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Supplementary material:

Additional information on material and methods

Sampling

Birds were shot with a narrow-gauge shotgun. In the west, except for one gull from Longyearbyen, eiders and gulls were taken at the mouth of Isfjorden around Kapp Linné, while guillemots were taken on Prins Karls Forland. In the north and east eiders were sampled around Kinnvika on Nordaustlandet, gulls at Kinnvika and Kongsøya and guillemots on Kongsøya and Hopen. The ringed seals were shot with rifles. One polar bear was found dead on the ice (emaciated with old skull injuries), the other drowned while under anaesthesia during sampling. Details of individual samples are kept on file at the Swedish Museum of Natural History (SMNH 2011) and summarized in Supplementary Table S1.

Indigenous populations of anadromous, resident and landlocked populations of Arctic char were sampled with gillnets of multiple mesh size in six lakes located along a gradient from Kapp Linné in the south-west, northwards along the west coast of Spitsbergen, the smaller islands of Danskøya and Amsterdamøya, and at Kinnvika and Prins Oscars Land on northern Nordaustlandet in the north-east (Fig. 1), using methods described by Hammar & Filipsson (1985). Supplementary samples of landlocked Arctic char were collected in 1981 from a Shetland loch as a southern and coastal reference in the North Atlantic Ocean. Detailed information on sampling strategies and sites are from Hammar (1982, 1991, 2000) and the field notes of Johan Hammar. Details for individual specimens are summarized in Supplementary Table S2.

Analysis

Extraction and analyses were performed as described by Jensen et al. (1983) with an additional fractionation step (Atuma et al. 1986). The extraction method was developed to extract similar amounts of lipid as the method of Bligh & Dyer (1959). In short: (1) extraction by macerating the samples in organic solvent; (2) determining lipid content; (3) removing lipids by treatment with either (i) concentrated sulphuric acid or (ii) potassium hydroxide (the latter allows determination of a wider range of cyclodienes); (4) separation after polarity using adsorption chromatography; (5) quantification by capillary column gas chromatography with electron capture detection (GC-ECD) using a Varian 3700 gas chromatograph (Varian, Mumbai, India), or, in the case of toxaphene and cyclodienes, by gas chromatography coupled to mass spectrometry (GC-MS) using a Finnigan 4500 spectrometer (Thermo Fisher Scientific, Waltham, MA, USA) using negative ion chemical ionization. GC-MS was also used to confirm results for other analytes if high backgrounds made quantification by GC-ECD difficult.

The analytical method and quality control/quality assurance followed the guidelines of the Swedish national environmental monitoring programme (SNEMP). The comparability of these data with other investigations is, therefore, similar to the comparability within the long environmental monitoring time series of SNEMP. Bignert et al. (1993) have analysed sources of variability in the SNEMP 1968-1990 time series for persistent organic pollutants (POPs) and can be referred to for information on the importance of biological variation vs. the variation in analytical chemical methods. Data from the intercalibration of different quantification methods used over time within the SNEMP time series was used to recalculate the 1980 data to become comparable to the 1971 data (Supplementary Table S8).

Specifically for polychlorinated biphenyl (PCB), 31 individual congeners were determined and the parameter ΣPCB was the sum of the concentrations of these 31 congeners. Standards of the individual organochlorine pesticides were from the US Environmental Protection Agency, while the individual PCB congeners were synthesized in-house (Sundström 1974).

To enable the determination of PCB and organochlorine pesticides in the presence of high concentrations of toxaphene, the extracts were fractionated on deactivated alumina (Atuma et al. 1986). This procedure yields three fractions containing approximately 5, 60 and 35% of the total toxaphene, respectively. Most of the other analytes elute to 100% within one of the three fractions, enabling identification and quantification by GC-ECD or GC-MS against a simplified toxaphene background. Supplementary Fig. S1 shows representative GC-MS chromatograms.

Polychlorinated terphenyls (PCT) were determined according to methods described by Renberg et al. (1978). The PCTs were determined as total-PCT (ΣPCT), the sum of *ortho*-, *meta*- and *para*-isomers of tetradecachloroterphenyl after perchlorination (isomer-specific data could not be reconstructed). For quantification the commercial product Aroclor 5460 was used as an external standard.

Note that detailed concentration data from one glaucous gull collected in 1979 and some other individual data have not been possible to recover. However, as these samples were analysed together with the other samples, the sum parameters should be comparable between all samples.

Principal component analysis

Principal component analyses (PCA) were used to compare pollutant patterns between samples and groups of samples, using MjM Software PC-ORD version 6.07 (www.pcord.com). PCA was done using correlation for the cross-products matrix, and a distance-based biplot was calculated for the response factors such as age and length. Compounds with no or few values above the limit of quantitation were excluded as they do not contribute towards co-occurrence from which patterns are inferred; the interest in the PCA is the patterns of co-occurrence of compounds, not the occurrence of rare compounds. Concentration data were relativized, i.e., the sum of the values per sample equals 1, and each value becomes a proportion of the sum of the total all concentrations of compounds in that sample. This allows comparisons of pollutant patterns between samples, the groups of samples represented by convex hulls in the Euclidean plane of the biplot. The data for polar bear and ringed seals were not included in the PCA because of few samples.

Other results of POPs in Svalbard biota from the early 1980s

Carlberg & Bøler (1985) report concentration data of some organochlorines and heavy metals in biota samples collected in western Svalbard in 1984. This investigation was done "In order to establish a background level of persistent chlorinated hydrocarbons and inorganic elements in biological material from Svalbard before a possible enhanced industrial activity in the area" (Carlberg & Bøler 1985, p. 2). Some of these samples (seals, fish, shrimps, ascidians) were analysed by Jacques Mowrer under the auspice of Sören Jensen, shortly after the Ymer-80 samples and using the same methods (Supplementary Table S9). Unfortunately, it is not possible to reconstruct the data at the same depth as for the Ymer-80 samples; critical documents on quality control/quality assurance (QA/QC) and chromatograms and integrator data are missing and it is not possible to reconstruct concentrations for individual PCB congeners.

A complication in interpreting the data is that, judging from saved hand-written result tables, Carlberg & Bøler (1985) do not present the original data; the data presented have been recalculated. The exact reason is not known, but it is noteworthy that Carlberg & Bøler (1985) also report data on POP concentrations in bird samples analysed in a different laboratory (Norheim & Kjos-Hanssen 1984). These data were produced with packed-column chromatography, and the quantification of PCB was based on one peak (CB153, 2,2',4,4',5,5'-hexachlorobiphenyl) only. It is possible, therefore, that the recalculations were done to make the data produced in the two laboratories comparable within the same report.

Direct comparison between the data from the Ymer-80 samples and the data presented by Carlberg & Bøler (1985) is meaningless. Although we cannot entirely vouch for the QA/QC procedures and that only the total PCB concentrations were determined, it is still worthwhile to present the original quantifications, i.e., the data before recalculation for the report by Carlberg & Bøler (1985). These "original" concentrations (Supplementary Table S9) should give a more relevant comparison with the Ymer-80 samples as well as other, more recently analysed samples. We also include data from two additional ringed seal samples that were not included by

Carlberg & Bøler (1985). However, we stress that critical information is missing and we cannot fully vouch for the accuracy of any of the data in Supplementary Table S9.

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Supplementary Table S1. Sample information for birds and mammals.

Sample No.	Sample code in specimen bank	Species	Sampling location[a]	Body mass (g)	Sex	Tissue	Sample mass (g)	Lipid mass (mg)	Lipid (%)
1	A80/6422	Brünnich's guillemot	Svalbard, Tømmerneset, Kongsøya	920	Male	Muscle	9.93	194.5	1.96
2	A80/6424	Brünnich's guillemot	Svalbard, Kinnvika	890	Male	Muscle	9.98	274.6	2.75
3	A80/6426	Brünnich's guillemot	N 80° 34’ 56” E 41° 34’ 10”	980	Female	Muscle	10.02	271.3	2.71
4	A80/6427	Brünnich's guillemot	Hopen, Beisaren, Hermanseuskardet	920	Male	Muscle	9.93	456.0	4.59
5	A80/6401	Glaucous gull	Svalbard, Kapp Koburg, Kongsøya	1880	Missing	Muscle	9.98	434.1	4.35
6	A80/6454	Glaucous gull	Svalbard, Kinnvika, Claravågen	1605	Missing	Muscle	9.93	310.7	3.13
7	A80/5117 (MA2)	Polar bear[b]	N 81° 00’ E 30° 00’	95000	Male	Muscle	9.96	76.5	0.77
8	MA3	Polar bear[c]	N 80° 09’ E 30° 00’	470000	Male	Muscle	9.99	132.7	1.33
9	A80/6428	Common eider	Svalbard, Kinnvika	2135	Female	Muscle	10.00	303.9	3.04
10	A80/6429	Common eider	Svalbard, Kinnvika	1662	Female	Muscle	9.99	176.4	1.77
11	A80/6430	Common eider	Svalbard, Kinnvika	1955	Female	Muscle	10.21	310.0	3.04
12	A806431	Common eider	Svalbard, Kinnvika	2300	Female	Muscle	9.87	435.0	4.41
13	A80/6432	Common eider	Svalbard, Kinnvika	1875	Female	Muscle	9.96	187.0	1.88
14	C82/6150	Brünnich's guillemot	Svalbard, Prins Karls Forland	Missing	Missing	Muscle	4.89	141.5	2.89
15	C82/6151	Brünnich's guillemot	Svalbard, Prins Karls Forland	Missing	Missing	Muscle	2.03	61.2	3.01
16	C82/6152	Brünnich's guillemot	Svalbard, Prins Karls Forland	Missing	Missing	Muscle	3.71	85.1	2.29
17	C82/6253	Brünnich's guillemot	Svalbard, Prins Karls Forland	Missing	Missing	Muscle	3.14	90.4	2.88
18	C82/6154	Brünnich's guillemot	Svalbard, Prins Karls Forland	Missing	Missing	Muscle	3.78	102.8	2.72
19	C82/6155	Common eider	Svalbard, Kapp Linné	Missing	Missing	Muscle	4.06	138.5	3.41
20	C82/6156	Common eider	Svalbard, Kapp Linné	Missing	Missing	Muscle	5.42	176.4	3.25
21	C82/6157	Common eider	Svalbard, Kapp Linné	Missing	Missing	Muscle	4.06	125.9	3.10
22	C82/6158	Common eider	Svalbard, Kapp Linné	Missing	Missing	Muscle	4.15	102.4	2.47
23	C82/6159	Common eider	Svalbard, Kapp Linné	Missing	Missing	Muscle	5.45	109.6	2.01
24	C82/6160	Glaucous gull	Svalbard, Kapp Linné	Missing	Missing	Muscle	3.17	142.4	4.49
25	C82/6161	Glaucous gull	Svalbard, Kapp Linné	Missing	Missing	Muscle	2.97	226.6	7.63
26	C82/6162	Glaucous gull	Svalbard, Kapp Linné	Missing	Missing	Muscle	4.30	371.5	8.64
27	C82/6163	Glaucous gull	Svalbard, Kapp Linné	Missing	Missing	Muscle	4.30	361.5	8.41
28	C82/6164	Glaucous gull	Svalbard, Kapp Linné	Missing	Missing	Muscle	2.90	127.2	4.39
29	Missing	Glaucous gull[d]	Svalbard, Longyearbyen	Missing	Missing	Muscle	Missing	Missing	Missing
30	C81/6011	Common guillemot[e]	Stora Karlsö, C Baltic	940	Female	Muscle	10.07	337.1	3.35
31	C81/6012	Common guillemot[e]	Stora Karlsö, C Baltic	920	Male	Muscle	10.34	319.0	3.09
32	A81/5012	Ringed seal	Svalbard, N 81° 50’ E 26° 33’	28000	Male	Blubber	5.00	4786.6	95.73
33	C81/5101	Ringed seal	Svalbard, Kongsfjorden	58000	Male	Blubber	5.01	4521.2	90.24

[a] Location as given in the files of the Swedish Natural History Museum. [b] Found dead with skull injuries. Probably starved to death. [c] Drowned at sampling. [d] Sample collected 1979. [e] Samples 30 and 31 were included in the survey for comparison with the Arctic samples. [f] Sample collected 1981.

Supplementary Table S2. Sample information for Arctic char.

Sample no.	Lake	Longitude	Latitude	General System	Date	Individual life history	Length (cm)	Mass (g)	Sex	Age	Lipid (%)
Svalbard											
3	Linnévatn	78° 05' 17" N	13° 51' 20" E	Anadromous	1980-09-09	Smolt	24.6	95	M	12	1.04
4	Linnévatn	78° 05' 17" N	13° 51' 20" E	Anadromous	1980-09-09	Smolt	26.2	137	F	7	2.18
6	Linnévatn	78° 05' 17" N	13° 51' 20" E	Anadromous	1980-09-09	Smolt	20.0	56	M	11	0.372
7	Linnévatn	78° 05' 17" N	13° 51' 20" E	Anadromous	1980-09-09	Resident	14.6	19	F	9	2.35
12	Linnévatn	78° 05' 17" N	13° 51' 20" E	Anadromous	1980-09-09	Resident	13.8	17	F	7	1.5
13	Linnévatn	78° 05' 17" N	13° 51' 20" E	Anadromous	1980-09-09	Resident	13.6	13	M	7	0.987
4	Diesetvatn	79° 06' 34" N	11° 25' 59" E	Anadromous	1979-07-22	Anadromous	48.8	Missing	F	9	2.99
5	Diesetvatn	79° 06' 34" N	11° 25' 59" E	Anadromous	1979-07-22	Anadromous	42.7	Missing	F	8	4.34
6	Jensenvatn	79° 42' 20" N	10° 51' 10" E	Landlocked	1979-07-29	Resident	51.0	1260	M	13	5.19
7	Jensenvatn	79° 42' 20" N	10° 51' 10" E	Landlocked	1979-07-29	Resident	44.0	980	F	11	5.65
8	Jensenvatn	79° 42' 20" N	10° 51' 10" E	Landlocked	1979-07-29	Resident	38.4	590	M	7	11.6
9	Jensenvatn	79° 42' 20" N	10° 51' 10" E	Landlocked	1979-07-29	Resident	57.5	1910	M	17	1.99
10	Jensenvatn	79° 42' 20" N	10° 51' 10" E	Landlocked	1979-07-29	Resident	58.3	1990	M	16	3.69
11	Jensenvatn	79° 42' 20" N	10° 51' 10" E	Landlocked	1979-07-29	Resident	59.0	1800	M	19	2.27
61	Annavatn	79° 45' 43" N	10° 43' 26" E	Landlocked	1981-08-23	Resident	39.2	490	F	22	2.82
62	Annavatn	79° 45' 43" N	10° 43' 26" E	Landlocked	1981-08-23	Resident	39.0	462	F	21	1.71
63	Annavatn	79° 45' 43" N	10° 43' 26" E	Landlocked	1981-08-23	Resident	39.6	562	M	19	2.38
64	Annavatn	79° 45' 43" N	10° 43' 26" E	Landlocked	1981-08-23	Resident	34.9	364	F	21	3.03
65	Annavatn	79° 45' 43" N	10° 43' 26" E	Landlocked	1981-08-23	Resident	40.6	512	M	19	1.76
203	Wibjørnvatn	80° 03' 44" N	18° 15' 39" E	Landlocked	1980-08-20	Resident	43.3	500	M	21	2.79
205	Wibjørnvatn	80° 03' 44" N	18° 15' 39" E	Landlocked	1980-08-20	Resident	42.2	520	M	19	6.03
206	Wibjørnvatn	80° 03' 44" N	18° 15' 39" E	Landlocked	1980-08-20	Resident	41.1	440	M	26	3.75
207	Wibjørnvatn	80° 03' 44" N	18° 15' 39" E	Landlocked	1980-08-20	Resident	38.5	370	M	20	2.96
209	Wibjørnvatn	80° 03' 44" N	18° 15' 39" E	Landlocked	1980-08-20	Resident	39.4	410	F	18	3.84
210	Wibjørnvatn	80° 03' 44" N	18° 15' 39" E	Landlocked	1980-08-20	Resident	36.6	300	M	19	4.05
211	Wibjørnvatn	80° 03' 44" N	18° 15' 39" E	Landlocked	1980-08-20	Resident	41.7	340	M	22	1.6
12	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Smolt?	28.8	160	M	16	3.2
13	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Smolt?	28.9	156	F	19	2.79
14	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Smolt?	28.4	150	F	16	2.8
15	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Smolt?	29.6	198	M	18	2.27
16	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Smolt?	29.5	150	M	15	1.65
17	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Resident?	18.9	54	M	11	3.22
18	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Resident?	12.8	14	M	7	4.59
19	Arkvatn	80° 28' 32" N	22° 49' 42" E	Anadromous	1980-08-16	Resident?	15.4	25	F	13	3.09
Shetland											
1	Girlsta Loch	60° 15' N	01° 13' W	Landlocked	1981-04-29	Resident	21.7	70	F	5	0.99
2	Girlsta Loch	60° 15' N	01° 13' W	Landlocked	1981-04-29	Resident	25.5	102	M	9	0.78
3	Girlsta Loch	60° 15' N	01° 13' W	Landlocked	1981-04-29	Resident	22.7	84	M	6	0.82
4	Girlsta Loch	60° 15' N	01° 13' W	Landlocked	1981-04-29	Resident	22.6	78	F	6	0.79
5	Girlsta Loch	60° 15' N	01° 13' W	Landlocked	1981-04-29	Resident	21.7	74	F	5	1.00

Supplementary Table S3a. Scientific names of the analytes.

Common name / abbreviation	Systematic name	CAS no.
Aldrin	(1*R*,4*S*,4a*S*,5*S*,8*R*,8a*R*)-1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-dimethanonaphthalene	309-00-2
α-Chlordane	1-Exo,2-exo,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene	5103-71-9
γ-Chlordane	1-Exo,2-endo,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene	5566-34-7
α-Chlordene	1,2,3,5,7,8-hexachloro-1,3a,4,5,6,6a hexahydro-, (1α,3aα,4β,5α,6aα)-1,4-ethenopentalene	56534-02-2
γ-Chlordene	2,3,3a,4,5,8-hexachloro-3a,6,7,7a-tetrahydro-(1α,3aβ,6α,7aβ,8*R**)-1,6-methano-1H-indene	97906-34-8
o,p'-DDD	1,1-dichloro-2-(2-chlorophenyl)-2-(4-chlorophenyl)ethane	53-19-0
p,p'-DDD	1,1-dichloro-2,2-bis(4-chlorophenyl)ethane	72-54-8
o,p'-DDE	1,1-dichloro-2-(2-chlorophenyl)-2-(4-chlorophenyl)ethene	3424-82-9
p,p'-DDE	1,1-dichloro-2,2-bis(4-chlorophenyl)ethene	72-55-9
o,p'-DDT	1,1,1-trichloro-2-(2-chlorophenyl)-2-(4 chlorophenyl)ethane	789-02-6
p,p'-DDT	1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3
Dieldrin	(1*R*,4*S*,4a*S*,5*R*,6*R*,7*S*,8*S*,8a*R*)-1,2,3,4,10,10-hexachloro-1,4,4a,5,6,7,8,8a-octahydro- 6,7-epoxy-1,4:5,8-dimethanonaphthalene	60-57-1
Endrin	(1*R*,4*S*,4a*S*,5*S*,6*S*,7*R*,8*R*,8a*R*)-1,2,3,4,10,10-hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene	72-20-8
HCB	Hexachlorobenzene	118-74-1
α-HCH	1α,2α,3β,4α,5β,6β-hexachlorocyclohexane	319-84-6
β-HCH	1α,2β,3α,4β,5α,6β-hexachlorocyclohexane	319-85-7
γ-HCH (lindane)	1α,2α,3β,4α,5α,6β-hexachlorocyclohexane	58-89-9
δ-HCH	1α,2α,3α,4α,5α,6β-hexachlorocyclohexane	319-86-8
Heptachlor	1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1*H*-indene	76-44-8
Heptachlor-epoxide	2,3,4,5,6,7,7-heptachloro-1a,1b,5,5a,6,6a-hexahydro-(1aα,1bβ,2α,5α,5aβ,6β,6aα)-2,5-methano-2H-indeno [1,2-b]oxirene	1024-57-3
Methoxychlor	1,1,1-trichloro-2,2-bis(4-methoxyphenyl)ethane	72-43-5
Mirex	1,1a,2,2,3,3a,4,5,5,5a,5b,6-dodecachlorooctahydro-1H-1,3,4-(methanetriyl)cyclobuta[cd]pentalene	2385-85-5
PCB	Polychlorinated biphenyls [a]	
PCT	Polychlorinated terphenyls [b]	
Toxaphene	Polychlorinated camphene [b]	
Trans-nonachlor	1,2,3,4,5,6,7,8,8-nonachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene	39765-80-5

[a] The structure of the individual congeners quantified are given in Supplementary Table S3b. [b] Individual congeners were not analysed, concentrations are given based on a technical standard. See Renberg et al. 1978 (PCT) and Atuma et al. 1986 (toxaphene).

Supplementary Table S3b. Structures of individual PCB congeners included in this study.

Congener no.	Structure	CAS no.	Vector in PCA plots
CB44	2,2′3,5′-Tetrachlorobiphenyl,	41464-39	4b
CB52	2,2',5,5'-Tetrachlorobiphenyl	35693-99-3	4a
CB64	2,3,4',6-Tetrachlorobiphenyl	52663-58-8	4c
CB70	2,3',4',5-Tetrachlorobiphenyl	32598-11-1	4d
CB84	2,2',3,3',6-Pentachlorobiphenyl	52663-60-2	5c
CB87	2,2',3,4,5'-Pentachlorobiphenyl	38380-02-8	5g
CB92	2,2',3,5,5'-Pentachlorobiphenyl	52663-61-3	5b
CB95	2,2',3,5',6-Pentachlorobiphenyl	38379-99-6	5a
CB97	2,2'3',4,5-Pentachlorobiphenyl	41464-51-1	5f
CB99	2,2',4,4',5-Pentachlorobiphenyl	38380-01-7	5e
CB101	2,2',4,5,5'-Pentachlorobiphenyl	37680-73-2	5d
CB105	2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	5j
CB110	2,3,3',4',6-Pentachlorobiphenyl	38380-03-9	5h
CB118	2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	5i
CB128	2,2',3,3',4,4'-Hexachlorobiphenyl	38380-07-3	6e
CB135	2,2',3,3',5,6'-Hexachlorobiphenyl	52744-13-5	6a
CB138	2,2',3,4,4',5'-Hexachlorobiphenyl	35065-28-2	6d
CB149	2,2',3,4',5',6-Hexachlorobiphenyl	38380-04-0	6b
CB153	2,2',4,4',5,5'-Hexachlorobiphenyl	35065-27-1	6c
CB156	2,3,3',4,4',5-Hexachlorobiphenyl	38380-08-4	6g
CB167	2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	6f
CB170	2,2',3,3',4,4',5-Heptachlorobiphenyl	35065-30-6	7g
CB171	2,2', 3,3',4,4',6-Heptachlorobiphenyl	52663-71-5	7d
CB172	2,2',3,3',4,5,5'-Heptachlorobiphenyl	52663-74-8	7e
CB177	2,2',3,3',4,5',6'-Heptachlorobiphenyl	52663-70-4	7c
CB180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	35065-29-3	7f
CB183	2,2',3,4,4',5',6-Heptachlorobiphenyl	52663-69-1	7b
CB187	2,2',3,4',5,5',6-Heptachlorobiphenyl	52663-68-0	7a
CB196	2,2',3,3',4,4',5,6'-Octachlorobiphenyl	42740-50-1	8b
CB199	2,2',3,3',4,5,5',6'-Octachlorobiphenyl	52663-75-9	8a
CB209	Decachlorobiphenyl	2051-24-3	10a

Supplementary Table S4a. Concentrations ($\mu g\ g^{-1}$ lipid) of HCB, individual PCB congeners and PCT in birds and mammals. PCB congeners are listed in elution order. "PCA id" refers to sample identification in Fig. 2.

Species Sample no. / PCA id.	Region	HCB	52	44	64	70	95	92	84	101	99	97	87	110	135	149	118	153	105	138	187	183	128	167	177	171	156	172	180	170	199	196	209	ΣPCB	ΣPCT
Brünnich's guillemot																																			
1 / BG1	N/E	0.70	–[b]	–	–	–	0.77	–	–	tr	0.46	–	–	–	–	–	1.5	2.8	–	2.1	1.5	0.23	–	0.22	–	–	0.43	0.45	2.1	0.71	0.81	0.56	0.13	15	–
2 / BG2		0.35	–	–	–	–	–	–	–	0.09	0.32	–	–	–	–	–	0.78	1.3	–	1.2	0.46	0.05	–	0.06	0.04	0.13	–	0.06	0.59	0.18	0.07	0.05	tr	5.4	–
3 / BG3		0.40	–	–	–	–	0.46	–	–	0.09	0.31	–	–	–	–	–	0.63	1.0	–	0.53	0.4	0.10	–	0.07	0.04	–	0.11	0.06	0.49	0.17	0.09	0.07	tr	4.7	–
4 / BG4		3.0	–	–	–	–	2.2	–	–	0.50	1.3	–	–	–	0.05	–	3.2	4.1	–	3.6	1.3	0.14	–	0.17	0.16	–	0.39	0.19	1.5	0.48	0.18	0.14	tr	20	–
14 / BG5	W	0.24	–	–	–	–	0.15	–	–	0.05	0.11	–	–	–	–	–	0.16	0.29	–	0.24	0.07	–	–	0.01	–	–	–	0.01	0.12	0.04	0.01	0.01	–	1.3	–
15 / BG6		0.27	–	–	–	–	tr	–	–	0.07	0.14	–	–	–	–	–	0.18	0.36	–	0.32	0.11	–	–	–	–	–	–	–	0.15	0.06	0.02	–	–	1.4	–
16 / BG7		0.23	tr[c]	–	–	–	0.79	–	–	0.10	0.38	–	–	–	0.01	–	1.0	1.5	–	1.2	0.67	0.13	–	0.10	0.05	–	0.14	0.11	0.68	0.24	0.14	0.10	0.02	7.4	–
17 / BG8		0.13	–	–	–	–	tr	–	–	tr	0.06	–	–	–	–	–	0.06	0.18	–	0.15	0.07	0.02	–	0.02	–	–	0.02	0.01	0.09	0.03	0.02	0.01	–	0.74	–
18 / BG9		1.1	tr	–	–	–	0.5	–	–	0.07	0.29	–	0.03	–	–	–	0.60	0.86	–	0.80	0.23	0.30	–	0.04	0.03	–	0.07	0.03	0.32	0.1	0.04	0.03	–	4.3	–
Glaucous gull																																			
5 / GG1	N/E	1.3	tr	–	0.36	–	–	–	–	1.5	5.0	–	0.34	–	0.39	–	8.6	25	–	19	3.9	2.8	0.32	–	0.26	–	1.8	0.92	20	5.3	0.83	1.8	0.25	98	–
6 / GG2		0.50	tr	–	0.34	–	0.3	–	–	0.24	0.30	–	0.03	–	0.03	–	0.55	1.4	–	0.92		0.13	0.09	–	0.02	–	0.10	0.05	0.70	0.18	0.07	0.1	0.01	5.5	–
24 / GG3	W	3.1	tr	–	–	–	3.9	–	–	1.8	4.1	–	0.41	–	0.23	–	11	25	–	18	2.5	2.6	tr	0.79	tr	–	2.4	0.67	23	5.3	0.90	2.6	0.42	110	35
25 / GG4		2.3	tr	–	–	–	2.5	–	–	1.9	3.0	–	0.33	–	0.23	–	6.1	15	–	12	3.8	1.0	0.30	0.28	0.31	–	1.3	0.81	10	2.8	1.1	1.2	0.23	65	20
26 / GG5		1.2	tr	–	–	–	1.7	–	–	1.0	2.1	–	–	–	0.18	–	3.6	9.3	–	6.9	1.5	1.0	0.69	–	tr	–	0.77	0.42	5.9	1.6	0.50	0.75	tr	38	14
27 / GG6		1.4	tr	–	–	–	2.4	–	–	1.1	2.7	–	0.25	–	0.26	–	5.0	10	–	8.2	1.6	0.58	1.0	–	tr	–	0.85	0.34	5.1	1.6	0.30	0.52	tr	42	29
28 / GG7		5.3	tr	–	–	–	12	0.49	–	4.8	11	0.34	1.2	–	0.38	–	31	27	–	29	5.2	2.0	1.3	1.5	0.49	–	3.0	0.99	13	4.0	1.1	1.2	0.18	150	17
29		3.2	M[d]	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	65	M
Common eider																																			
9 / CE1	N/E	0.09	–	–	–	–	0.08	–	–	0.11	0.09	–	–	–	0.01	–	0.22	–	–	0.37	0.11	–	–	0.01	0.02	0.04	–	0.02	0.22	0.07	0.02	0.02	–	1.4	–
10 / CE2		0.12	–	–	–	–	–	–	–	0.14	0.05	–	–	–	0.01	–	0.04	0.66	–	0.23	–	0.08	–	0.03	0.02	0.03	–	0.02	0.44	0.09	0.03	0.05	–	1.9	–
11 / CE3		0.18	–	–	–	–	–	–	–	0.08	0.04	–	–	–	–	–	0.07	0.19	–	0.13	0.05	0.02	–	–	0.01	0.01	–	0.01	0.11	0.04	0.02	0.02	–	0.80	–
12 / CE4		0.07	–	–	–	–	–	–	–	0.06	0.03	–	–	–	–	–	0.07	0.15	–	0.11	0.04	0.01	–	–	–	–	0.01	–	0.05	0.01	–	0.01	–	0.55	–
13 / CE5		0.11	–	–	–	–	–	–	–	0.05	0.02	–	–	–	–	–	0.03	0.11	–	0.06	0.03	0.01	0.01	–	–	–	0.01	–	0.05	0.01	0.01	0.01	–	0.41	–
19 / CE6	W	0.15	0.12	0.08	–	0.13	0.60	0.07	–	0.33	0.11	0.09	0.13	0.26	0.03	–	0.41	0.67	–	0.48	0.15	0.07	0.03	0.04	0.03	–	0.05	0.01	0.27	0.06	0.03	0.03	tr	4.3	12
20 / CE7		0.14	0.16	0.09	–	0.15	0.71	0.11	–	0.27	0.15	0.10	0.16	0.3	0.02	–	0.34	0.35	–	0.33	0.08	0.03	0.06	–	0.02	–	0.04	0.01	0.12	0.04	0.04	0.05	0.10	3.8	29
21 / CE8		0.09	0.12	–	–	0.10	0.52	0.07	–	0.19	0.09	0.08	0.11	0.22	0.02	–	0.18	0.15	–	0.18	0.04	0.01	0.02	–	tr	–	0.02	0.01	0.05	–	0.08	0.07	tr	2.3	8.0
22 / CE9		0.06	0.16	–	–	0.16	tr	0.09	–	0.26	0.14	0.12	0.18	0.32	0.04	–	tr	0.21	–	0.28	0.06	0.01	tr	–	tr	–	0.05	–	0.07	0.03	0.11	0.07	tr	2.4	15
23 / CE10		0.08	0.15	–	–	tr	0.72	–	0.07	0.25	0.09	0.10	0.15	0.18	0.02	–	0.28	0.25	–	0.25	0.06	0.02	tr	0.03	tr	–	0.04	0.01	0.10	0.04	0.04	0.03	0.03	2.9	21
Ringed seal																																			
32	N/E	0.02	0.12	–	0.26	–	0.07	–	0.06	0.76	0.21	0.01	0.01	–	0.02	–	0.07	0.61	–	0.42	0.14	0.05	–	–	0.02	0.01	–	0.01	0.25	0.01	0.02	0.02	–	3.2	–
33		0.01	0.07	–	0.33	–	0.04	–	0.04	0.33	–	–	0.01	–	–	–	0.08	0.31	–	0.16	0.06	0.02	–	0.01	0.01	0.01	–	0.01	0.10	–	0.01	0.01	–	1.6	–
Polar bear																																			
7[a]	N/E		–	–	–	–	–	–	–	14	17	–	–	–	1.1	–	–	110	–	9.7	–	0.93	–	–	–	–	–	–	89	39	–	–	0.68	280	–
8		0.06	–	–	–	–	–	–	–	0.26	0.20	–	–	–	0.01	–	–	1.2	–	0.04	–	–	–	–	–	–	–	–	1.0	0.62	–	–	–	3.5	–

[a] Found dead and emaciated with skull injuries. [b] – Concentration below the limit of detection ($\le 0.003\ \mu g\ g^{-1}$ lipid). [c] tr – trace amounts, i.e., between the limit of detection and limit of quantification ($0.003\ \mu g\ g^{-1}$ lipid $\le$ tr $< 0.01\ \mu g\ g^{-1}$ lipid).
[d] M – missing data.

Supplementary Table S4b. Concentrations (μg g^{-1} lipid) of chlorinated pesticides in birds and mammals. "PCA id" refers to sample identification numbers in Fig. 2.

Species	Region	HCH				Dieldrin	Endrin	Aldrin	Heptachlor	Heptachlor	Chlordene		Chlordane			*Trans-*	ΣChlor-	Methoxy-	DDE		DDD		DDT		ΣDDT	Mirex	Toxaphene
Sample no / PCA id		α-	β-	γ-	δ-					epoxide	α-	γ-	Oxy-	γ-	α-	Nonachlor	danes	chlor	*o,p'-*	*p,p'-*	*o,p'-*	*p,p'-*	*o,p'-*	*p,p'-*			
Brünnich's guillemot																											
1 / BG1	N/E	–[b]	0.02	0.01	–	NQ[d]	NQ	–	–	NQ	–	–	0.11	0.01	–	0.01	0.13	0.03	–	8.0	–	–	–	0.02	8.1	–	M
2 / BG2		–	tr	–	–	NQ	NQ	–	–	NQ	–	–	0.12	–	–	0.03	0.15	–	–	3.5	–	0.05	–	–	3.5	–	M
3 / BG3		0.02	tr	–	–	NQ	NQ	–	–	NQ	–	–	0.14	0.02	0.03	0.04	0.23	–	–	3.1	–	0.04	–	–	3.1	–	M
4 / BG4		0.03	0.15	–	–	NQ	NQ	–	–	NQ	–	0.03	0.73	0.08	0.06	0.20	1.1	0.08	–	12	–	–	–	–	12	0.02	M
14 / BG5	W	0.02	–	–	–	NQ	NQ	–	–	NQ	0.02	–	0.10	–	0.02	0.02	0.16	–	–	0.98	–	–	–	–	0.98	–	M
15 / BG6		0.03	–	–	–	NQ	NQ	–	–	NQ	0.13	–	0.15	–	–	–	0.28	–	–	1.4	–	–	–	–	1.4	–	M
16 / BG7		–	–	–	–	NQ	NQ	–	–	NQ	–	–	0.28	–	–	–	0.28	–	–	3.7	–	–	–	–	3.7	–	M
17 / BG8		–	–	–	–	NQ	NQ	–	–	NQ	–	–	0.02	–	–	–	0.02	–	–	0.51	–	–	–	–	0.51	–	M
18 / BG9		–	–	–	–	NQ	NQ	–	–	NQ	–	–	0.15	–	–	–	0.15	–	–	2.3	–	0.05	–	–	2.4	–	M
Glaucous gull																											
5 / GG1	N/E	–	0.13	–	–	NQ	NQ	–	tr	NQ	tr	–	1.6	0.14	–	0.25	1.9	0.03	–	27	–	0.41	–	tr	27	–	M
6 / GG2		–	0.04	–	–	NQ	NQ	–	tr	NQ	0.07	–	0.29	–	–	0.06	0.42	–	–	3.1	–	0.11	–	tr	3.2	–	M
24 / GG3	W	–	tr	–	–	1.6	tr	–	0.56	2.1	0.02	0.03	1.7	0.06	–	0.12	4.6	0.07	–	34	–	0.24	–	0.09	34	–	M
25 / GG4		–	0.09	–	–	0.73	–	–	0.23	1.1	tr	–	1.5	0.08	0.03	–	2.9	–	–	33	–	0.52	–	tr	33	–	M
26 / GG5		–	tr	–	–	tr	–	–	0.12	1.5	tr	–	1.3	0.08	–	0.31	3.4	–	–	20	–	0.18	–	tr	20	–	M
27 / GG6		–	0.20	–	–	tr	–	–	tr	1.8	0.08	–	2.1	0.20	–	0.88	5.0	–	–	24	–	0.84	–	0.12	25	–	M
28 / GG7		0.01	0.24	–	–	1.8	tr	–	0.42	2.3	tr	–	2.7	0.30	–	0.90	6.7	–	–	38	–	1.1	–	0.11	39	0.04	M
29		0.75	4.2	–	–	M[e]	M	M	M	M	M	M	M	M	M	M	M	M	–	26	–	–	–	0.12	26	M	M
Common eider																											
9 / CE1	N/E	–	–	–	–	NQ	NQ	–	–	NQ	0.05	–	tr	–	–	0.02	0.07	–	–	0.98	–	0.07	–	–	1.1	–	M
10 / CE2		0.04	–	–	–	NQ	NQ	–	–	NQ	0.01	–	0.10	0.01	–	0.02	0.14	–	–	0.94	–	0.03	–	–	0.97	–	M
11 / CE3		0.06	–	–	–	NQ	NQ	–	–	NQ	–	–	0.06	–	–	0.02	0.08	–	–	0.46	–	0.03	–	–	0.49	–	M
12 / CE4		–	–	–	–	NQ	NQ	–	–	NQ	–	–	0.03	–	–	0.02	0.05	–	–	0.38	–	0.03	–	–	0.41	–	M
13 / CE5		–	–	–	–	NQ	NQ	–	–	NQ	–	–	0.03	–	–	0.01	0.04	–	–	0.24	–	0.02	–	–	0.26	–	M
19 / CE6	W	tr[c]	tr	–	–	tr	–	–	0.12	0.34	–	–	0.10	–	–	0.25	0.81	0.07	–	1.0	–	0.05	–	0.01	1.1	–	M
20 / CE7		0.05	tr	–	–	0.02	–	–	0.12	1.1	0.18	0.27	0.83	0.21	0.01	0.32	3.0	0.16	–	0.47	–	0.04	–	0.02	0.53	–	M
21 / CE8		–	–	–	–	0.06	–	–	0.06	1.5	0.12	0.19	1.4	0.08	0.01	0.01	3.4	–	–	0.18	–	0.02	–	0.02	0.22	–	M
22 / CE9		–	–	–	–	tr	–	–	0.03	0.82	0.04	–	0.92	0.03	–	0.04	1.9	0.17	–	0.17	–	0.03	–	tr	0.20	–	M
23 / CE10		–	tr	–	–	tr	–	–	0.01	0.23	–	–	0.48	–	–	0.02	0.74	0.10	–	0.33	–	0.03	–	tr	0.36	–	M
Ringed seal																											
32	N/E	0.06	–	–	–	NQ	NQ	–	–	NQ	–	–	0.34	0.03	0.09	0.88	1.3	–	–	0.08	–	–	–	0.91	0.99	–	M
33		0.03	–	–	–	NQ	NQ	–	–	NQ	–	–	0.09	–	–	0.11	0.20	–	–	0.06	–	0.26	–	0.29	0.61	–	M
Polar bear																											
7[a]	N/E	–	–	–	–	16	–	–	0.66	10	–	–	8.6	0.58	–	–	20	–	M	M	M	M	M	M	–	–	M
8		0.02	–	–	–	NQ	NQ	–	–	NQ	0.06	–	0.11	0.01	–	0.05	0.23	–	–	0.33	–	0.04	–	0.03	0.40	–	M

[a] Found dead and emaciated with skull injuries. [b] – Concentration below the limit of detection (≤ 0.003 μg g^{-1} lipid). [c] tr – trace amounts, i.e., between the limit of detection and limit of quantification (0.003 μg g^{-1} lipid ≤ tr < 0.01 μg g^{-1} lipid).
[d] NQ – not quantified. [e] M – missing data.

Supplementary Table S5a. Concentrations (µg g^{-1} lipid) of individual PCB congeners in Arctic char samples. The congeners are listed in elution order. "PCA id" refers to sample identification numbers in Fig. 3 and Supplementary Figs. S2, S3 and S4.

Lake Sample no / PCA id	52	44	64	70	95	92	84	101	99	97	87	110	135	149	118	153	105	138	187	183	128	167	177	171	156	172	180	170	199	196	209	ΣPCB
Linnévatn																																
3 S[a] / Ln3	0.14	0.09	–	0.13	0.61	0.08	–	0.32	0.14	0.07	0.15	0.28	0.01	–	0.41	0.66	–	0.50	0.13	0.05	0.02	0.05	0.03	–	0.04	–	0.23	0.03	0.01	0.02	–	4.2
4 S / Ln4	0.12	–[d)]	–	0.08	0.28	0.03	–	0.19	0.04	–	0.11	0.22	–	–	0.15	0.11	–	0.16	0.02		0.01	–	–	–	–	0.01	0.05	0.02	–	–	–	1.6
6 S / Ln6	0.72	0.16	–	0.26	1.2	0.14	–	0.66	0.27	0.18	0.26	0.52	0.08	–	0.82	1.5	–	0.96	0.30	0.14	0.09	0.08	0.06	–	0.20	0.06	0.64	0.24	0.06	0.05	0.05	9.7
7 R[b] / Ln7	0.03	0.01	–	0.01	0.07	0.01	–	0.03	0.01	–	0.02	0.04	–	–	0.05	0.08	–	0.06	0.01	–	–	–		–	–	–	0.03	0.01	–	–	–	0.47
12 R / Ln12	0.05	–	–	0.01	0.10	0.02	–	0.07	–	0.01	0.01	0.06	–	–	0.04	0.18	–	0.10	0.02	0.01	–	–	0.01	–	0.01	–	0.03	–	–	–	–	0.73
13 R / Ln13	0.07	0.01	–	0.03	0.12	0.01	–	0.07	0.03	0.02	0.03	0.05	0.01	–	0.08	0.15	–	0.10	0.03	0.01	–	–	0.01	–	0.02	0.01	0.06	0.02	–	–	–	0.94
Diesetvatn																																
4 A[c] / Di4	0.01	0.01	–	0.01	0.04	–	–	0.02	0.01	–	0.01	0.02	–	–	0.03	0.04	–	0.03	0.01	–	–	–	–	–	–	–	0.02	0.01	–	–	–	0.27
5 A / Di5	0.04	–	–	0.01	0.04	–	–	0.02	0.01	0.01	0.01	0.04	–	–	0.03	0.05	–	0.03	0.02	–	–	–	–	–	–	–	0.02	0.01	–	–	–	0.34
Jensenvatn																																
6 R / Je6	0.23	–	–	–	0.38	0.01	–	0.15	0.34	–	0.04	–	0.01	–	1.0	0.85	–	0.85	0.14	0.06	0.04	0.04	0.01	–	0.09	0.02	0.33	0.09	0.01	0.01	–	4.7
7 R / Je7	0.18	0.02	–	–	0.17	–	–	0.37	0.41	–	–	–	0.02	–	0.79	0.93	–	0.69	0.25	0.10	0.07	–	–	–	0.08	0.05	0.29	0.10	0.05	0.03	–	4.6
8 R / Je8	0.13	0.03	–	–	0.09	–	–	0.10	0.21	–	–	–	0.01	–	0.24	0.46	–	0.35	0.12	0.05	0.03	–	–	–	0.04	0.02	0.14	0.05	0.02	0.01	–	2.1
9 R / Je9	0.46	0.04	–	–	0.48	–	–	0.21	0.45	–	0.04	–	0.02	–	2.3	2.7	–	1.7	0.25	0.26	–	0.07	–	–	0.24	0.05	0.35	0.20	0.09	0.09	–	10
10 R / Je10	0.28	0.06	–	–	0.87	0.03	–	0.36	0.69	0.03	0.08	–	0.02	–	1.9	1.7	–	1.8	0.33	0.12	0.08	0.09	0.03	–	0.16	0.06	0.72	0.15	0.03	0.01	–	9.6
11 R / Je11	0.36	–	–	–	0.28		–	0.84	0.90	–	–	–	–	–	1.6	1.9	–	1.4	0.50	0.20	0.19	–	–	–	0.16	0.20	0.56	0.10	0.05	0.06	–	9.3
Annavatn																																
61 R /An61	0.69	0.06	–	–	0.40	–	–	0.18	0.37	–	0.04	–	–	–	1.1	2.3	–	2.1	0.25	0.26	–	0.09	–	–	0.24	0.03	1.3	0.26	0.09	0.04	–	9.8
62 R / An62	0.37	0.15	–	–	0.13	–	–	0.20	0.31	–	–	–	0.02	–	0.45	0.81	–	0.68	0.25	0.04	0.03	–	0.04	–	0.08	0.01	0.29	0.09	0.05	–	–	4.0
63 R / An63	0.94	0.38	0.07	–	0.24	0.02	–	0.11	0.27	–	0.03	–	0.03	–	0.50	1.0	–	0.8	0.16	0.06	0.10	–	0.01	–	0.09	0.03	0.34	0.10	–	0.02	–	5.3
64 R / An64	0.70	0.19	–	–	0.16	0.09	–	0.19	0.30	–	0.06	–	0.01	–	0.61	1.6	–	1.2	0.33	0.14	0.03	0.04	0.03	–	0.13	0.08	1.1	0.28	0.11	0.02	–	7.4
65 R / An65	0.99	0.32	0.09	–	0.87	0.03	–	0.33	0.76	0.02	0.09	–	0.03	–	2.1	1.8	–	1.9	0.37	0.14	0.09	0.10	0.03	–	0.21	0.07	0.32	0.18	0.08	0.08	–	11
Wibjørnvatn																																
203 R / Wb203	0.19	0.05	–	–	0.10	–	–	0.29	0.31	–	–	–	0.01	–	0.34	0.28	–	0.20	0.07	0.03	0.07	–	–	–	0.08	–	0.05	0.03	–	–	–	2.1
205 R / Wb205	0.13	0.02	–	–	0.08	–	–	0.06	0.09	–	–	–	–	–	0.18	0.16	–	0.12	0.05	0.01	0.02	–	–	–	0.04	–	0.04		–	–	–	1.0
206 R / Wb206	0.14	0.03	–	–	0.07	–	–	0.21	0.20	–	–	–	–	–	0.30	0.21	–	0.14	0.05	–	0.04	–	–	–	0.05	–	0.04	0.02	–	–	–	1.5
207 R / Wb207	0.12	0.04	–	–	0.17	–	–	0.10	0.15	–	0.01	–	0.05	–	0.30	0.33	–	0.22	0.05	0.01	0.01	–	–	–	0.07	–	0.05	0.02	–	–	–	1.7
209 R / Wb209	0.13	0.03	–	–	0.07	–	–	0.21	0.23	–	–	–	–	–	0.30	0.20	–	0.14	0.05	–	0.04	–	–	–	0.06	–	0.04	–	–	–	–	1.5
210 R / Wb210	0.13	–	–	–	0.11	–	–	0.06	0.12	–	0.01	–	0.01	–	0.26	0.22	–	0.13	0.06	0.01	–	–	–	–	0.04	–	0.04	–	–	–	–	1.2
211 R / Wb211	0.25	0.10	–	–	0.14	–	–	0.43	0.40	–	–	0.02	0.02	–	0.40	0.55	–	0.39	0.25	0.06	0.07	–	–	–	0.11	–	0.09	0.02	–	–	–	3.3
Arkvatn																																
12 S? / Ar12	0.13	0.04	–	–	0.07	–	–	0.23	0.27	–	–	–	0.01	–	0.26	0.21	–	0.14	0.05	0.02	0.05	–	–	–	0.06	0.02	0.04	–	–	–	–	1.6
13 S? / Ar13	0.14	–	–	–	0.12	–	–	0.05	0.11	–	0.01	–	–	–	0.22	0.20	–	0.15	0.06	–	0.03	–	–	–	0.06	–	0.03	0.02	–	–	–	1.2
14 S? / Ar14	0.17	0.02	–	–	0.09	–	–	0.05	0.08	–	–	–	0.03	–	0.15	0.17	–	0.11	0.05	0.01	0.01	–	–	–	0.03	–	0.03	0.01	–	–	–	1.0
15 S? / Ar15	0.07	–	–	–	0.04	–	–	0.09	0.13	–	–	–	–	–	0.12	0.11	–	0.10	0.06	0.02	0.02	–	–	–	0.03	–	0.05	0.01	–	–	–	0.85
16 S? / Ar16	0.15	0.04	–	–	0.30	–	–	0.12	0.28	–	0.03	–	0.02	–	0.28	0.23	–	0.22	0.06	0.01	0.03	0.02	–	–	0.05	0.02	0.04	–	–	–	–	1.9
17 R? / Ar17	0.09	0.03	–	–	0.05	–	–	0.02	0.05	–	–	–	0.01	–	0.11	0.10	–	0.05	0.03	–	0.02	–	–	–	0.03	–	0.02	–	–	–	–	Σ0.61
18 R? / Ar18	0.06	0.01	–	–	0.03	–	–	0.07	0.09	–	–	–	–	–	0.12	0.08	–	0.06	0.02	–	0.02	–	–	–	0.02	0.01	0.02	–	–	–	–	0.61
19 R? / Ar19	0.06	0.03	–	–	0.05	–	–	0.02	0.04	–	–	–	–	–	0.11	0.08	–	0.07	0.02	0.01	0.01	–	–	–	0.02	–	0.02	–	–	–	–	0.54

Supplementary Table S5a. Continued.

Lake Sample no / PCA id	52	44	64	70	95	92	84	101	99	97	87	110	135	149	118	153	105	138	187	183	128	167	177	171	156	172	180	170	199	196	209	ΣPCB
Girlsta Loch																																
1 R / GL1	0.13	–	–	0.08	0.58	0.07	–	0.15	0.08	0.10	0.11	0.26	0.01	–	0.27	0.18	–	0.35	0.10	0.01	0.06	0.06	0.02	–	0.02	0.01	0.12	0.08	0.05	0.07	0.03	3.0
2 R / GL2	0.36	0.07	–	0.22	0.88	0.07	0.06	0.84	0.46	0.30	0.13	0.65	0.12	–	1.1	1.3	0.02	0.88	0.37	0.14	0.07	0.09	0.10	–	0.13	0.01	0.64	0.28	0.09	0.03	0.19	9.6
3 R / GL3	0.36	0.09	–	0.15	0.88	0.11	–	0.33	0.18	0.08	0.16	0.41	0.02	–	0.47	0.68	–	0.40	0.13	0.09	0.06	0.05	0.02	–	0.06	0.01	0.23	0.14	0.07	0.09	0.13	5.4
4 R / GL4	0.19	–	–	–	0.52	–	0.07	0.25	0.09	0.11	0.16	0.19	0.02	–	0.58	0.35	–	0.25	0.09	0.02	–	0.05	–	–	0.04	–	0.16	0.09	0.06	0.02	0.09	3.4
5 R / GL5	0.13	–	–	0.14	–	0.09	–	0.22	0.13	0.12	0.18	0.30	0.04	–	0.00	0.21	–	0.27	0.04	–	–	–	–	–	0.03	–	0.09	0.03	–	–	0.08	2.1

[a] S – smolt. [b] R – resident. [c] A – anadromous. [d] – Concentration below the limit of detection (≤ 0.003 μg g^{-1} lipid).

Supplementary Table S5b. Concentrations of ($\mu g\ g^{-1}$ lipid) of HCB, PCT, HCHs and DDT compounds in Arctic char samples.

Lake	HCB	ΣPCT	HCH				ΣHCH	DDE		DDD		DDT	
Sample no / PCA id			α-	β-	γ	δ-		*o,p'*-	*p,p'*-	*o,p'*-	*p,p'*-	*o,p'*-	*p,p'*-
Linnévatn													
3 S[a] / Ln3	0.07	0.83	0.18	0.06	0.01	–	0.25	–	0.38	–	–	–	NQ[f]
4 S / Ln4	0.05	0.28	0.27	0.05	0.04	–	0.36	–	0.31	–	–	–	NQ
6 S / Ln6	0.10	1.1	0.15	0.10	0.02	–	0.27	–	1.0	–	–	–	NQ
7 R[b] / Ln7	0.02	–[d]	0.14	0.04	0.02	–	0.20	–	0.04	–	–	–	NQ
12 R / Ln12	0.05	–	0.32	0.04	0.03	–	0.40	–	0.07	–	–	–	NQ
13 R / Ln13	0.05	–	0.32	0.06	0.03	–	0.42	–	0.11	–	–	–	NQ
Diesetvatn													
4 A[c] / Di4	0.08	–	0.19	–	–	–	0.19	–	0.06	–	–	–	–
5 A / Di5	0.09	–	0.15	–	–	–	0.15	–	0.08	–	–	–	–
Jensenvatn													
6 R / Je6	0.15	–	1.0	0.08	0.06	–	1.1	–	0.61	–	–	–	0.03
7 R / Je7	0.19	–	1.1	0.07	0.06	–	1.2	–	0.56	–	–	–	0.03
8 R / Je8	0.11	–	0.99	0.12	0.03	–	1.1	–	0.20	–	–	–	0.02
9 R / Je9	0.13	–	0.75	0.07	0.05	–	0.87	–	2.3	–	–	–	0.02
10 R / Je10	0.13	–	0.62	0.02	0.03	–	0.67	–	1.8	–	–	–	0.03
11 R / Je11	0.13	–	0.81	0.05	0.05	–	0.91	–	1.9	–	–	–	0.03
Annavatn													
61 R /An61	0.19	NQ[e]	0.37	–	0.04	–	0.41	–	2.9	–	–	–	NQ
62 R / An62	0.22	NQ	0.35	–	0.04	–	0.39	–	1.5	–	–	–	NQ
63 R / An63	0.13	NQ	0.31	–	0.04	–	0.35	–	0.64	–	–	–	NQ
64 R / An64	0.22	NQ	0.34	–	0.04	–	0.38	–	2.2	–	–	–	NQ
65 R / An65	0.17	NQ	0.31	–	0.04	–	0.35	–	1.3	–	–	–	NQ
Wibjørnvatn													
203 R / Wb203	0.20	NQ	0.21	0.03	0.02	–	0.26	–	0.46	–	–	–	–
205 R / Wb205	0.16	NQ	0.18	–	0.03	–	0.21	–	0.21	–	–	–	–
206 R / Wb206	0.17	NQ	0.21	0.03	0.03	–	0.27	–	0.38	–	–	–	–
207 R / Wb207	0.18	NQ	0.20	0.03	0.02	–	0.25	–	0.30	–	–	–	–
209 R / Wb209	0.20	NQ	0.22	0.03	0.02	–	0.27	–	0.26	–	–	–	–
210 R / Wb210	0.16	NQ	0.19	0.04	0.02	–	0.25	–	0.19	–	–	–	–
211 R / Wb211	0.14	NQ	0.18	0.03	0.02	–	0.24	–	0.84	–	–	–	–
Arkvatn													
12 S? / Ar12	0.22	NQ	0.38	–	0.06	–	0.44	–	1.8	–	–	–	–
13 S? / Ar13	0.22	NQ	0.36	–	0.04	–	0.40	–	3.5	–	–	–	–
14 S? / Ar14	0.20	NQ	0.33	–	0.04	–	0.37	–	1.1	–	–	–	–
15 S? / Ar15	0.18	NQ	0.32	–	0.04	–	0.36	–	2.5	–	–	–	–
16 S? / Ar16	0.16	NQ	0.29	–	0.04	–	0.33	–	4.1	–	–	–	–
17 R? / Ar17	0.20	NQ	0.38	–	0.04	–	0.42	–	0.44	–	–	–	–
18 R? / Ar18	0.15	NQ	0.32	–	0.04	–	0.36	–	0.19	–	–	–	–
19 R? / Ar19	0.19	NQ	0.35	–	0.05	–	0.40	–	0.66	–	–	–	–

Supplementary Table S5b. Continued.

Lake	HCB	ΣPCT	HCH				ΣHCH	DDE		DDD		DDT	
Sample no / PCA id			α-	β-	γ	δ-		*o,p'*-	*p,p'*-	*o,p'*-	*p,p'*-	*o,p'*-	*p,p'*-
Girlsta Loch													
1 R / GL1	0.09	NQ	0.10	0.03	0.05	–	0.17	–	0.53	–	–	–	NQ
2 R / GL2	0.08	NQ	0.12	0.05	0.02	–	0.19	–	3.5	–	–	–	NQ
3 R / GL3	0.09	NQ	0.11	0.05	0.04	–	0.19	–	1.9	–	–	–	NQ
4 R / GL4	0.09	NQ	0.10	0.05	0.05	–	0.19	–	0.77	–	–	–	NQ
5 R / GL5	0.09	NQ	0.14	0.05	0.06	–	0.25	–	0.37	–	–	–	NQ

[a] S – smolt. [b] R – resident. [c] A – anadromous. [d] – Concentration below the limit of detection (≤ 0.003 µg g^{-1} lipid). [e] NQ – not quantified. [f] Not quantified because of co-elution with large toxaphene peak.

Supplementary Table S6. Concentrations (μg g^{-1} lipid) of PCT and selected pesticides in pooled samples of Arctic char.

Lake	PCT	Dieldrin	Endrin	Aldrin	Hepachlor	Heptachlor epoxide	*Trans*-nonachlor	Chlordene		Chlordane			ΣChlordanes	Methoxychlor	DDE		DDD		DDT		ΣDDT	Mirex	Toxaphene fraction			ΣToxaphene
								α-	γ-	Oxy-	γ-	α-			*o,p'*-	*p,p'*-	*o,p'*-	*p,p'*-	*o,p'*-	*p,p'*-			1	2	3	
Jensenvatn	–[a]	0.22	0.01	–	0.09	0.07	0.04	–	–	0.07	0.02	0.02	0.30	–	–	0.20	–	tr[b]	–	0.01	0.21	–	tr	0.24	2.0	2.2
Annavatn	–	0.52	0.03	–	0.01	0.11	0.20	–	–	0.11	0.01	0.07	0.60	–	–	1.7	–	0.02	–	0.17	1.9	–	–	0.80	0.31	1.1
Arkvatn																										
Smolt?	–	0.50	0.04	–	0.11	0.13	0.40	–	–	0.13	0.02	0.10	0.89	–	–	2.0	–	0.06	–	0.40	2.5	–	–	1.6	0.31	1.9
Resident?	–	0.58	0.05	–	0.14	0.14	0.31	–	–	0.14	0.03	0.11	0.87	–	–	0.42	–	0.04	–	0.31	0.73	–	–	1.3	0.70	2.0

[a] – Concentration below the limit of detection (≤ 0.003 μg g^{-1} lipid). [b] tr – trace amounts, i.e., between the limit of detection and limit of quantification (0.003 μg g^{-1} lipid ≤ tr < 0.01 μg g^{-1} lipid).

Supplementary Table S7 Concentrations of organochlorine contaminants (µg g^{-1} lipid) in common guillemot (*Uria aalge*) from the central Baltic Sea. These samples were analysed together with the samples from Ymer-80 for comparison. The data have not been presented in full elsewhere and are included here to present as complete a data set as possible from the Ymer-80 survey.

Sample no	52	44	64	70	95	92	84	101	99	97	87	110	135	149	118	153	105	138	187	183	128	167	177	171	156	172	180	170	199	196	209	ΣPCB	ΣPCT
30	–[a]	–	3.4	–	2.6	–	–	0.48	2.2	–	0.35	–	–	–	8.9	10	–	14	7.4	1.4	–	0.89	0.84	–	1.3	1.2	5.1	1.6	2.0	0.91	0.15	65	M[b]
31	–	–	2.2	–	1.1	–	–	0.46	1.1	–	0.26	–	–	–	4.1	–	–	7.5	6.1	1.1	–	0.55	1.2	–	0.70	1.1	3.2	1.2	1.7	0.92	0.27	35	M

Sample no	HCB	HCH				Dieldrin	Endrin	Aldrin	Hepachlor	Heptachlor	Chlordede		Chlordane			*Trans-*	Methoxy-	DDE		DDD		DDT		ΣDDT	Mirex	Toxaphene
		α-	β-	γ-	δ-					epoxide	α-	γ-	Oxy-	γ-	α-	nonachlor	chlor	*o,p'-*	*p,p'-*	*o,p'-*	*p,p'-*	*o,p'-*	*p,p'-*			
30	3.4	–	0.17	–	–	NQ[c]	NQ	–	–	NQ	–	–	0.18	–	–	–	–	–	19	–	0.13	–	–	19	–	M
31	2.5	–	–	–	–	NQ	NQ	–	–	NQ	–	–	0.02	–	–	–	–	–	13	–	–	–	–	13	–	M

[a] – Concentration below the limit of detection (≤ 0.003 µg g^{-1} lipid). [b] M – missing data. [c] NQ – not quantified.

Supplementary Table S8. Concentrations (μg g^{-1} lipid) of ΣPCB and ΣDDT in samples of Brünnich's guillemot and polar bears collected on Svalbard in 1971 and 1980. The data from the 1971 samples are from Edelstam et al. (1987) and included here for completeness. Note that the 1971 data were produced with an older analytical method using packed column GC-ECD and not comparable to data from capillary column GC-ECD. The Ymer-80 data in this table have, therefore, been recalculated based on an intercalibration of the methods to ensure consistency within SNEMP time series to make them comparable to the data from 1971.

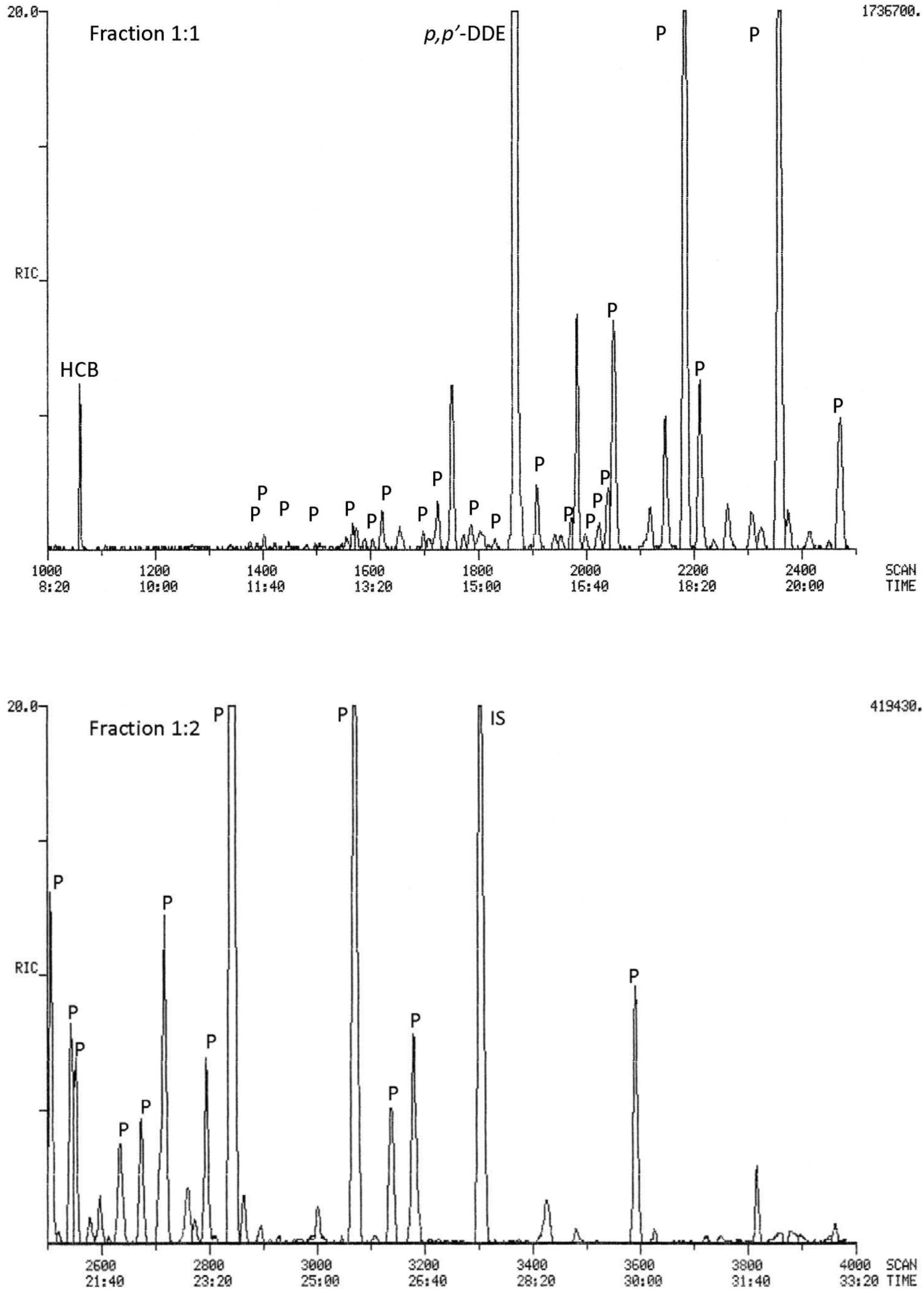
	ΣPCB Mean Range	ΣDDT Mean Range
Brünnich's guillemot		
1971		
Adults, W Svalbard (n = 7)	12 7.3-16	5.6 3.2-8.4
1980		
Adults, N/E Svalbard (n = 4)	18 7.0-33	5.2 2.4-9.4
Age unknown, W Svalbard (n = 5)	4.9 1.2-12	1.4 0.40-2.9
Glaucous gull		
1971		
Svalbard unspecified (n = 2)	130 61-200	34 30-38
1980		
N/E Svalbard (n = 2)	100 10-190	12 2.5-21
W Svalbard (n = 5)	150 75-270	24 16-27
Polar bear		
1971 (n = 2)	17 13-20	0.34 0.31-0.37
1980 (n = 1)	6.4	0.31

Supplementary Table S9. Concentrations (µg g^{-1} lipid) of POPs in seals, fish and other animals collected in western Svalbard in 1984. These samples were analysed in the same laboratory and with the same methods as, but slightly prior to, the Ymer-80 samples. Unfortunately, the documentation has not been possible to reconstruct in full. These are the original data. Data regarding these samples presented by Carlberg & Bøler (1985) were, for unknown reasons, recalculated (see discussion in text above).

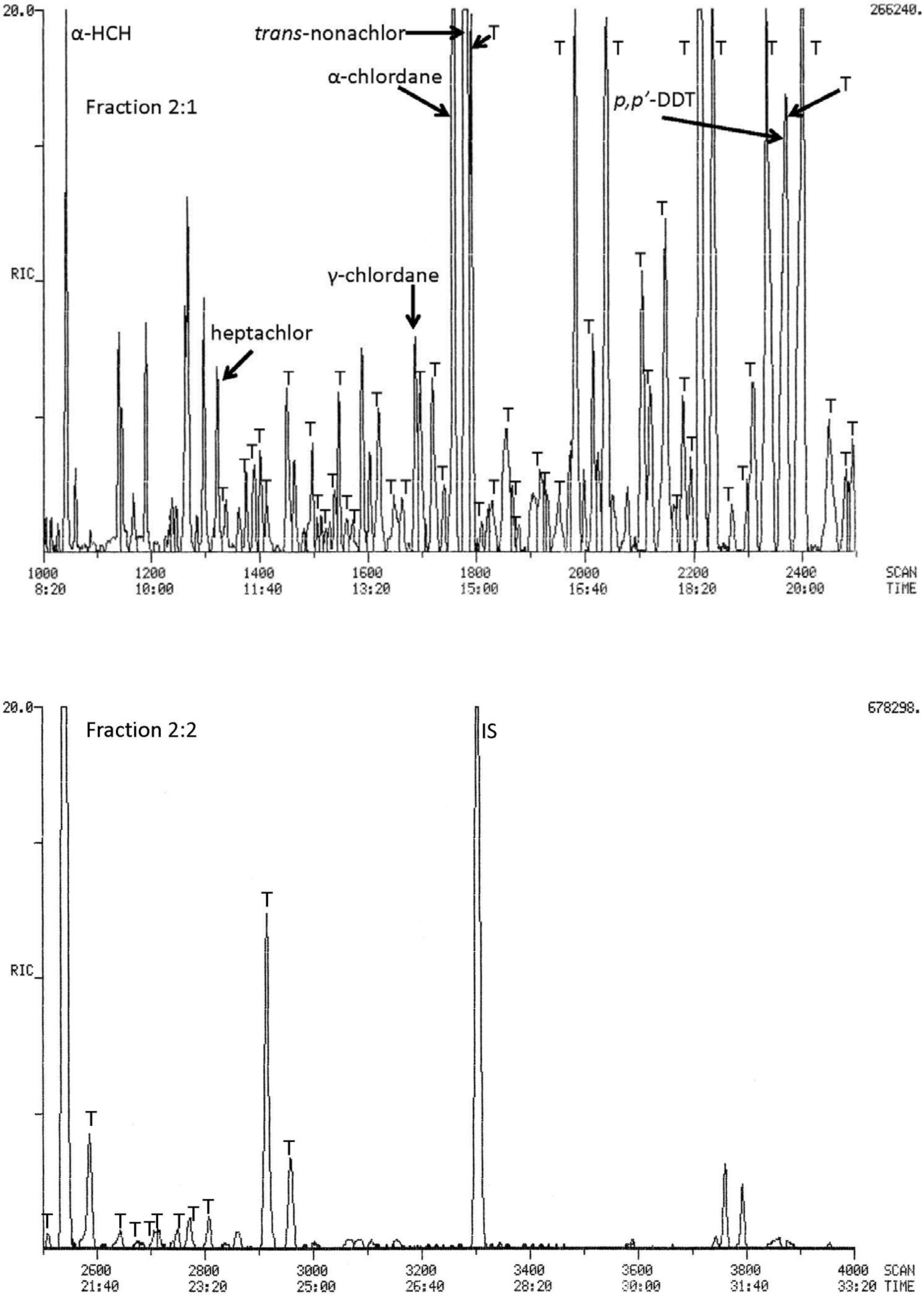
Species	Lipid.	HCB	ΣPCB	HCH			Diel-	En-	Al-	Hepta	Heptachlor	Chlordene		Chlordane			Nonachlor		Methoxy-	DDE		DDD		DDT		ΣDDT	Mirex	Toxaphene
Date	%			α-	β-	γ-	drin	drin	drin	chlor	epoxide	α -	γ-	Oxy-	γ-	α-	*Trans-*	*Cis-*	chlor	*o,p'-*	*p,p'-*	*o,p'-*	*p,p'-*	*o,p'-*	*p,p'-*			
Ringed seal (*Pusa hispida*), liver, Hornsund																												
1984–09–13	3.3	0.02	0.76	0.05	–[c]	0.01	0.08	–	–	0.01	0.04	0.28		0.11	tr	tr	0.04	tr	–	0.02	0.48	–	0.06	–	0.06	0.29	–	NQ
1984–09–21	3.9	0.03	0.42	0.06	–	tr	0.10	–	–	0.01	0.04	0.28	–	0.11	tr	tr	0.04	tr	–	0.02	0.48	–	0.06	–	0.06	0.29	–	NQ
1984–09–28	3.2	0.03	0.45	0.04	–	tr	0.08	–	–	0.01	0.03	0.21	0.01	0.07	tr	tr	0.04	tr	–	0.01	0.26	–	0.02	–	0.01	0.14	–	NQ
1984–10–02	3.1	0.04	1.0	0.03	–	tr	0.11	–	–	0.02	0.03	0.16	–	0.12	tr	tr	0.07	tr	–	0.02	0.37	–	0.04	–	0.03	0.23	–	NQ
1984–10–03	2.6	0.03	0.66	0.07	–	tr	0.11	–	–	0.01	0.02	0.21	–	0.16	tr	tr	0.07	0.01	–	0.02	0.44	–	0.06	–	0.03	0.27	–	NQ
Kapp Linné[a]																												
1983?	3.2	0.03	7.2	0.04	tr[d]	0.01	NQ[e]	NQ	–	0.01	NQ	0.59	0.01	0.86	tr	0.01	0.02	tr	–	0.02	0.46	–	0.06	–	0.021	0.75	–	NQ
Ringed seal (*Pusa hispida*), blubber Hornsund																												
1984–09–13	82	0.02	1.6	0.07	tr	tr	tr	–	–	0.01	0.03	0.01	–	0.19	tr	tr	0.11	0.02	–	–	0.83	–	0.02	–	0.40	1.2	–	0.63
1984–09–21	90	0.01	0.84	0.14	tr	0.01	0.01	–	–	–	0.02	0.01	–	0.14	0.01	tr	0.16	0.04	–	–	0.67	–	0.04	–	0.31	1.0	–	1.1
1984–09–28	84	0.01	1.0	0.05	tr	tr	0.01	–	–	–	0.02	0.01	0.01	0.20	0.01	tr	0.18	0.03	–	–	0.89	–	0.02	–	0.44	1.4	–	0.96
1984–10–02	79	0.02	2.3	0.06	tr	tr	0.02	–	–	–	0.02	0.02	–	0.25	0.02	tr	0.26	0.06	–	–	0.94	–	0.04	–	0.52	1.5	–	0.51
1984–10–03	90	0.01	0.78	0.08	tr	tr	0.01	–	–	–	0.02	0.01	–	0.19	0.01	tr	0.1	0.02	–	–	0.77	–	0.04	–	0.42	1.2	–	0.36
Kapp Linné																												
1983?	84	0.04	4.6	0.26	0.01	0.02	NQ	NQ	–	0.02	NQ	0.01	–	0.13	0.01	0.01	0.15	0.03	–	–	0.92	–	0.03	tr	1.0	1.9	–	NQ
1983?	96	0.02	5.1	0.14	0.01	0.01	NQ	NQ	–	0.03	NQ	0.01	–	0.25	0.01	0.01	0.23	0.04	–	–	1.4	–	0.03	0.01	1.6	3.0	–	NQ
Bearded seal (*Erignathus barbatus*), liver, Hornsund																												
1984–09–21	3.5	0.48	4.3	0.05	tr	tr	0.01		–	0.01	0.04	0.20	–	0.12	tr	tr	0.12	tr	–	0.01	2.5	–	0.31	–	0.31	2.9	–	NQ
1984–10–01	2.9	0.30	3.5	0.04	–	–	0.01		–	0.01	0.05	–	–	0.11	tr	tr	0.11	tr	–	0.01	2.9	–	0.17	–	0.17	3.2	–	NQ
Bearded seal (*Erignathus barbatus*), blubber, Hornsund																												
1984–09–21	80	0.02	2.1	0.01	tr	tr	0.02	0.02	–	–	0.03	–	–	0.14	tr	tr	0.59	0.02	–	tr	1.4	–	0.01	–	0.01	1.8	–	M[f]
1984–10–01	77	0.02	2.2	0.01	tr	tr	0.02	0.03	–	0.02	0.01	–	–	0.13	tr	tr	0.29	0.02	–	–	1.5	–	0.01	–	0.01	1.9	–	0.47
Cod (?)[b], fillet, Kongsfjorden																												
1984–08–19	2.0	0.06	0.11	0.02	tr	tr	0.04	–	–	tr	0.01	–	–	tr	tr	tr	0.04	tr	–	–	0.06	–	0.02	–	0.02	0.10	–	M
Plaice (*Hippoglasoidus platesoidus*), fillet, Kongsfjorden																												
1984–08–19	0.11	55	0.04	tr	tr	0.05	0.01	–	–	tr	0.01	0.03	tr	0.12	0.05	0.01	0.08	0.04	–	0.01	0.15	–	0.01	–	0.07	0.24	–	M
Shrimps (*Pandalus*), Kongsfjorden																												
1984–08–19	0.01	34	0.02	–	0.01	–	–	–	–	0.01	–	–	0.01	–	tr	0.01	–	–	–	–	0.01	–	–	–	–	0.01	–	M
Ascidian (Ascidiacea), Kongsfjorden																												
1984–08–20	0.07	0.49	–	0.10	–	0.02	0.05	0.04	–	0.04	0.02	tr	–	tr	tr	0.01	0.02	–	–	0.02	0.03	–	–	–	0.01	0.06	–	0.22

[a] The Kapp Linné samples are poorly documented, e.g., sampling date are lacking. These samples were provided from Norwegian authorities and analysed in the same sequence as the data report by Carlberg & Bøler (1985). However, for unknown reasons they were not included in that report. [b] Species unclear due to varying and strange usage of both common and scientific names in the background material. Either cod (*Gadus morhua*) or polar cod (*Boreogadus saida*), but most likely the latter. [c] – Concentration below the limit of detection (≤ 0.003 µg g^{-1} lipid). [d] tr – trace amounts, i.e., between the limit of detection and limit of quantification (0.003 µg g^{-1} lipid ≤ tr < 0.01 µg g^{-1} lipid). [e] NQ – not quantified. [f] M – missing data.

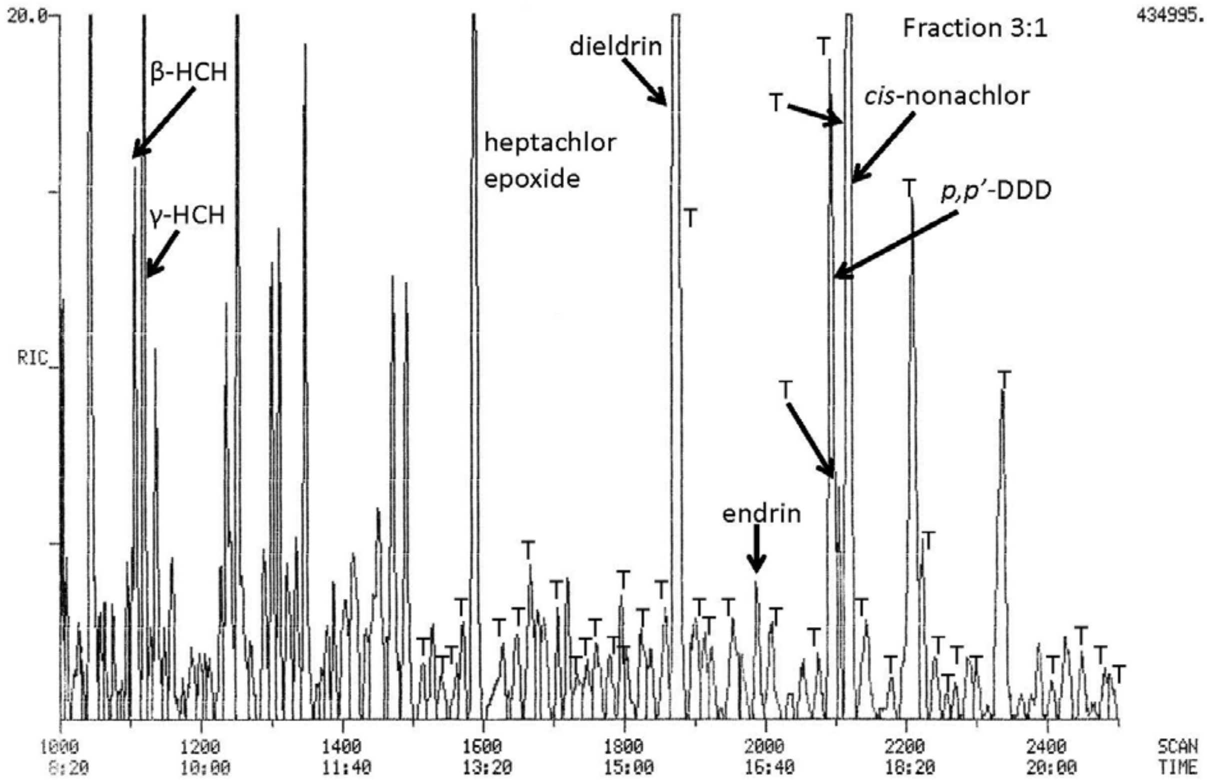
Supplementary Fig. S1. Representative chromatograms (full scan GC-MS) of the fractions obtained after fractionation on deactivated alumina of an Arctic char sample. Each chromatogram is presented in two panels. Peak identifications: P – PCB; T – toxaphene.

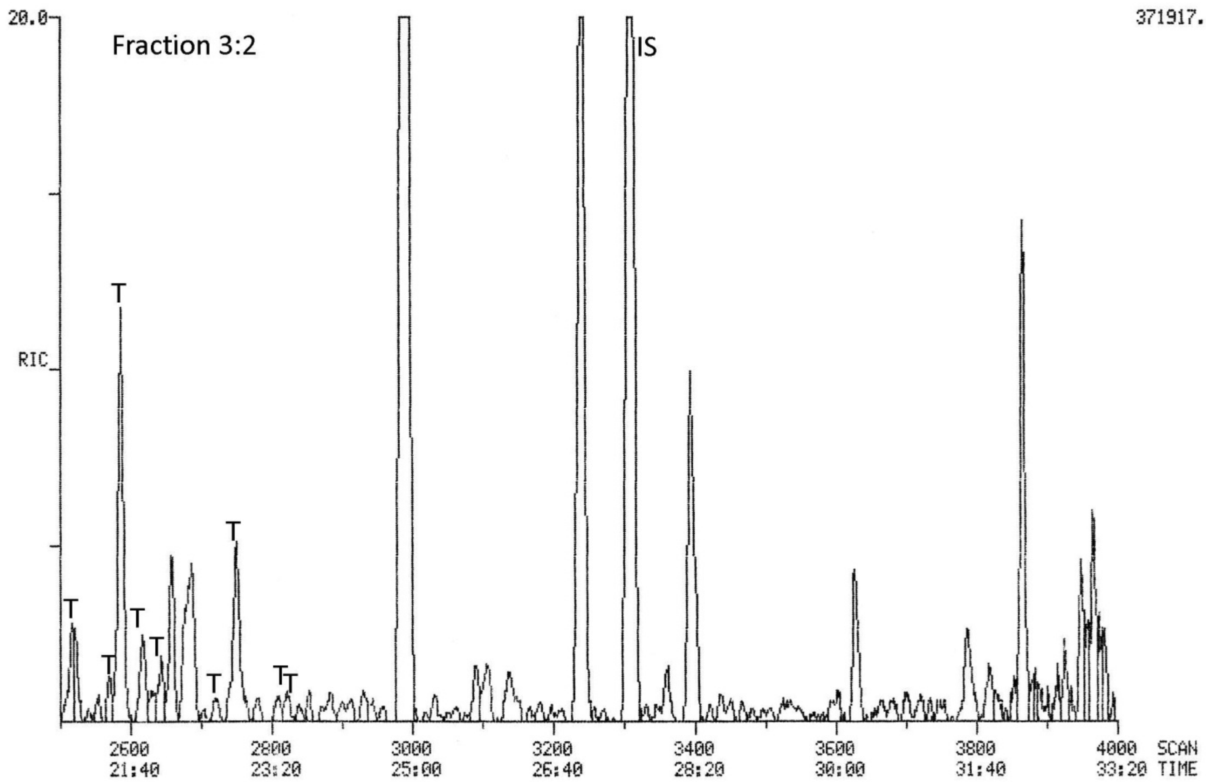


Supplementary Fig. S1. Continued.

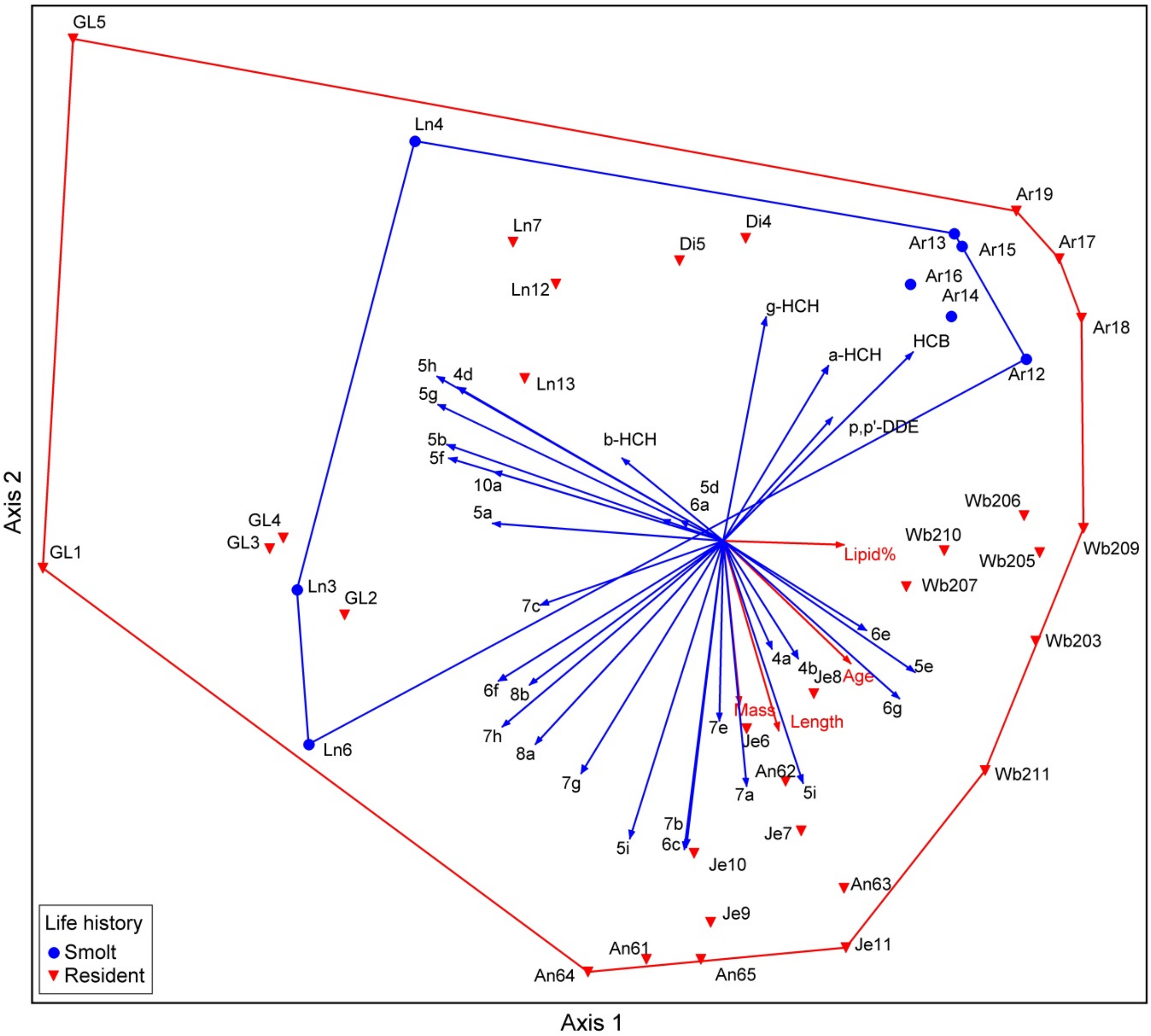


Supplementary Fig. S1. Continued.

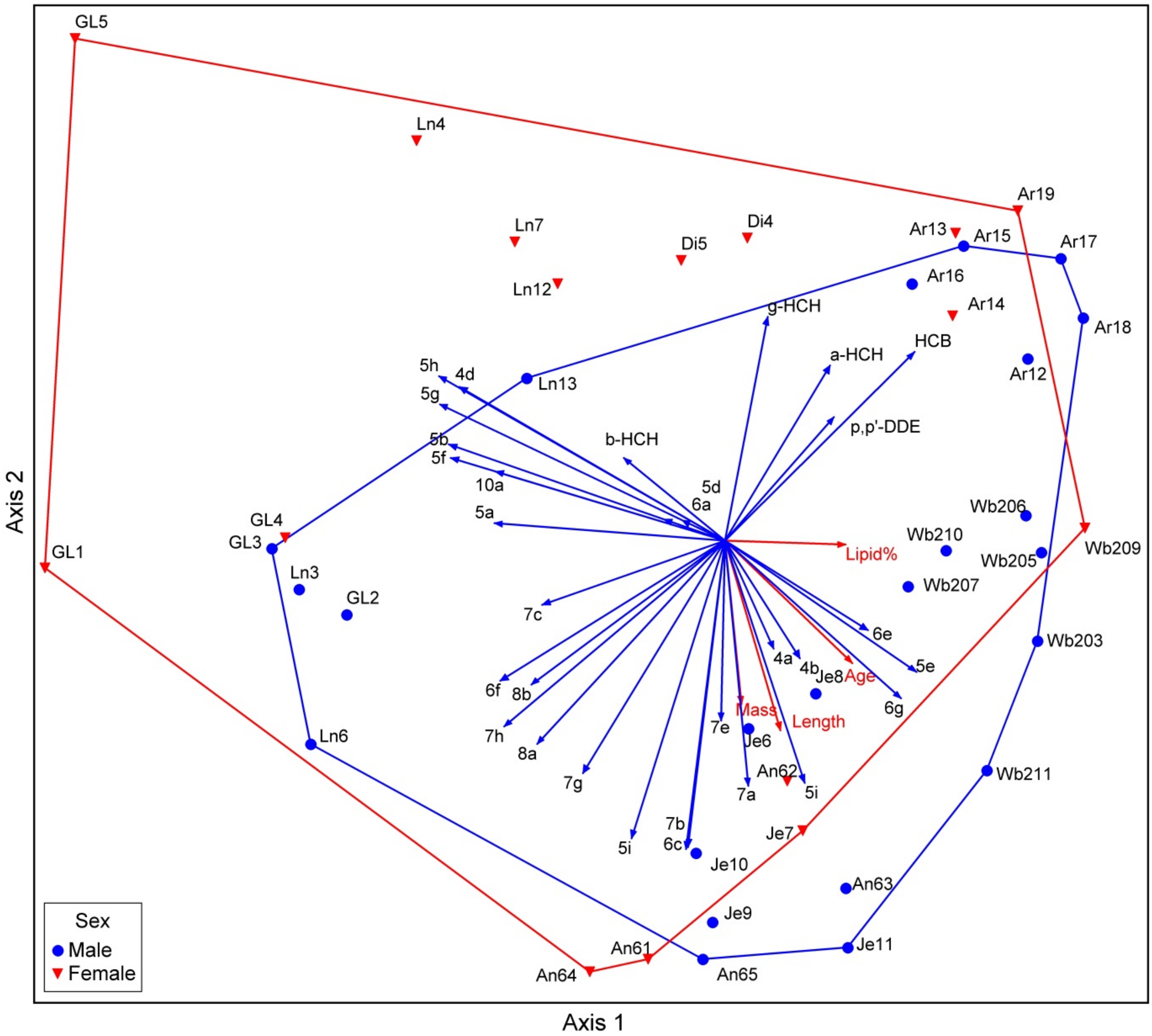




Supplementary Fig. S2. Principal component analysis of relativized contaminant concentrations in Arctic char. Vector numbers refer to individual PCB congeners, see Table S3b.



Supplementary Fig. S3. Principal component analysis of relativized contaminant concentrations in Arctic char. Vector numbers refer to individual PCB congeners, see Table S3b.



Supplementary Fig. S4. Principal component analysis of relativized contaminant concentrations in Arctic char. Vector numbers refer to individual PCB congeners, see Table S3b.