Annex I: Overview of Arctic fulmar results

Recent projects in the Arctic Waters OSPAR region to measure and assess plastic particles and their properties in fulmars (Baak et al., 2021, Collard and Ask 2021, Gavrilo 2019, Linnebjerg et al., 2021) show the increased interest in this plastic indicator. The OSPAR Secretariat approached the fulmar lead to ask whether Arctic fulmar information could be added to the fulmar assessment for the QSR in 2021. Therefore, the national ICG-ML representatives from Iceland, Denmark and Norway, respectively, were asked to fill in a document format with their available fulmar data and a short discussion was held. All these countries kindly supplied their fulmar data in the format (see annex II to IV) and provided a short evaluation of their data. All these countries use the OSPAR fulmar CEMP guidelines to collect their data (OSPAR 2015). A short summary of the status of the monitoring, the main results and recommendations are given below. Fulmars can in some parts of the North Atlantic and the Arctic oceans also be collected as by-catch by fishermen or by hunting. A previous study has indicated that cause of death did not affect the quantity of plastics in fulmars (van Franeker & Meilboom, 2002).

Iceland reports monitoring plastics in fulmars since 2018 and has produced a substantial amount of fulmar data. In addition, earlier studies were performed in 2011 and 2013-2014, respectively. Therefore, Iceland could have sufficient (five years) of monitoring data by the end of 2022 to perform a formal fulmar assessment. In addition, the inclusion of the older data may enable a trend analysis over a longer period of time. The plastic levels in fulmars in Iceland in the period 2018-2019 are above the Fulmar Threshold Value (Fulmar-TV).

Denmark has reported a substantial set of fulmar research data for the east of Greenland in 2017. The results from this research project suggest that the Fulmar-TV could be reached. However, it must be noted clearly that in total five years of fulmar data are necessary to perform a reliable fulmar assessment to average out year-to-year variations.

Norway has provided a substantial set of Arctic fulmar data. Unfortunately, this dataset is mostly from 2013, and therefore does not present the more recent status of the fulmar plastic loads. Furthermore, the coordinates and in some case sampling dates of the fulmar samples are missing. Therefore, the current Norwegian fulmar data are unfortunately not suitable for a formal fulmar assessment.

References

Baak, J.E., Linnebjerg, M., Mallory, M., Barry, T., Gavrilo, M., Merkel, F.R., Price, C., Provencher, J.F., 2021. Plastic pollution in seabirds, Developing a program to monitor plastic pollution in seabirds in the pan-Arctic region. Conservation of Arctic Flora and Fauna (CAFF) International Secretariat, Akureyri, Iceland, pp 32 ISBN 978-9935-431-87-5.

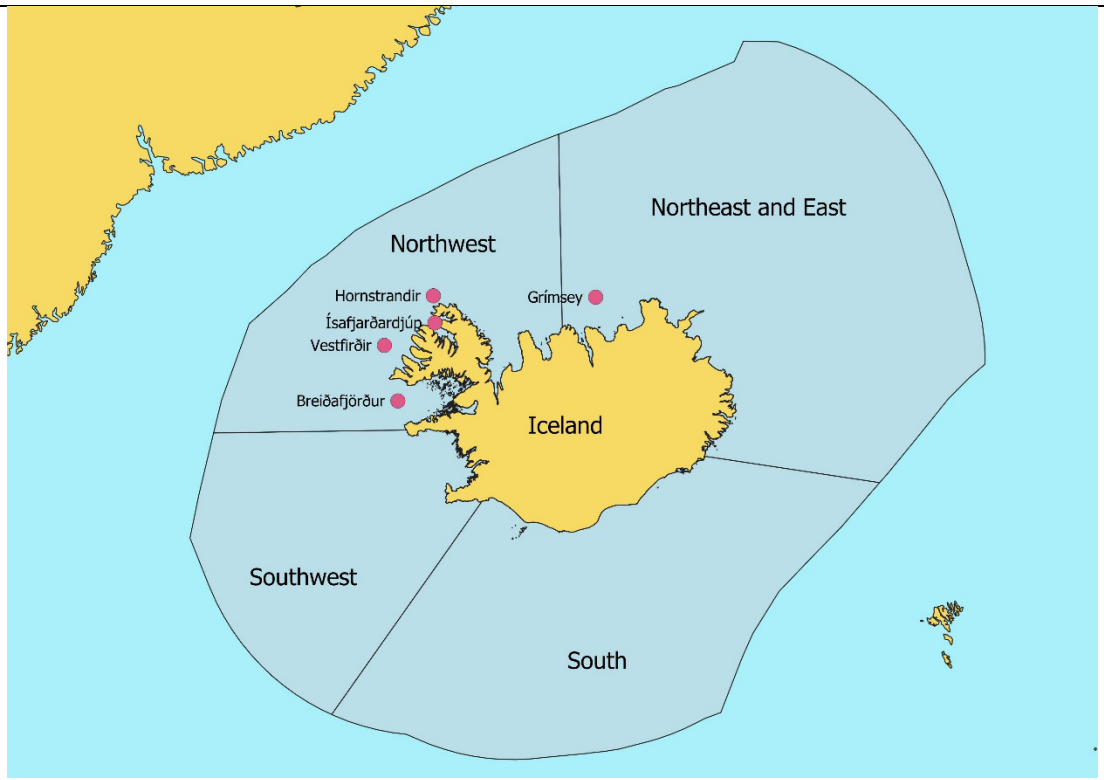
Collard, F., Ask, A., 2021. Plastic ingestion by Arctic fauna: A review. Science of The Total Environment 786: 147462 doi https://doi.org/10.1016/j.scitotenv.2021.147462

Gavrilo, M., 2019. Plastic Pollution and Seabirds in the Russian Arctic, Workshop Report. Arctic Migratory Birds Initiative & Conservation of Arctic Flora and Fauna (CAFF) International Secretariat, Akureyri, Iceland, pp 24

Linnebjerg, M., Baak, J.E., Barry, T., Gavrilo, M., Mallory, M., Merkel, F., Price, C., Strand, J., Walker, T., Provencher, J.F., 2021. Review of plastic pollution policies of Arctic countries in relation to seabirds. Conservation of Arctic Flora and Fauna (CAFF) International Secretariat, Akureyri, Iceland pp 40 ISBN 978-9935-431-89-9

OSPAR, 2015. Guidelines for Monitoring and Assessment of plastic particles in stomachs of fulmars in the North Sea area, OSPAR Agreement 2015-03, pp 26 doi http://www.ospar.org/convention/agreements?q=fulmar&t=32281&a=&s (Update 2019)

Annex II. Additional fulmar results for the Arctic Region: ICELAND

Country-OSPAR region	Iceland-Arctic Ocean
Fulmar plastics monitoring method	CEMP Guidelines for Monitoring and Assessment of plastic particles in stomachs of fulmars in the North Sea area
Sampling locations	
Results	

Location name	X-coord	Y-coord	Sampling date	Total mass of plastics [g]	Mass of user plastics
Grímsey	-17,96	66,55	2018-05-17	0,0000	0,0000
Grímsey	-17,96	66,55	2018-05-17	0,0208	0,0208
Grímsey	-17,96	66,55	2018-05-17	0,0174	0,0174
Grímsey	-17,96	66,55	2018-05-17	0,0000	0,0000
Grímsey	-17,96	66,55	2018-05-17	0,0029	0,0029
Grímsey	-17,96	66,55	2018-05-17	0,0000	0,0000
Grímsey	-17,96	66,55	2018-05-17	0,3193	0,2598
Grímsey	-17,96	66,55	2018-05-17	0,0009	0,0009
Grímsey	-17,96	66,55	2018-05-17	0,0219	0,0219
Grímsey	-17,96	66,55	2018-05-17	0,0355	0,0355
Grímsey	-17,96	66,55	2018-05-17	0,0000	0,0000
Grímsey	-17,96	66,55	2018-05-17	0,0000	0,0000
Grímsey	-17,96	66,55	2018-05-17	0,0187	0,0187
Grímsey	-17,96	66,55	2018-05-17	0,0000	0,0000

	Grímsey	-17,96	66,55	2018-05-17	0,0025	0,0025
	Grímsey	-17,96	66,55	2018-05-17	0,0000	0,0000
	Grímsey	-17,96	66,55	2018-05-17	0,0008	0,0008
	Grímsey	-17,96	66,55	2018-05-17	0,0096	0,0096
	Grímsey	-17,96	66,55	2018-05-17	0,3220	0,3220
	Grímsey	-17,96	66,55	2018-05-17	0,2197	0,2197
	Grímsey	-17,96	66,55	2018-05-17	0,0129	0,0129
	Grímsey	-17,96	66,55	2018-05-17	0,1355	0,1165
	Hornstrandir	-23,12	66,57	2018-05-17	0,2994	0,2635
	Hornstrandir	-23,12	66,57	2018-05-17	0,0120	0,0120
	Hornstrandir	-23,12	66,57	2018-05-17	0,0702	0,0702
	Hornstrandir	-23,12	66,57	2018-05-17	0,0024	0,0024
	Hornstrandir	-23,12	66,57	2018-05-17	0,0000	0,0000
	Hornstrandir	-23,12	66,57	2018-05-17	0,0299	0,0299
	Hornstrandir	-23,12	66,57	2018-05-17	0,0334	0,0334
	Hornstrandir	-23,12	66,57	2018-05-14	0,0000	0,0000
	Hornstrandir	-23,12	66,57	2018-05-14	0,0047	0,0047
	Hornstrandir	-23,12	66,57	2018-05-14	0,0152	0,0152
	Northwest - precise location unknown			2018-05-05	0,0347	0,0347
	Northwest - precise location unknown			2018-05-05	0,0000	0,0000
	Northwest - precise location unknown			2018-05-05	0,0000	0,0000
	Hornstrandir	-23,12	66,57	2018-05-17	0,0356	0,0356
	Hornstrandir	-23,12	66,57	2018-05-17	0,0000	0,0000
	Hornstrandir	-23,12	66,57	2018-05-17	0,0502	0,0220
	Hornstrandir	-23,12	66,57	2018-05-14	0,2320	0,2320
	Hornstrandir	-23,12	66,57	2018-05-14	0,0000	0,0000
	Hornstrandir	-23,12	66,57	2018-05-14	0,0020	0,0020
	Hornstrandir	-23,12	66,57	2018-05-16	0,0075	0,0075
	Hornstrandir	-23,12	66,57	2018-05-16	0,1195	0,1195
	Hornstrandir	-23,12	66,57	2019-04-09	0,0162	0,0162
	Hornstrandir	-23,12	66,57	2019-04-09	0	0
	Hornstrandir	-23,12	66,57	2019-04-09	0	0
	Hornstrandir	-23,12	66,57	2019-04-09	0	0
	Hornstrandir	-23,12	66,57	2019-04-09	0,0661	0,0303
	Hornstrandir	-23,12	66,57	2019-04-09	0	0
	Hornstrandir	-23,12	66,57	2019-04-09	0	0
	Hornstrandir	-23,12	66,57	2019-04-09	0,0628	0,0628
	Hornstrandir	-23,12	66,57	2019-04-08	0	0
	Ísafjarðardjúp	-23,08	66,22	2019-03-11	0,0055	0,0055
	Ísafjarðardjúp	-23,08	66,22	2019-03-11	0,005	0,005
	Hornstrandir	-23,12	66,57	2019-04-08	2,5731	2,5286
	Hornstrandir	-23,12	66,57	2019-04-08	0,1412	0,1412

	Hornstrandir	-23,12	66,57	2019-04-08	0,02059	0,0189
	Hornstrandir	-23,12	66,57	2019-04-08	0,0346	0,0346
	Hornstrandir	-23,12	66,57	2019-04-08	2,4604	2,4481
	Hornstrandir	-23,12	66,57	2019-04-08	0,0132	0,0132
	Hornstrandir	-23,12	66,57	2019-04-08	0,0029	0,0029
	Hornstrandir	-23,12	66,57	2019-04-08	0,0375	0,0375
	Hornstrandir	-23,12	66,57	2019-04-08	0,1601	0,1601
	Hornstrandir	-23,12	66,57	2019-04-08	0	0
	Ísafjarðardjúp	-23,08	66,22	2019-03-19	0,0725	0,0526
	Ísafjarðardjúp	-23,08	66,22	2019-03-19	0	0
	Vestfirðir	-24,68	65,93	2019-03-14	0,006	0,006
	Vestfirðir	-24,68	65,93	2019-03-14	0,0036	0,0036
	Vestfirðir	-24,68	65,93	2019-03-14	0	0
	Vestfirðir	-24,68	65,93	2019-03-14	0,1042	0,1042
	Vestfirðir	-24,68	65,93	2019-03-14	0	0
	Vestfirðir	-24,68	65,93	2019-03-14	0,0333	0,0333
	Vestfirðir	-24,68	65,93	2019-03-14	0,2321	0,1526
	Vestfirðir	-24,68	65,93	2019-03-14	0,0239	0,0239
	Hornstrandir	-23,12	66,57	2019-04-05	0	0
	Hornstrandir	-23,12	66,57	2019-04-05	0,0659	0,0659
	Ísafjarðardjúp	-23,08	66,22	2019-03-24	0,1196	0,0946
	Ísafjarðardjúp	-23,08	66,22	2019-03-24	0	0
	Ísafjarðardjúp	-23,08	66,22	2019-03-24	0,0106	0,0106
	Ísafjarðardjúp	-23,08	66,22	2019-03-24	0,0123	0,0123
	Ísafjarðardjúp	-23,08	66,22	2019-03-24	0,0392	0,0392
	Ísafjarðardjúp	-23,08	66,22	2019-03-24	0	0
	Hornstrandir	-23,12	66,57	2019-05-14	0	0
	Hornstrandir	-23,12	66,57	2019-05-14	0,0075	0,0075
	Hornstrandir	-23,12	66,57	2019-04-08	0	0
	Hornstrandir	-23,12	66,57	2019-04-08	0,0063	0,0063
	Hornstrandir	-23,12	66,57	2019-04-08	0,0293	0,0293
	Hornstrandir	-23,12	66,57	2019-04-08	0,0018	0,0018
	Hornstrandir	-23,12	66,57	2019-04-08	0	0
	Hornstrandir	-23,12	66,57	2019-04-08	0,0015	0,0015
	Hornstrandir	-23,12	66,57	2019-04-08	0	0
	Hornstrandir	-23,12	66,57	2019-04-08	0	0
	Hornstrandir	-23,12	66,57	2019-04-08	0,0219	0,0219
	Hornstrandir	-23,12	66,57	2019-04-08	0	0
	Northeast - precise location unknown			2019-05-03	0,0223	0,0223
	Northeast - precise location unknown			2019-05-03	0,0151	0
TV performance	Assessment period: 2018 - 2019 %fulmars >0,1 g: 14,6 %					

Discussion	These results are from the first two years of an ongoing monitoring project of plastics ingestion by fulmars around Iceland[1,2]. All samples come from longline victims collected from fishing vessels with home ports at Bolungarvik (NW) and Husavik (NE). The collection period in both years was from March through May. There is no difference in the quantity of plastics between the two collection areas. There exist two previous studies on plastics ingestion by fulmars in Iceland, from 2011 and 2013-2014[3,4]. Both of them show higher rates of plastics, 28% and 48% fulmars with >0,1 g plastics respectively. All these studies show that plastic ingestion by fulmars in Iceland is exceeding OSPAR's EcoQO (less than 10% of fulmars having more than 0,1 g of ingested plastic)[5].
Conclusions	Plastic ingestion by fulmars in Iceland is exceeding OSPAR's EcoQO, i.e. less than 10% of fulmars having more than 0,1 g of ingested plastic[5].
References	[1] Snæþórsson, A. Ö. 2018. Plast í meltingarvegi fýla við Ísland árið 2018. Náttúrustofa Norðausturlands, NNA-1808. http://nna.is/wp-content/uploads/2018/06/1808-Plast-%C3%AD-meltingarvegi-f%C3%BDla-vi%C3%B0-%C3%8Dsland-%C3%A1ri%C3%B0-2018.pdf. [2] Snæþórsson, A. Ö. 2019. Plast í meltingarvegi fýla við Ísland árið 2019. Náttúrustofa Norðausturlands, NNA-1904. https://www.ust.is/library/Skrar/Atvinnulif/Haf-og-vatn/Plast%20%C3%AD%20meltingarvegi%20f%C3%BDla%20vi%C3%B0%20%C3%8Dsland%20%C3%A1ri%C3%B0%202019.pdf. [3] Kühn, S., and J. A. van Franeker. 2012. Plastic ingestion by the northern fulmar (Fulmarus glacialis) in Iceland. Marine Pollution Bulletin 64:1252-1254. https://doi.org/10.1016/j.marpolbul.2012.02.027. [4] Trevail, A., G. W. Gabrielsen, S. Kühn, A. Bock, and J. A. van Franeker. 2015. Plastic ingestion by northern fulmars, *Fulmarus glacialis*, in Svalbard and Iceland, and relationships between plastic ingestion and contaminant uptake. Norwegian Polar Institute. https://doi.org/10.1007/s00300-015-1657-4. [5] OSPAR. 2008. Background document for the EcoQO on plastic particles in stomachs of seabirds. OSPAR Commission, Biodiversity Series, publication 355. https://www.ospar.org/ospar-data/p00355_ecoqo%20plastics%20in%20seabird%20stomachs.pdf.

Annex III. Additional fulmar results for the Arctic Region: GREENLAND

Country-OSPAR region	Greenland/Denmark - Arctic Ocean
Fulmar plastics monitoring method	CEMP Guidelines for Monitoring and Assessment of plastic particles in stomachs of fulmars in the North Sea area Northern fulmars (n = 31) were collected in North-East Greenland by hunting during the Danish NEG-cruise in 2017 coordinated by Aarhus University
Sampling locations	
Results	

Bird ID	Location name	X-coord[1]	Y-coord	Sampling date	Total mass of plastics [g]	Mass of user plastics[2]
NEG-1-60679	NE Greenland	75,86	-17,92	2017-09-04	0,0221	0,0221
NEG-2-60680	NE Greenland	75,86	-17,92	2017-09-04	0,1737	0,1737
NEG-3-60681	NE Greenland	75,86	-17,92	2017-09-04	0,0466	0
NEG-4-60683	NE Greenland	75,86	-17,92	2017-09-04	0,0643	0,0643
NEG-5-60692	NE Greenland	75,86	-17,92	2017-09-04	0,0648	0,0648
NEG-6-60693	NE Greenland	75,86	-17,92	2017-09-04	0,0068	0,0068
NEG-7-60694	NE Greenland	75,42	-11,46	2017-09-09	0,038	0,038
NEG-8-60695	NE Greenland	75,42	-11,46	2017-09-09	0	0
NEG-9-60696	NE Greenland	75,42	-11,46	2017-09-09	0,6359	0,5836
NEG-10-60697	NE Greenland	75,42	-11,46	2017-09-09	0,0228	0,0228
NEG-11-60698	NE Greenland	75,42	-11,46	2017-09-09	0,0484	0,0484
NEG-12-60699	NE Greenland	75,42	-11,46	2017-09-09	0,0108	0,0108
NEG-13-60751	NE Greenland	78,80	-6,73	2017-08-25	0,011	0,011
NEG-14-60752	NE Greenland	78,80	-6,73	2017-08-25	0,0595	0,0213
NEG-15-60753	NE Greenland	78,80	-6,73	2017-08-25	0	0
NEG-16-60754	NE Greenland	78,80	-6,73	2017-08-25	0,0067	0,0067
NEG-17-60755	NE Greenland	78,80	-6,73	2017-08-25	0,0203	0,0007

NEG-18-60758	NE Greenland	78,50	-6,29	2017-08-26	0,0204	0,0204
NEG-19-60759	NE Greenland	78,50	-6,29	2017-08-26	0,0258	0,0258
NEG-20-60760	NE Greenland	78,50	-6,29	2017-08-26	0,0244	0,0244
NEG-21-60763	NE Greenland	78,50	-6,29	2017-08-26	0,006	0,006
NEG-22-60788	NE Greenland	76,98	-15,17	2017-09-01	0,0045	0,0045
NEG-23-60789	NE Greenland	76,98	-15,17	2017-09-01	0,0025	0,0025
NEG-24-60790	NE Greenland	76,98	-15,17	2017-09-01	0,3336	0,3035
NEG-25-60792	NE Greenland	76,98	-15,17	2017-09-01	0,0034	0,0034
NEG-26-60793	NE Greenland	76,98	-15,17	2017-09-01	0,0048	0,0048
NEG-27-60795	NE Greenland	76,98	-15,17	2017-09-01	0	0
NEG-28-60796	NE Greenland	76,98	-15,17	2017-09-01	0,0006	0,0006
NEG-29-60797	NE Greenland	76,98	-15,17	2017-09-01	0,0619	0,0205
NEG-30-60798	NE Greenland	75,42	-11,46	2017-09-09	0,0793	0,0793
NEG-31-60800	NE Greenland	76,98	-15,17	2017-09-01	0,0066	0,0066

1. Coordinate system: LAT LONG, standard GPS format/decimals
2. Excluding industrial plastics (pellets)

TV performance	Assessment period: 2017 %fulmars >0,1 g: 9,7 %
Discussion	The levels of plastic contents in northern fulmars collected in North-East Greenland in 2017 were below the OSPAR EcoQO indicating that the population inhabiting this area is less exposed to plastic. This can be due to the fact that the south-going ocean current from the central Arctic ocean is dominating in the area, and therefore less affected by plastic transported with the Gulf current entering the Arctic from the North Atlantic ocean. The relative contribution of pellets compared to the total plastic contents is significantly lower than in other areas also indicating that the North-East Greenlandic birds are less exposed to plastic transported from industrial areas.
Conclusions	The levels of plastic contents in the fulmars collected in North-East Greenland in 2017 were below the OSPAR EcoQO and may therefore be regarded as a relevant reference site for the fulmar monitoring in the OSPAR Region.
References	These data were generated within the DANCEA-funded SUMAG-project, contact: Jakob Strand, Aarhus University, Denmark, jak@bios.au.dk Ask A., Cusa M., Danielsen J., Gabrielsen GW, Strand J., 2020. Plastic characterization in northern fulmars (*Fulmarus glacialis*), Nordic Council of Ministers, TemaNord report No. 2020:537, 29pp, http://dx.doi.org/10.6027/temanord2020-537 Strand et al., Characterisation of plastic contents in northern fulmars from different locations in West and East Greenland, in prep.

Annex IV. Additional fulmar results for the Arctic Region: NORWAY

Country-OSPAR region	NORWAY-Arctic Ocean
Fulmar plastics monitoring method	CEMP Guidelines for Monitoring and Assessment of plastic particles in stomachs of fulmars in the North Sea area
Sampling locations	Small map of country-sub-region + locations where fulmars were sampled

The fulmar sample data provided in this annex (N = 98) originate exclusively from by-catch in the longline fishery. For most of the birds, the exact coordinates are unknown, other than that the fishing vessels operated north of Lofoten approximately within the area marked in red. The white star marks the location of a small sample of birds (N = 5) for which coordinates were reported.

Results

Location name	X-coord[1]	Y-coord	Sampling date	Total mass of plastic [g]	Mass of user plastic
Eggakanten west of Vannøya			2013-06-19	0,1067	0,1067
Eggakanten west of Vannøya			2013-06-19	0,3322	0,3187
Eggakanten west of Vannøya			2013-06-19	0	0
Eggakanten west of Vannøya			2013-06-19	0,2274	0,2099

	Eggakanten west of Vannøya			2013-06-19	0,2138	0,1177
	Eggakanten west of Vannøya			2013-05-27	0,0456	0,0456
	Eggakanten west of Vannøya			2013-05-27	0,5937	0,4869
	Eggakanten west of Vannøya			2013-05-27	0,1986	0,1521
	Eggakanten west of Vannøya			na	0	0
	Eggakanten west of Vannøya			na	0,0147	0,0147
	Eggakanten west of Vannøya			2013-05-31	0	0
	Eggakanten west of Vannøya			2013-05-27	0,0066	0,0066
	Eggakanten west of Vannøya			na	0	0
	Eggakanten west of Vannøya			na	0,0099	0,0099
	Eggakanten west of Vannøya			na	0	0
	North of Lofoten	11,74583	67,50278	2013-05-14	0,1155	0,0894
	North of Lofoten	11,74583	67,50278	2013-05-16	0,0922	0,0922
	North of Lofoten	11,74583	67,50278	2013-05-23	0,2264	0,2264
	North of Lofoten	11,74583	67,50278	2013-05-23	0,0008	0,0008
	North of Lofoten	11,74583	67,50278	2013-05-23	0	0
	North of Lofoten			2012-06-01	0,0053	0,0053
	North of Lofoten			2012-06-11	0,0201	0,0201
	North of Lofoten			2012-06-01	0,0614	0,0614
	North of Lofoten			2012-06-08	0	0
	North of Lofoten			2013-06-10	0,0098	0,0098
	North of Lofoten			2013-06-10	0	0
	North of Lofoten			2013-06-10	0,3498	0,3299
	North of Lofoten			2013-06-10	0,0049	0,0049
	North of Lofoten			2013-06-10	0,2104	0,2083
	North of Lofoten			2013-06-10	0,0904	0,0904
	North of Lofoten			2013-06-10	0,1103	0,1103
	North of Lofoten			2013-05-27	0,5711	0,5339
	North of Lofoten			2013-06-04	0,1142	0,1142
	Eggakanten west of Vannøya			2013-07-30	0,1679	0,1679
	Eggakanten west of Vannøya			2013-07-30	0	0
	Eggakanten west of Vannøya			2013-07-30	0,0486	0,0486
	Eggakanten west of Vannøya			2013-07-30	0,0134	0,0134

	Eggakanten west of Vannøya			2013-07-30	0	0
	Eggakanten west of Vannøya			2013-07-30	0,0965	0,0965
	Eggakanten west of Vannøya			2013-07-30	0,0078	0,0078
	Eggakanten west of Vannøya			2013-07-30	0,012	0,012
	Eggakanten west of Vannøya			2013-07-30	0,0483	0,0483
	Eggakanten west of Vannøya			2013-07-30	0,0782	0,0782
	Eggakanten west of Vannøya			2013-07-30	0,0041	0,0041
	Eggakanten west of Vannøya			2013-07-30	0,2146	0,162
	Eggakanten west of Vannøya			2013-07-30	0,0348	0,0348
	Eggakanten west of Vannøya			2013-07-30	0,0284	0,0284
	Eggakanten west of Vannøya			2013-07-30	0,0162	0,0162
	Eggakanten west of Vannøya			2013-07-30	0,118	0,118
	Eggakanten west of Vannøya			2013-07-30	0,0189	0,0189
	Eggakanten west of Vannøya			na	0,0069	0,0069
	Eggakanten west of Vannøya			na	0,1061	0,1061
	Eggakanten west of Vannøya			na	0	0
	Eggakanten west of Vannøya			na	0	0
	Eggakanten west of Vannøya			na	0,0064	0,0064
	Eggakanten west of Vannøya			na	0	0
	Eggakanten west of Vannøya			na	0	0
	Eggakanten west of Vannøya			na	0,0222	0,0222
	Eggakanten west of Vannøya			na	0,0302	0,0091
	Eggakanten west of Vannøya			na	0,0686	0,0686
	Eggakanten west of Vannøya			na	0,0656	0,0656
	Eggakanten west of Vannøya			na	0,1090	0,0487

	Eggakanten west of Vannøya			na	0,1600	0,1401
	Eggakanten west of Vannøya			na	0,1904	0,1648
	Eggakanten west of Vannøya			na	0,4303	0,3916
	Eggakanten west of Vannøya			na	0,0516	0,0516
	Eggakanten west of Vannøya			na	0,0542	0,0542
	Eggakanten west of Vannøya			na	0,2278	0,2278
	North of Lofoten			2013-05-03	0,0033	0,0033
	North of Lofoten			2013-05-27	0,1919	0,1919
	North of Lofoten			2013-05-30	0,3560	0,2586
	North of Lofoten			2013-05-30	0,0752	0,0437
	North of Lofoten			2017	0,0516	0,0516
	North of Lofoten			2017	1,4559	1,3458
	North of Lofoten			2017	0,2626	0,2367
	North of Lofoten			2017	0,0134	0,0134
	North of Lofoten			2017	4,7301	4,6835
	North of Lofoten			2017	0,2382	0,2029
	North of Lofoten			2017	0,0625	0,0604
	North of Lofoten			2017	0,2814	0,2421
	North of Lofoten			2017	0,0299	0,0299
	North of Lofoten			2017	0,0054	0,0054
	North of Lofoten			2017	0,1149	0,1149
	North of Lofoten			2017	0,0026	0,0026
	North of Lofoten			2017	0,009	0,009
	Vesterålsbankene			2017	0	0
	North of Lofoten			2017	0,0966	0,0966
	Vesterålsbankene			2017	0	0
	Vesterålsbankene			2017	0	0
	North of Lofoten			2017	0,1666	0,0952
	North of Lofoten			2017	0,0375	0,0375
	Vesterålsbankene			2017	0,0019	0,0019
	North of Lofoten			2017	0,0207	0,0207
	North of Lofoten			2017	0,0208	0,0208
	North of Lofoten			2017	0,0343	0,0343
	North of Lofoten			2017	0,0303	0,0303
	North of Lofoten			2017	0,0044	0,0044
	Vesterålsbankene			2017	0	0

1. Coordinate system: LAT LONG, standard GPS format/decimals
2. Excluding industrial plastics (pellets)

TV performance	Assessment period: 2012, 2013 and 2017 %fulmars >0,1 g: 31,6 % in total.
Discussion	No significant differences were found in the number of birds exceeding the fulmar threshold value of 0,1 g plastic in their stomachs (hereafter: Fulmar-TV) between 2012/13 and 2017 ($\chi^2 = 0,36$, $p = 0,55$) and therefore the results are not discussed separately by year. The number of birds exceeding the Fulmar-TV is higher in our sample (31,6%) than in the samples of fulmars shot in Kongsfjorden, Svalbard in 2013 (22,5% of birds exceeding the Fulmar-TV; Trevail et al., 2015). In contrast, birds from Southern Norway (N = 115 beached birds collected between 2002 and 2019) showed higher levels of plastic ingestion, with 49,6% exceeding the Fulmar-TV (Dehnhard et al., unpublished data; submitted to OSPAR in 2020). The number of by-caught birds from northern (mainland) Norway that exceeded the Fulmar-TV was similar to the data reported from Iceland from 2011 (28% of birds exceeding the Fulmar-TV; Kühn et al., 2012), but higher than those from recent years in Iceland (16 and 13% for 2018 and 2019, respectively; Snæþórsson 2018; 2019).
Conclusions	The number of birds exceeding the Fulmar-TV from the mainland Norway sample reflects the general tendency of a gradient towards less plastic in fulmar stomachs in the Arctic (van Franeker et al., 2021). Investigating stomach contents of more recently by-caught birds could provide useful information as to whether there is an increase or decrease in the amount of ingested plastic over time. This would also be interesting given the seemingly decreasing trend in samples from Iceland from 2012 to 2019.
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