Air monitoring in Canada and the global passive monitoring project

GLOBAL OBSERVATION SYSTEM FOR MERCURY

Environment and Climate Change Canada- Atmospheric Mercury Monitoring Network (ECCC-AMM)

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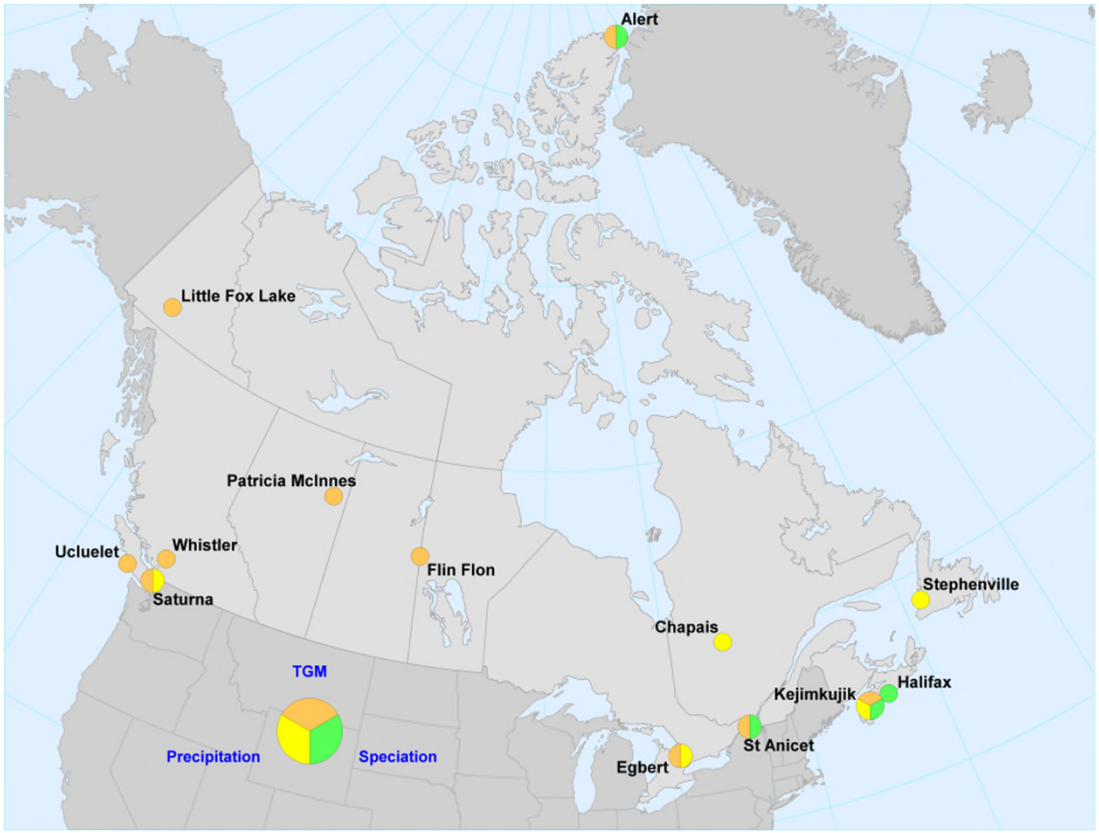
Canadian Atmospheric Mercury Monitoring (ECCC-AMM)

Active Air Monitoring
- *10 TGM*
- *4 Speciation*
- *5 Wet Deposition*

At one point…

Active Air Monitoring
- *6 TGM*
- *2 Speciation*
- *4 Wet Deposition*

Currently



Canadian Atmospheric Mercury Monitoring

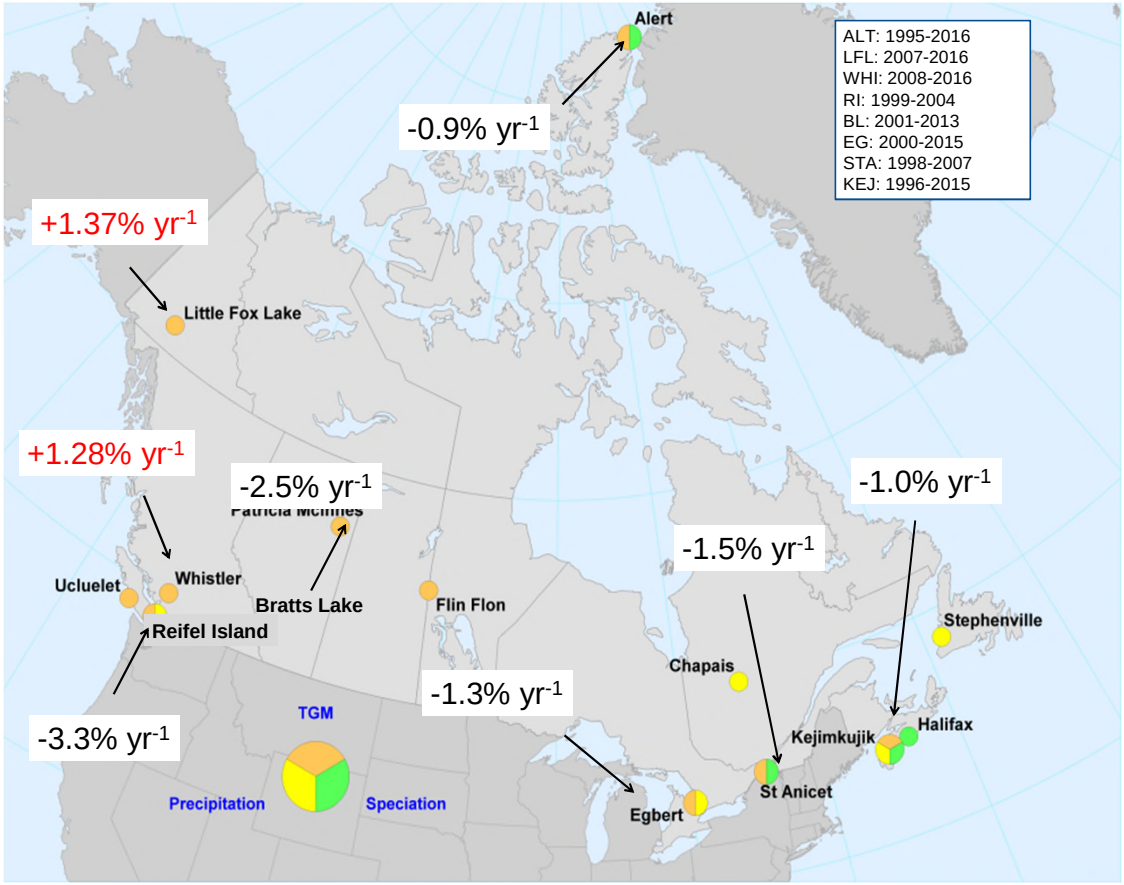
Air monitoring sites and concentrations

Station	Network	Long., °W	Lat., °N	No. of days	Measurement period for data included here	Mean TGM, ng m^{-3}	Mean TGM 2005[a]
Little Fox Lake YK	NCP[b]	135.63	61.35	1 686	Jun 2007 – Oct 2011	1.28	-
Reifel Island BC	CAMNet	123.17	49.10	1 759	Mar 1999 – Feb 2004	1.67	1.67
Saturna BC	CAPMoN	123.13	48.78	641	Mar 2009 – Dec 2010	1.43	-
Whistler BC	INCATPA[c]	122.93	50.07	1 086	Aug 2008 – Oct 2011	1.21	-
Meadows AB	None	114.64	53.53	821	May 2005 – Dec 2008	1.51	-
Genesee AB	None	114.20	53.30	2 154	Mar 2004 – Dec 2010	1.53	-
Fort Chipewyan AB	CAMNet	111.12	58.78	398	Jun 2000 – July 2001	1.36	1.36
Esther AB	CAMNet	110.20	51.67	1 032	Jun 1998 – Apr 2001	1.65	1.65
Bratt's Lake SK	CAPMoN	104.71	50.20	3 372	May 2001 – Dec 2010	1.44	1.53
Flin Flon MB	CARA	101.88	54.77	891	Jul 2008 – Jun 2011	3.75	-
Windsor ON	None	83.01	42.18	727	Jan 2007 – Dec 2008	1.93	-
Burnt Island ON	CAMNet	82.95	45.81	3 533	May 1998 – Dec 2007	1.55	1.58
Egbert ON	CAMNet	79.78	44.23	5 135	Dec 1996 – Dec 2010	1.58	1.67
Buoy ON	CAMNet	79.45	43.40	76	Jul – Sep 2005	1.70	-
Kuujjuarapik QC	CAMNet	77.73	55.30	3 677	Aug 1999 – Sep 2009	1.68	-
Point Petre ON	CAMNet	77.15	43.84	4 070	Nov 1996 – Dec 2007	1.75	1.78
St. Anicet QC	CAMNet	74.28	45.12	5 607	Aug 1994 – Dec 2009	1.60	1.64
St. Andrews NB	CAMNet	67.08	45.09	3 936	Jan 1996 – Jul 2007	1.38	1.42
Kejimkujik NS	CAMNet	65.21	44.43	5 479	Jan 1996 – Dec 2010	1.40	1.45
Mingan QC	CAMNet	64.17	50.27	1 461	Jan 1997 – Dec 2000	1.57	-
Southampton PE	CAMNet	62.58	46.39	731	Jan 2005 – Dec 2006	1.23	-
Alert NU	CAMNet	62.33	82.50	6 196	Jan 1995 – Dec 2011	1.51	1.55

Wet Deposition

Station	Network	Long., °W	Lat., °N	Measurement period for data presented here	Total Hg, ng L^{-1}	Mean monthly precipitation, mm	Mean Hg deposition µg m^{-2} $month^{-1}$
Reifel Island BC	MDN	123.17	49.10	Apr 2000 – Feb 2004	5.6	68	0.38
Saturna BC	MDN	123.13	48.78	Sep 2009 – Jan 2011	4.5	91	0.41
Fort Vermilion AB	GSC	116.02	58.38	Dec 2006 – Jan 2008	4.3	22	0.10
Genesee AB	MDN	114.20	53.30	Jul 2006 – Jan 2011	12.8	32	0.44
Crossfield AB	GSC	114.00	51.29	May 2006 – Dec 2007	9.3	23	0.21
Henry Kroeger AB	MDN	110.83	51.42	Oct 2004 – Jan 2011	11.7	25	0.35
Esther AB	MDN	110.20	51.67	Apr 2000 – May 2001	14.2	14	0.21
Bratts Lake SK	MDN	104.72	50.20	Jun 2001 – Jan 2011	11.2	26	0.37
Flin Flon MB	-	101.88	54.77	Sep 2009 – Dec 2010	59.9	30	4.87
Churchill MB	GSC	94.07	58.75	Jun 2006 – Dec 2007	5.3	15	0.11
ELA ON	MDN	93.72	49.66	Nov 2009 – Jan 2011	9.6	69	0.77
Burnt Island ON	MDN	82.95	45.81	Nov 2001 – Mar 2003	9.2	61	0.50
Egbert ON	MDN	79.78	44.23	Mar 2000 – Jan 2011	8.4	57	0.47
Dorset ON	MDN	78.93	45.22	Jan 1997 – Dec 1998	9.7	57	0.53
Point Petre ON	MDN	77.15	43.84	Nov 2001 – Mar 2003	9.1	58	0.51
Chapais QC	MDN	74.98	49.82	Dec 2009 – Jan 2011	6.4	71	0.46
St. Anicet QC	MDN	74.03	45.20	Apr 1998 – Aug 2007	7.9	70	0.55
St. Andrews NB	MDN	67.08	45.08	Jul 1996 – Dec 2003	6.6	86	0.56
Kejimkujik NS	MDN	65.21	44.43	Jul 1996 – Jan 2011	5.2	111	0.58
Mingan QC	MDN	64.23	50.27	Apr 1998 – Aug 2007	5.0	77	0.38
Stephenville NL	MDN	58.57	48.56	Feb 2010 – Jan 2011	5.6	97	0.50
Cormak NL	MDN	57.38	49.32	May 2000 – Jul 2010	4.2	94	0.39

Overall trends of atmospheric Hg in Canada from the GMA 2018



Canadian Mercury Science Assessment

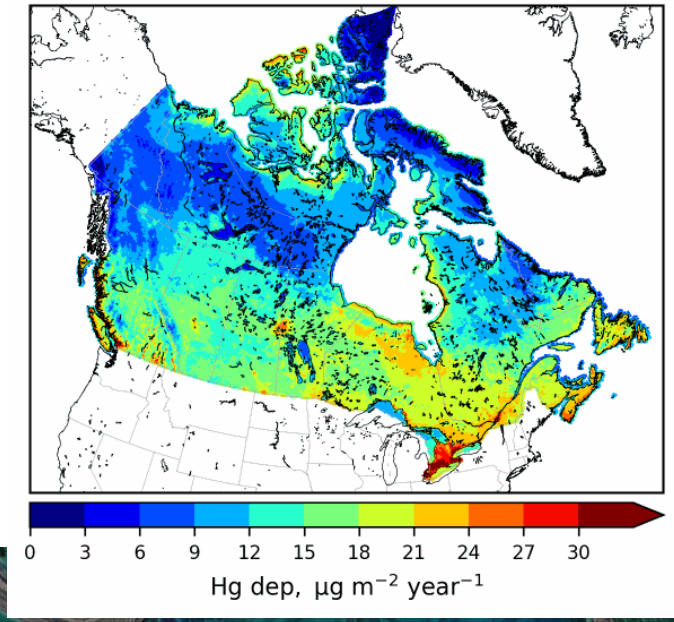
Science recommendations to policy

Responded to policy questions

- *What ecosystems are at risk in Canada?*
- *What activities have the most impact on Hg levels?*
- *What are the main emission sources contributing to Canadas burden?*

Sources of total deposition in Canada
35% global terrestrial
25% oceanic
40% anthropogenic

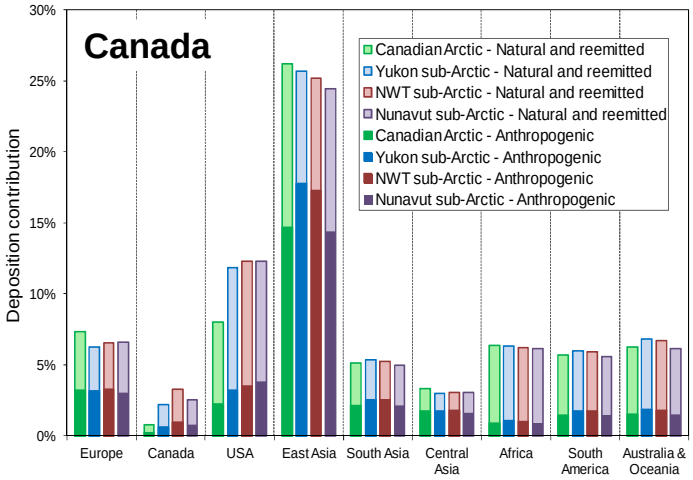
95% anthropogenic Hg deposited in Canada is from outside of Canada



Mercury Deposition in Canada
Average (2011-2015)

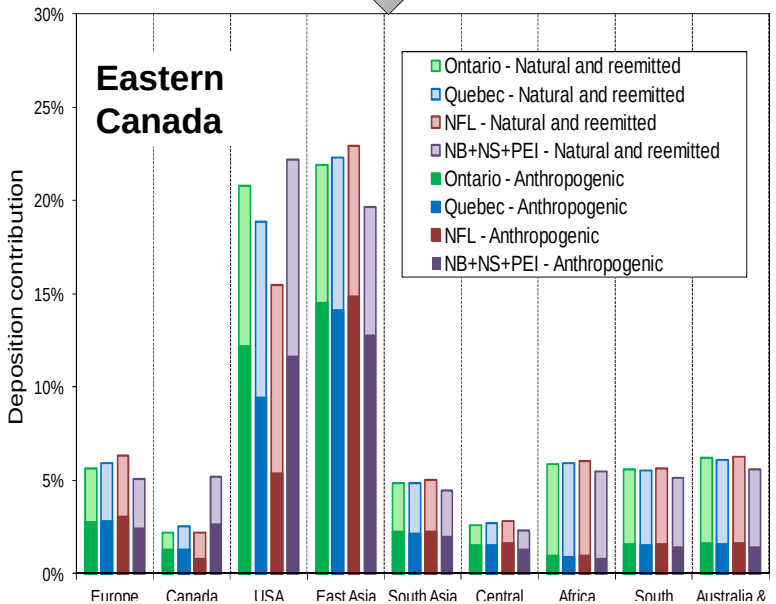
Hg deposition regional contribution

Global/Regional Atmospheric Heavy Metals Model for 2005



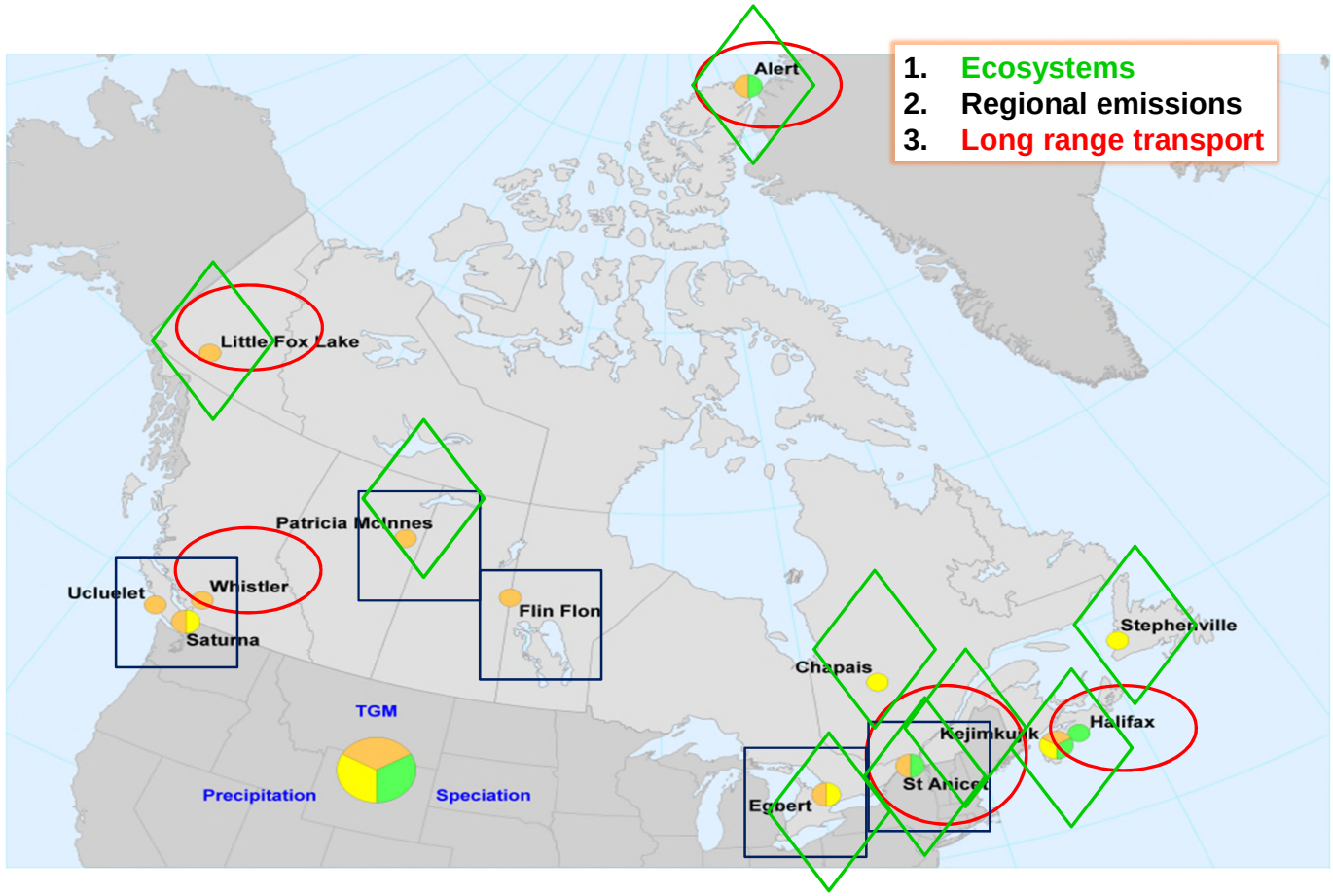
Canadian Arctic
Yukon sub-Arctic
NWT sub-Arctic
Nunavut sub- Arctic

Ontario
Quebec
Newfoundland
NB+NS+PEI

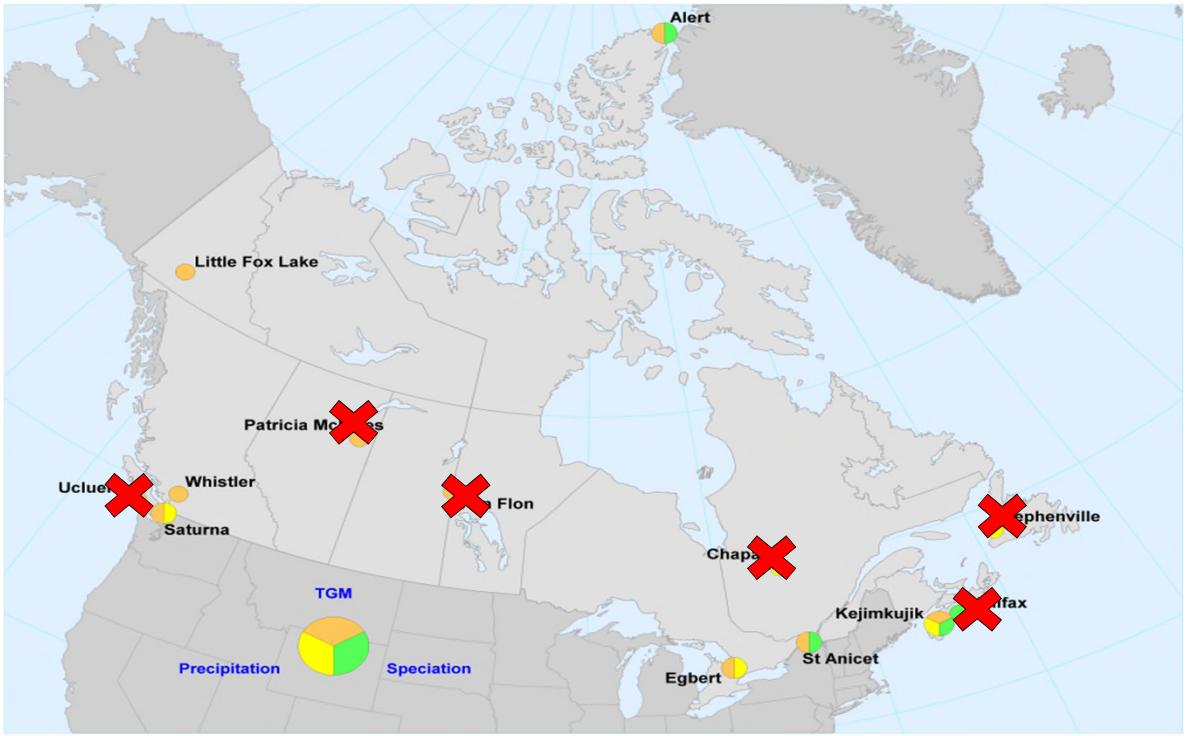


Ashu Dastoor

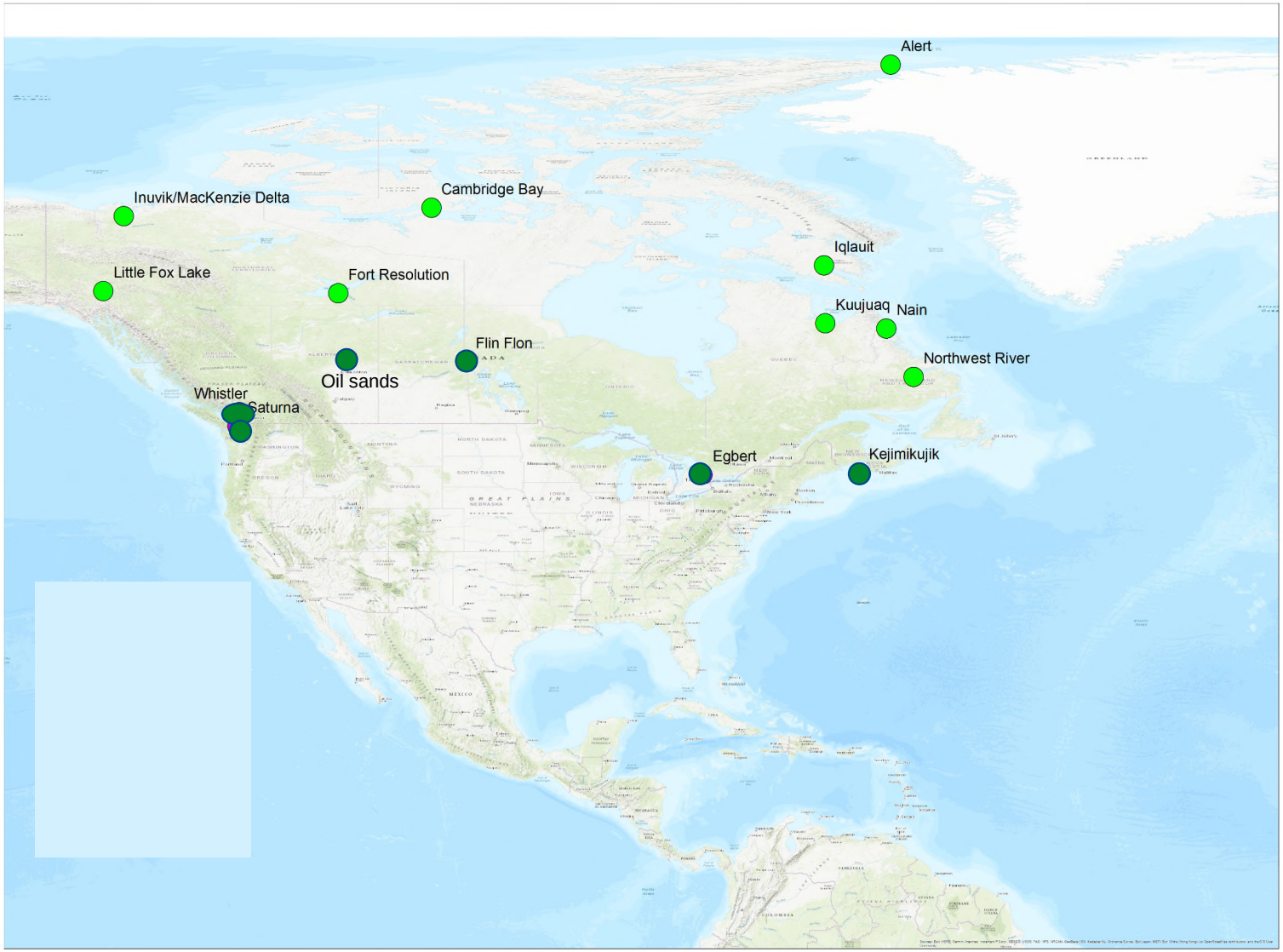
Monitoring plan for Canada



We have less sites to address this plan



Fill in the gaps with passive sampling

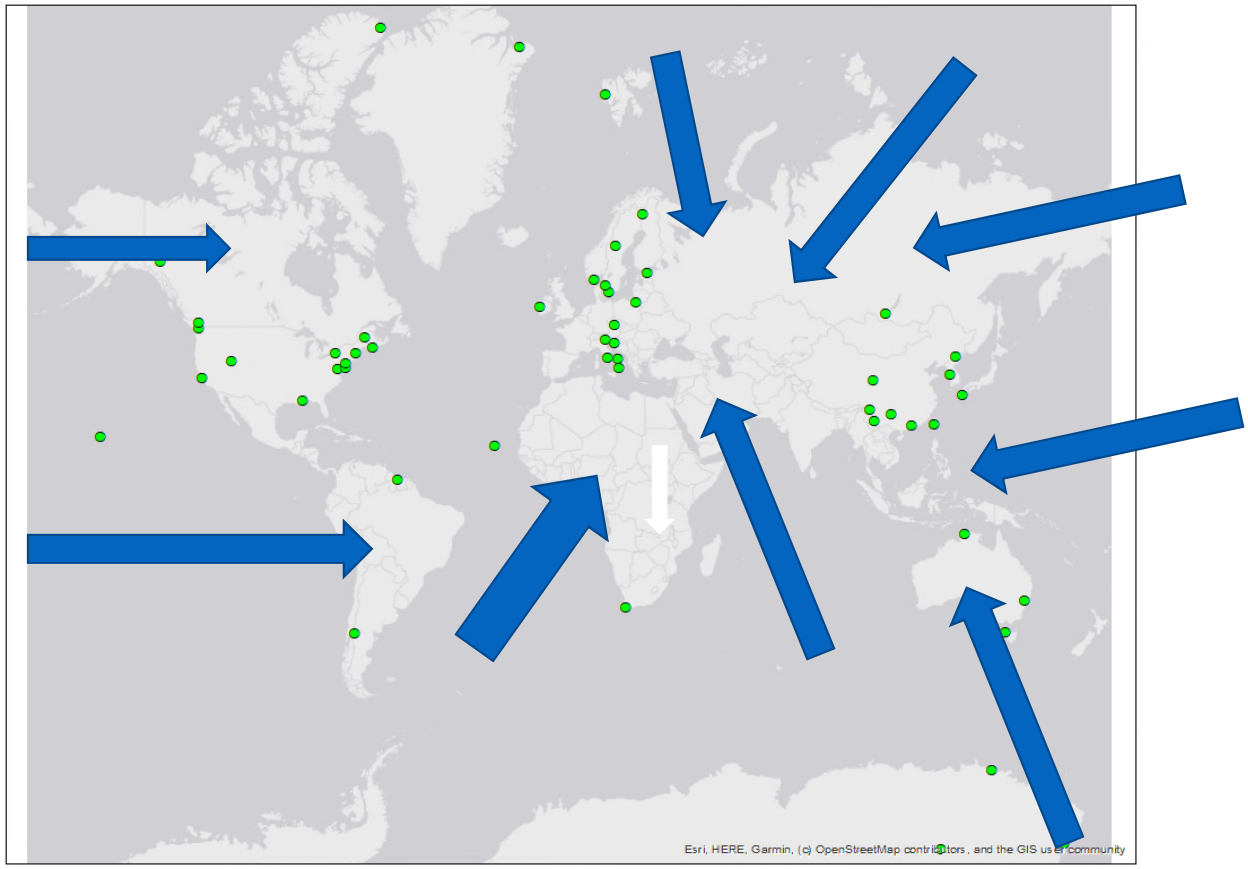


Significant gaps in Hg monitoring

There is a need for global air monitoring

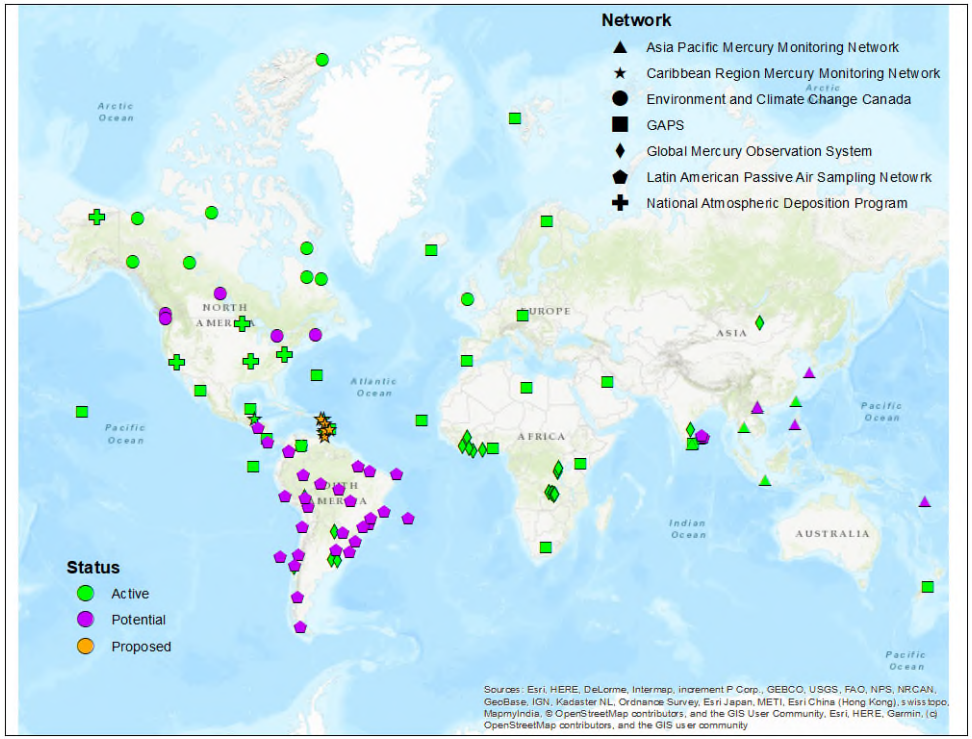
…but there isn't an appetite to create a whole new network within the Minamata Convention

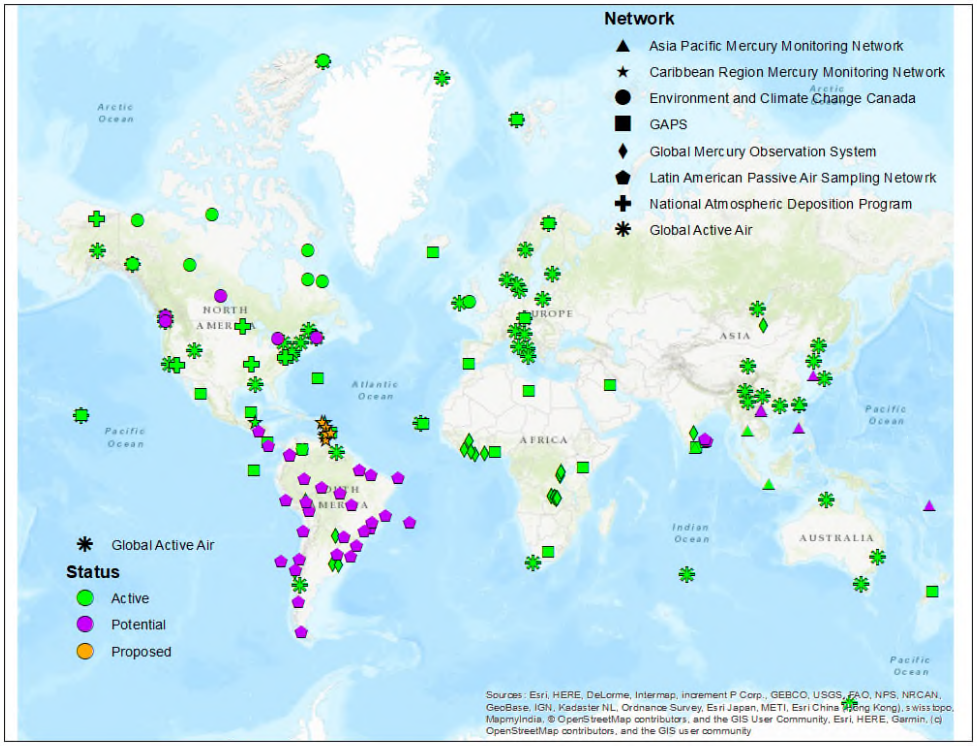
Fill in the gaps with passive air samplers through a concept of "network of networks"



ECCC – Initiated a global Passive monitoring pilot project

Initiate a global passive sampling network of networks

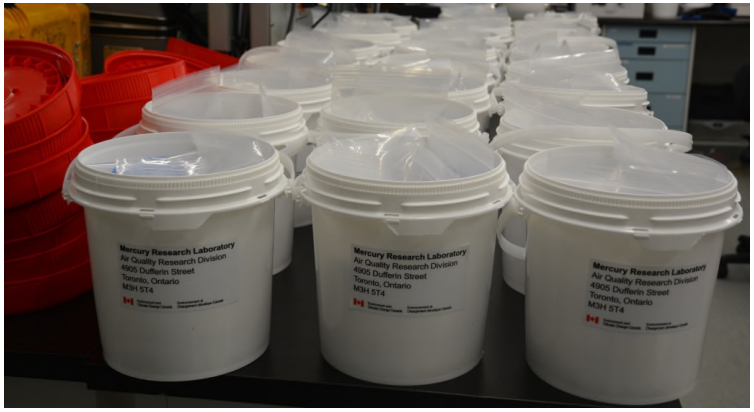




So far so good – 28 countries, ~ 50 sites!

Maldives

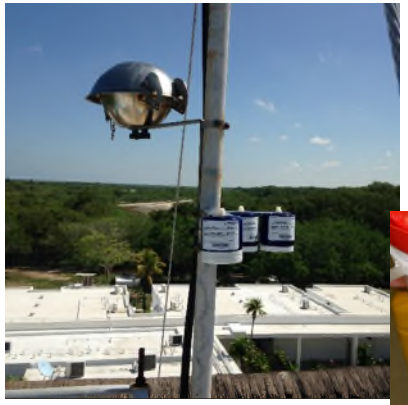
Spain



Finland

Kenya

Indonesia



Mexico