8
1989/90	69.1	55	(80.0)	10	(66.7)	3	1989/90	70.8	65	39.1
1990/91	85.7	49	(100.0)	6	(100.0)	1	1990/91	87.3	55	50.9
1991/92	56.8	37	(52.2)	23	(0.0)	6	1991/92	55.0	60	50.3
1992/93	60.0	40	(22.2)	9	(11.1)	9	1992/93	53.1	49	58.3
1993/94	72.4	29	(70.0)	10	(75.0)	4	1993/94	71.8	39	67.6
1994/95	66.7	27	(40.0)	15	(55.6)	9	1994/95	57.1	42	64.9
1995/96	(40.0)	10	(25.0)	8	()	0	1995/96	33.3	18	54.1
1996/97	(60.0)	20	(71.4)	7	()	0	1996/97	63.0	27	55.7
1997/98	31.3	32	13.8	29	(0.0)	2	1997/98	23.0	61	49.6
1998/99	9.3	324	12.8	164	10.5	76	1998/99	10.5	488	37.4
1999/00	38.1	63	38.5	52	(33.3)	9	1999/00	38.3	115	33.6
2000/01	(26.3)	19	46.2	39	(20.0)	5	2000/01	39.7	58	34.9
2001/02	4.0	200	8.5	59	(0.0)	21	2001/02	5.0	259	23.3
2002/03	74.3	35	(12.5)	24	(0.0)	4	2002/03	49.2	59	28.5
2003/04	3.4	87	4.6	151	0.0	27	2003/04	4.2	238	27.3
2004/05	19.4	36	24.4	45	(6.3)	16	2004/05	22.2	81	24.1
2005/06	(4.2)	24	(19.0)	21	(50.0)	8	2005/06	11.1	45	18.3
2006/07	21.4	28	(9.1)	11	(16.7)	12	2006/07	17.9	39	20.9
2007/08	(28.6)	7	38.5	26	(14.3)	14	2007/08	36.4	33	18.4
2008/09	(3.8)	26	7.5	53	(0.0)	7	2008/09	6.3	79	18.8
2009/10	(33.3)	3	(11.8)	17	(0.0)	2	2009/10	15.0	20	17.4
2010/11	(0.0)	4	(0.0)	5	()	0	2010/11	0.0	9	15.1
2011/12	2.6	77	1.9	52	(0.0)	13	2011/12	2.3	129	12.0
2012/13	(0.0)	2	(0.0)	3	()	0	2012/13	0.0	5	4.7
2013/14	(0.0)	2	()	0	(0.0)	1	2013/14	0.0	2	3.5
2014/15	()	0	(0.0)	2	()	0	2014/15	0.0	2	0.5
2015/16	(0.0)	3	(0.0)	10	()	0	2015/16	0.0	13	0.5
2016/17	(0.0)	11	(0.0)	13	(0.0)	3	2016/17	0.0	24	0.0
2017/18	(10.0)	10	(33.3)	3	(50.0)	6	2017/18	15.4	13	3.1
2018/19	(0.0)	4	(12.5)	16	(0.0)	0	2018/19	10.0	20	5.1
2019/20	(7.1)	14	(0.0)	16	(0.0)	2	2019/20	3.3	30	5.7

5.7 5yr average
6.8 SD