

Annex 8.3.1. PFOS, FOSA and PFOA in river, lake, and estuary waters within the WEOG region

Media and country	Subregion	River/Lake/estuary	Collection year
<b>Rivers</b>			
UK	Yorkshire	Aire	2010
UK	Yorkshire	Aire	2013
Austria		Danube	2005
Germany/Austria/Hungary/Romania		Danube	2007
Austria		Schwechat	2005
Germany		Elbe River	2006
Germany		Elbe River	2006
Germany		Elbe River	2007
Germany		Elbe River	2007
Belgium/Netherlands		Scheldt River	2007
Belgium		Scheldt River	2008
Germany	Bayreuth	Roter Main	2005
Italy		River Po	2006-07
Switzerland/Germany/Netherlands		Rhine basin #1-60	2008
Germany		Ruhr River basin	2006
Switzerland/Germany/Netherlands		Rhine River basin	2006
Switzerland		River Glatt	2006
Germany		Rhine	2007
Germany		Rhine River	2007
Netherlands		Meuse	2006
Netherlands		Rhine	2006
Spain	Tarragona	Ebro River	2007
Spain	Valencia	L'Albufera Park	2009
France	Paris region	Orge River	2010
France		Loire	2009
France		Moselle	2009
France		Bordeaux	2009
France		Seine	2009
Spain		Llobregat River	2008-09
Spain		Xúquer River	2011
Spain		Llobregat River	2011
Spain		Ebro River	2011
Germany		Agricultural stream	2011
Germany	near Hesse	Agricultural stream	2011
Poland		River Motława	2004
Poland		River Radunia	2004
Canada	Quebec	St. Lawrence R.	2006
Canada	Manitoba	Nelson R.	2008

Canada	Alberta/Saskatchewan	North Sask. River	2005
USA	Georgia	Coosa River catchment	2008
USA	North Carolina	Cape Fear river basin	2006
US/Canada	NY	Niagara River	2004
USA	NY	Hudson River	2004
USA	NJ	New Jersey surface waters	2010
USA	IL	Illinois R	2008
USA	MN	Minnesota R	2008
USA	MN	Mississippi R	2008
USA	WI	Mississippi R	2008
USA	IL	Mississippi R	2008
USA	MO	Missouri R	2008
USA	WA	Columbia R	2008
USA	GA	Altamaha River	2005
USA	WA	Quinault River	2008
USA	WA	Entiat River	2008
Norway	Svalbard	Longyeardalen River	2006
Australia	NSW	Upper Parramatta River (Sydney)	2007

### Small Lakes

Denmark	Faroe Is	Lakes Leitisvatn, Havnadal, Kornvatn, and Á Mýranar	2012
Norway	Norway	Lake Mjøsa	2003
Canada	Ellesmere Is	Lake A	2008
Canada	Cornwallis Is	Amituk Lake	2003
Canada	Cornwallis Is	Char Lake	2003&2005
Canada	Cornwallis Is	Resolute Lake	2003&2005
Canada	Cornwallis Is	Meretta Lake	2003&2005
Canada	Northern Québec	Pingualuk	2007
USA	NY	Lake Onondaga	2004
Antarctica	King George Is, Fildes Peninsula	4 small lakes	2011
USA	NY State	remote lake	2006
USA	NY State	remote lake	2006
USA	WA	Lake Washington	2008

### Large Lakes

USA	NY/Vermont	Lake Champlain	2004
US/Canada	NY/Ontario	Lake Ontario (southeast)	2004
US/Canada	NY/Ontario	Lake Ontario	2004
US/Canada	NY/Ontario	Lake Ontario	2005
Canada/USA	NY/ON	Lake Ontario	2010
US/Canada	NY/Ontario	Lake Erie (east)	2004
US/Canada	OH/Ontario	Lake Erie	2004

Canada/USA	OH/PA/NY/ON	Lake Erie	2007
Canada/USA	MI/Ontario	Lake Huron	2004
Canada/USA	MI/ON	Lake Huron	2007
Canada/USA	MI/ON	Lake Superior	2005
Canada/USA	MI/ON	Lake Superior	2005
Canada/USA	MI/Ontario	Lake Superior	2005
USA	MI/ON	Lake Michigan	2006
Canada	Manitoba	Lake Winnipeg north basin	2008
Canada	Ellesmere Is	Lake Hazen	2013

### Estuaries and regional seas

Germany		Elbe Estuary	2006
Germany		Elbe Estuary	2006
Germany		Elbe estuary	2005
Germany		North Sea (near Elbe)	2006
Germany		North Sea (near Elbe)	2006
North Sea		Eastern North Sea	2005
Baltic Sea		Baltic Sea	2007
Baltic Sea		Southern Baltic	2008
Baltic Sea		Central Baltic/Gulf of Finland	2008
Baltic Sea		Kattegat/Skagerrak	2008
North Sea		German coast	2007
Finland		Gulf of Finland (Helsinki, Porvoo)	2003
Norwegian Sea		Norwegian coast	2007
France	E Atlantic	Bay of Biscay	2007
UK/France		English Channel	2008
Beaufort Sea		Mackenzie Bay	2005
USA	RI	Narragansett Bay/RI Sound	2009
Greenland	N Atlantic	E Greenland coast	2009
Antarctica	King George Is.	coastal seawater (remote)	2011
USA	WA	Puget Sound - nearshore and estua	2010
Canada	BC	west Vancouver Is - nearshore	2010
North Sea		Northern North Sea	2005
North Sea		Central North Sea	2005
UK/France		English channel	2005
Denmark		Danish coastal	2003
Iceland		Gufunes bay	2003
Faroe Is		Torshavn, Utfyri skipasmiduna	2003
Norway	Svalbard	Adventfjorden/Isfjorden	2006
Italy		Northern Adriatic Sea	2011
Netherlands		North Sea near Rhine	2008
Poland		Gulf of Gdansk	2004
Spain	East coast	coastal waters	2009
USA	CA	San Francisco Bay	2009
Belgium	North Sea	Coastal Belgium	2009

## Footnotes

<sup>1</sup> to calculate averages, 1/2 MDL and 1/2 LOQ were used if numerical values were not given

<sup>2</sup> = minimum not reported

<sup>3</sup> = FOSA not reported

<sup>4</sup> = SD instead of min/max

i (March 2015)

N	Sample type	PFOS			FOSA			PFOA		
		average	min	max	average	min	max	average	min	max
4		0.263	0.150	0.480				1.9	1.7	2.1
4		1.58	0.300	3.00				8.00	7.80	8.20
3	unfiltered	<4			<1			18	17	19
52	unfiltered	19	<sup>2</sup>	8	<sup>3</sup>			46	<sup>2</sup>	20
3	unfiltered	20.0	<5	35	<1			3.8	<1.1	5.1
16	dissolved	4.88	1.27	8.26	4.87	1.24	8.91	8.37	2.85	12.45
15	particulate	1.17	0.12	2.32	1.66	0.36	4.04	0.14	0.01	0.30
15	unfiltered	1.62	0.50	2.9	0.32	0.10	1.00	6.36	2.80	9.6
3	unfiltered	16.3	11	19	<sup>3</sup>			6.00	5.00	7.00
3	unfiltered	102	41	154	<sup>3</sup>			57.0	10.0	88.0
7	unfiltered	11.6	1.07	18.6	<sup>3</sup>			25.6	1.92	41.4
2	unfiltered	3.3	3.2	3.4	<sup>3</sup>			2.40	2.20	2.60
11	unfiltered	6.1	2.0	12.0	<sup>3</sup>			89.0	2.00	337
60	unfiltered	4.1	0.9	24.8	<sup>3</sup>			5.2	0.61	42
22	unfiltered	15.0	1.00	193	<sup>3</sup>			316	1.00	3640
38	unfiltered	7.13	1.00	26.0	<sup>3</sup>			6.5	1.00	48.0
20	unfiltered	49	27	93				7.43	3.1	12
6	unfiltered	20.5	15	32	<sup>3</sup>			7.5	3.00	16.0
8	unfiltered	2.26	1.46	4.21				3.21	1.25	5.17
5	unfiltered	23	<1	56	<sup>3</sup>			31.2	19	57.0
3	unfiltered	28.3	25	30	<sup>3</sup>			19.0	16.0	24.0
2	unfiltered	2.03	1.59	2.47	<0.19			1.68	1.9	1.45
12	unfiltered	49.5	0.99	120	<sup>3</sup>			14.2	0.94	58.1
3	unfiltered	17.4	2.20	<sup>4</sup>	<sup>3</sup>			9.40	0.60	<sup>4</sup>
5	unfiltered	21.0	4.00	62.0	<sup>3</sup>			2.80	<4	4
3	unfiltered	7.00	6.00	8.00	<sup>3</sup>			4.67	<4	7
3	unfiltered	4.33	4.00	5.00	<sup>3</sup>			<4		
9	unfiltered	6.33	2.00	9.00	<sup>3</sup>			2.22	<4	4
6	unfiltered	116	20	348	<sup>3</sup>			21.0	7.4	44
3	unfiltered	42.9	<0.39	128	<0.5			17.9	<0.83	52.0
3	unfiltered	904	<0.39	2708	<0.5			26.4	1.20	68.0
5	unfiltered	0.43	<0.39	0.60	<0.5			4.41	<0.83	11.0
5	unfiltered	1.09	0.26	1.30	<1.7			2.18	0.49	2.80
18	unfiltered	1.48	1.30	4.60	<1.7			2.71	0.46	6.50
6	unfiltered	0.60	0.24	2.29	<2			0.42	0.25	0.54
7	unfiltered	7.34	0.25	19	0.17	0.04	0.25	0.9	0.6	1.1
3	unfiltered	6.38	4.35	7.82	0.069	0.054	0.083	3.70	1.61	5.46
4	unfiltered	0.66	0.63	0.73	0.010	<0.004	0.015	0.92	0.86	1.04

4 unfiltered	1.42	0.58	1.94	0.234	<0.004	0.93	0.80	0.53	0.98
8 unfiltered	130	<7	321	<sup>3</sup>			96.9	<7	204
10 unfiltered	50.4	30.0	127	<sup>3</sup>			135	46.8	287
3 unfiltered	5.50	3.30	6.70	<sup>3</sup>			19.0	18.0	22
8 unfiltered	1.70	1.50	3.40	<sup>3</sup>			35.0	22.0	173
12 unfiltered	8.42	<5	43.0	<sup>3</sup>			21.0	<5	100
24 unfiltered	12.5	1.76	50.8	<sup>3</sup>			11.0	2.2	26.9
16 unfiltered	4.3	<0.014	18.9	<sup>3</sup>			2.87	<0.71	22.5
48 unfiltered	12.4	<0.014	245	<sup>3</sup>			3.15	<0.014	23.8
23 unfiltered	13.8	1.7	61.7	<sup>3</sup>			13.5	<0.71	125
22 unfiltered	7.28	1.76	61.7	<sup>3</sup>			4.62	1.67	31.0
12 unfiltered	4.87	1.62	11.0	<sup>3</sup>			1.50	<0.71	9.4
7 unfiltered	0.779	0.25	1.66				0.234	0.025	0.52
9 unfiltered	2.63	2.3	2.9				3.03	2.6	3.7
2 unfiltered	0.375	<0.1	0.5				0.265	<0.25	0.28
2 unfiltered	0.745	<0.25	1.24				0.215	<0.25	0.33
6 unfiltered	0.290	0.370	<sup>4</sup>	<sup>3</sup>			0.305	0.193	<sup>4</sup>
20 unfiltered	14	7.5	21	<sup>3</sup>			5.7	4.2	6.4

4 unfiltered	0.25	0.05	0.57	<sup>3</sup>			0.29	0.23	0.42
5	0.31	0.13	0.48	0.025	0.03	0.03	6.81	4.82	8.23
11 unfiltered	0.03	0.01	0.07				0.15	0.09	0.25
3 unfiltered	1.20	0.900	1.5				4.10	1.90	8.40
6 unfiltered	1.83	0.900	2.5				1.75	0.40	3.40
12 unfiltered	44.9	23	90				9.85	5.00	16.00
6 unfiltered	54	50	57				13.50	13.00	15.00
1 unfiltered	0.028			0.004			0.062		
3 unfiltered	756	198	1090	<sup>3</sup>			49.0	39.0	64.0
4 unfiltered	0.02	0.01	0.02	<0.04			0.08	0.05	0.10
6 unfiltered	1.67	0.25	2.88	<0.25	<0.25	0.4	10.1	4.83	15.8
5 unfiltered	7.11	5.85	9.3	<0.25	<0.25	0.47	6.79	3.27	10.6
2	5.86	5.61	6.1				4.185	2.54	5.83

4 unfiltered	2.70	0.80	7.70	<sup>3</sup>			24.0	10.0	46.0
13 unfiltered	4.90	2.90	30.0	<sup>3</sup>			21.0	18.0	34.0
7 unfiltered	6.14	3.60	8.40	0.117	0.100	0.200	3.63	2.00	6.70
2 unfiltered	4.20	3.60	4.80	0.300	0.100	0.500	1.90	1.80	2.00
8 unfiltered	5.96	2.60	9.48	<sup>3</sup>			2.26	1.71	3.72
3 unfiltered	3.00	2.80	5.50	<sup>3</sup>			15.0	13.0	27.00
3 unfiltered	4.50	4.00	5.30	0.400	0.200	0.600	1.90	1.60	2.20

3 unfiltered	2.84	2.49	3.41	<sup>3</sup>			1.86	1.56	2.11
6 unfiltered	2.05	1.20	3.20	0.250	0.100	0.400	0.55	0.10	1.10
8 unfiltered	2.25	0.239	2.30	<sup>3</sup>			2.20	0.49	3.84
6 unfiltered	0.35	0.07	1.00	0.003	<0.001	0.01	0.39	0.19	0.69
9 unfiltered	0.25	0.10	0.40	<sup>3</sup>			0.48	0.18	0.95
3 unfiltered	0.23	0.10	0.30	0.150	0.100	0.200	0.63	0.20	1.20
4 unfiltered	2.00	1.73	2.36	<sup>3</sup>			2.22	1.88	2.57
4 unfiltered	0.79	0.68	1.10	0.007	<0.004	0.010	1.01	0.86	1.24
8 unfiltered	0.02	0.01	0.027	0.010	0.001	0.023	0.12	0.07	0.40
4 dissolved	1.07	0.18	2.18	1.84	0.92	2.84	4.47	3.75	5.29
4 particulate	0.30	0.03	0.76	0.61	0.31	0.95	0.20	0.08	0.35
4 unfiltered	2.11	1.23	3.64						
4 unfiltered	2.24	1.17	4.16	0.85	0.44	1.18	3.81	3.58	4.02
4 particulate				0.22	0.14	0.37			
8 unfiltered	1.10	0.28	1.48						
19 unfiltered	0.08	0.02	0.33	<0.06			1.41	0.16	4.50
33 unfiltered	0.21	0.04	0.39	0.03	0.01	0.24	0.41	0.15	0.78
25 unfiltered	0.16	0.06	0.24	0.15	0.01	0.69	0.37	0.24	0.56
10 unfiltered	0.20	0.10	0.30	0.05	0.01	0.16	0.60	0.46	0.73
16 unfiltered	0.95	<0.01E	2.20	0.13	<0.03	0.38	1.88	0.18	2.90
4	6.19	0.86	21.70	0.04	0.03	0.07	4.75	3.97	5.60
4 unfiltered	<0.03			0.20	0.12	0.28	0.25	0.07	0.35
5 unfiltered	0.09	0.01	0.29	0.21	0.10	0.31	0.16	0.10	0.23
7 unfiltered	0.12	0.08	0.23	0.05	0.03	0.07	0.13	0.09	0.22
3 unfiltered	0.01	0.01	0.01	<0.001			0.03	0.03	0.03
2 unfiltered	1.20	0.19	2.20	0.03	0.01	0.05	0.73	0.25	1.20
6 unfiltered	0.02	0.01	0.05	0.05	0.02	0.08	0.07	0.04	0.09
5 unfiltered	<0.006			0.03	0.02	0.05	0.11	0.08	0.17
7 unfiltered	2.25	<0.2	5.59	<sup>3</sup>			2.38	0.20	8.26
6 unfiltered	0.42	<0.25	0.80	<sup>3</sup>			1.27	0.80	1.80
6 unfiltered	0.10	0.05	0.18						
13 unfiltered	0.31	0.07	0.81						
6 unfiltered	0.23	0.12	0.43						
4	1.09	0.55	1.57	0.03	0.03	0.03	7.54	6.20	8.48
4	<0.13			<0.05			3.79	3.53	4.02
3	0.67	0.31	1.18	0.03	0.03	0.03	5.18	3.62	7.24
3 unfiltered	0.11	0.07	<sup>4</sup>	<sup>3</sup>			0.07	0.02	<sup>4.00</sup>
3 unfiltered	1.34	1.34	1.34	<sup>3</sup>			1.54	0.79	2.51
7 unfiltered	0.38	0.13	0.70	<sup>3</sup>			0.21	0.02	0.45
9 unfiltered	0.59	0.28	0.96	<0.5			0.38	0.13	0.63
29 unfiltered	0.44	0.02	3.93	<sup>3</sup>			0.35	0.04	1.86
unfiltered	7.00	2.40	44.30	<1			10.60	1.40	75.60
6 unfiltered	2.02	<1	4.20	<5			<5		

4

0.05

0.01

0.08

0.02

<0.01

0.03

0.11

0.10

0.17



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Halsall, unpublished







79o47' N    79.5    -12    12o3'E



Annex 8.3.2. PFOS, FOSA and PFOA in river waters within the WEOG region organized b

	PFOS			FOSA			PFOA
	average	min	max	average	min	max	average
Faroe Is	0.25	0.05	0.57	3.00			0.29
Norway	0.30	0.29	0.31	1.51	0.03	3.00	3.56
Lithuania	0.75	0.00	1.00				1.00
Poland	3.97	0.60	7.34	1.08	0.17	2.00	0.66
Italy	6.09	2.00	12.0				89.0
Germany	6.96	1.09	20.5	1.34	0.32	1.70	33.1
Sweden	7.00	1.00	21.0				4.29
Canada	8.75	0.03	54.0	0.06	0.00	0.23	7.47
France	11.2	2.00	62.0	3.00	0.00	0.00	4.22
Australia	14.0	7.50	21.0				5.70
Austria	14.3	4.00	20.0	1.00	1.00	1.00	22.6
Hungary	16.2	3.00	41.0				7.83
UK	35.8	2.00	238				28.7
Netherland	39.5	10.00	110				26.3
Switzerland	43.9	13.00	135				24.2
USA	57.1	1.67	756	0.25	0.25	0.25	26.2
Belgium	101.7	41.00	154				57.0
Spain	185.9	0.43	904	0.42	0.19	0.50	14.3
Slovenia	198.6	2.00	1371				2.29

<sup>1</sup>See Rivers,Lakes, Estuaries sheet

by country

min	max	References	
0.23	0.42		1
0.31	6.81		1
1.00	1.00	Loos et al. 2008a	
0.42	0.90		1
2.00	337		1
0.14	316		1
2.00	9.00	Loos et al. 2008a	
0.15	62.0		1
2.00	10.0		1
4.20	6.40		1
3.80	46.0		1
1.00	32.0	Loos et al. 2008a	
2.00	43.0	Loos et al. 2008a	
7.00	73.0	Loos et al. 2008a	
1.00	100.0	Loos et al. 2008a	
1.50	135.1		1
10.0	88.0		1
1.68	26.4		1
1.00	3.00	Loos et al. 2008a	

Annex 8.3.3 PFOS, FOSA and PFOA in ocean waters within the WEOG region

Ocean	Region	Range latitude (°N or S)	Range longitude (°W or E)	year
N Atlantic	E Greenland coast	67 - 82 N	25 W - 9 E	2009
N Atlantic	Bay of Biscay	44 - 46 N	6 - 8	2007
N Atlantic	Labrador Sea	53 - 59 N	50 - 55 W	2003
N Atlantic	W Atlantic Canada	43 - 49 N	49 - 52 W	2003
N Atlantic	Mid- N Atlantic	44 - 48 N	14 - 37 W	2003
N Atlantic	Mid-Atlantic	10.0 - 10.1 N	29 - 43 W	2002
N Atlantic	E Atlantic - W Africa	0 - 11 N	17 - 24 W	2002
N Atlantic	E Atlantic/W Europe	35 - 48 N	5 - 13 W	2008
N Atlantic	East Atlantic/W Africa	19 - 28 N	15 - 20 W	2008
N Atlantic	East Atlantic	22 - 45 N	8 - 22 W	2007
N Atlantic	Western Atlantic	35 - 41 N	69 - 70 W	2009
N Atlantic	Sargasso Sea	26 - 34 N	65 - 69 W	2009
Arctic Ocean	Bering St/Chukchi Sea	65 - 69 N	165 - 168 W	2005
Arctic Ocean	Archipelago	68 - 70 N	59 - 124 W	2005
Arctic Ocean	S. Greenland/Labrador Sea	59 - 63 N	45 - 52 W	2005
N Atlantic	East Atlantic/Portugal	46 - 42 N	10 - 12 W	2007
N Atlantic	East Atlantic/W Africa	20 - 34 N	13 - 20 W	2007
N Atlantic	western N Atlantic	20 - 34 N	13 - 20 W	2007
N Atlantic	mid-N Atlantic	20 - 34 N	13 - 20 W	2007
N Atlantic	E Atlantic/ Eq Africa	1 - 17 N	11 - 21 W	2007
N Atlantic	S. Greenland Sea	64-73 N	14-22 W	2009
N Atlantic	N. Greenland Sea	74-82 N	10E-15 W	2009
N. Pacific	Bering Sea	55 -64 N	166 E-170 W	2010
Arctic Ocean	Chukchi Sea	67 - 76 N	153 - 169 E	2010
N Atlantic	Coastal Greenland	71-80 N	16-24 W	2009
N Atlantic	Greenland Sea	68 - 80 N	0-20 W	2009
N Atlantic	Coastal France	45-50 N	2 - 6 W	2010
N Atlantic	East Atlantic/Portugal	39-43 N	10 - 12 W	2010
N Atlantic	E Atlantic/W. Africa	20-24 N	13 - 20 W	2010
N Atlantic	E Atlantic/ Eq Africa	2-15 N	19 - 21 W	2010
Southern Ocean	Antarctic/Southern Ocean	63-70 S	0 - 71 W	2010
Southern Ocean	Antarctic/Southern Ocean	51.5-65 S	109-135 E	2012/13
Southern Ocean	Southern Ocean/Australia	46-51 S	135-146 E	2012/13
Arctic Ocean	Canadian Arctic	123 W	71 N	2008
Arctic Ocean	Canadian Arctic	123 W	71 N	2008
Arctic Ocean	Barents Sea	75.65 N	20.9 E	2011
Arctic Ocean	Barents Sea	75.65 N	20.9 E	2011
Arctic Ocean	Rautenfjord, NW Spitsbergen	79.78 N	12.05 E	2012
Arctic Ocean	Rautenfjord, NW Spitsbergen	79.78 N	12.05 E	2012

N	PFOS (pg/L)			FOSA (pg/L)			PFOA (pg/l)	
	Average	min	max	Average	min	max	Average	
6	22.3	<10	54.9	48.1	18.0	76.1	66.3	
5	91	<10	291	206	97	307	156	
5	19.1	12.4	35.6				158	
3	10.1	8.6	10.9				220	
3	18.3	15.1	21.4				234	
3	63.3	43.8	77.5				231	
3	35.6	15.0	56.3				103	
12	65.6	45.0	116	18.9	<3.0	38.0	108	
3	85.0	62.0	112	<3.0			92.3	
8	123	43	190	1.15	0.5	1.8	156	
7	53.3	23.0	93.0	11.8	3.10	46.0	75.3	
11	23.9	13.0	32.0	3.35	1.10	6.90	37.3	
3	18.7	14.0	27.0	1.50	<1	3.50	36.0	
19	17.8	0.50	39.0	5.05	<1	44.0	27.9	
3.0	13.7	10.0	20.0	3.47	<1	7.5	29	
5	<10			69.6	<17	104	97.0	
11	<10			42.5	<17	110	43.3	
5	14.2	<10	51.0	<17			36.8	
7	12	<10	54.0	<17			69.1	
10	10.5	<10	60.0	25.6	<17	60	24.8	
9	36.3	<10	54.5	23.5	18	49.23	46.3	
23	10.9	<10	31.3	96.3	18	300.03	52.9	
5	28.0	10.5	60.0	58.2	<81	90.0	34.6	
13	27.5	21.0	53.0	56.9	<81	260	37.3	
5	<20						95.4	
20	10.8	<20	25.0				80.2	
5	96.6	69.0	130				121	
3	71.3	70.0	74.0				81.3	
5	55.2	47.0	65.0				63.9	
4	46.5	40.0	52.0				8.1	
17	14.4	<20	45.0				7.0	
35	61.7	10	340				48.9	
8	899	190	1690				635	
37	58.3	5.00	217	NR	NR		145	
10	217	4.70	533	NR	NR		780	
3	<10			63.5	<10	85	482	
2	283	<10	560	327	385	268	3175	
4	45	<10	76.0	22.5	<10	26	110	
4	78.3	5	101	55	<10	55	145	

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min	max	Reference	Notes
44.7	85.2	Busch et al 2010	
97.0	229	Ahrens et al. 2009c	
52	338	Yamashita et al. 2005; 2008	
160	330	Yamashita et al. 2005; 2008	
184	324	Yamashita et al. 2005; 2008	
100	450	Yamashita et al. 2005; 2008	
93.8	113	Yamashita et al. 2005; 2008	
77.0	154	Ahrens et al. 2010	
59.0	110	Ahrens et al. 2010	
35	260	Benskin et al. 2012	
30.0	130	Benskin et al. 2012	
21.0	49.0	Benskin et al. 2012	
32.0	39.0	Benskin et al. 2012	
6.50	54.0	Benskin et al. 2012	
23.0	35.0	Benskin et al. 2012	
80.0	115	Ahrens et al. 2009c	
<4	77	Ahrens et al. 2009c	
<4	81	Ahrens et al. 2009c	
<4	121	Ahrens et al. 2009c	
<4	87	Ahrens et al. 2009c	
17.43	94.9	Busch et al 2010	
6.70	120	Busch et al 2010	
<20	86	Cai et al 2012b	
<20	67	Cai et al 2012b	
57.0	130	Zhao et al 2013	
45.0	160	Zhao et al 2013	
86.0	160	Zhao et al 2013	
71.0	94.0	Zhao et al 2013	
<13	93.0	Zhao et al 2013	
<13	13.0	Zhao et al 2013	
<13	15.0	Zhao et al 2013	
10	1260	Bengtson-Nash 2013	
10	1220	Bengtson-Nash 2013	
29	520	Bertrand et al 2013	Seawater (beneath ice seawater) n=37
50	3270	Bertrand et al 2013	Seaice (fresh & first year ice ) n=10
330	511	Bertrand et al 2013	Seawater (beneath ice seawater) n=3
2630	3720	Bertrand et al 2013	Seaice (multi-year ice) n=2
95	165	Bertrand et al 2013	Seawater (beneath ice to 18m depth) n=4
126	175	Bertrand et al 2013	Seaice (fjord ice ~0.6 m thick) n=4

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 Ahrens et al. 2009c  
 Ahrens et al. 2010  
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 Ericson et al. 2008  
 Flores et al. 2013  
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 Möller at.al 2010  
 Nakayama et al 2007  
 Nakayama et al 2010  
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