

Northern Contaminants Program Programme de lutte contre les contaminants dans le Nor





Environment and Climate Change Canada

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Introduction

- Arctic top and apex predators including polar bears (Ursus) maritimus) bioaccumulate a broad array halogenated flame retardants (HFRs) and other organic contaminants [1], and also have a high capacity to metabolize some compounds [2]
- Banned legacy persistent organic pollutants (POPs) such as DDTs and PCBs are decreasing over time in marine mammals, fish, and seabirds throughout the Arctic, with some exceptions [3]
- Polybrominated diphenyl ethers (PBDEs) underwent rapid increases in some Arctic marine mammals in the 1980's and 1990's and then plateaued after bans on production and restrictions on use in North America [3,4]
- Trends of HFRs and perfluorinated alkyl substances (PFASs) have been less consistent, increasing in some species [4]
- The recent regulation of PBDEs and other HFRs makes assessing their temporal trends important for understanding the effectiveness of regulatory action on wildlife contaminant trends in the Arctic

Objectives:

- Investigate the temporal trends in concentrations of PBDEs and alternative HFRs, as well as priority PCBs (for comparison)
- **Examine changes and differences in patterns of PCB** and PBDE congeners over time



biphenyls (BB-101, BB-153), pentabromophenyl allyl ether (PBP-AE), 5,6-dibromo-1,10,11,12,13,13-hexachloro-11tricyclo[8.2.1.02,9]tridecene (DBHCTD), 2,4,6-tribromophenyl-2,3-dibromopropyl ether (TBPDPTE), 2,3-dibromopropyl pentabromophenyl ether (PBP-dbpe), bis(2-ethylhexyl)-tetrabromophthalate (BEH-TEBP), and Dechlorane Plus (syn-DDC-CO and anti-DDC-CO)

References

- [1] Letcher, R. J., et al., 2018. Science of the Total Environment. 610-611, 121-136.
- [2] AMAP, 2018. AMAP Assessment 2018: Biological Effects of Contaminants on Arctic Wildlife and Fish. Arctic Monitoring and Assessment Programme (AMAP), Tromsø, Norway. vii+84pp
- [3] Arctic Monitoring and Assessment Programme (AMAP), AMAP Assessment 2015: Temporal Trends in Persistent Organic Pollutants in the Arctic. In: Arctic Monitoring and Assessment Programme (AMAP), (Ed.), Oslo, Norway, 2016, pp. vi+71. [4] Ikonomou, G. V., 2005. Spatial and temporal trends of PBDEs in biota from the Canadian Arctic marine environment. Organohalogen Compounds. 67, 950-953

Halogenated flame retardant temporal trends in polar bears from the two major subpopulations in Hudson Bay, Canada Carletor NSERC CRSNG Adam D. Morris¹, Robert J. Letcher¹, David Blair¹, Markus Dyck² UNIVERSITY

Results **Trends of PBDEs:** Southern Hudson Bay Western Hudson Bay 100] BDE-47 +8.5% yr⁻¹ **BDE-47 BDE-99** +7.5% yr⁻¹ **BDE-100 BDE-100** +9.1% yr-**BDE-153 BDE-153** S +8.7% yr⁻¹ Σ_{ϵ} PBDE Σ_FPBDE 250 Figure LN-linear median trends concentrations (ng g⁻¹ lipid weight) in WHB and SHB polar bears. Σ_5 PBDE = BDE-47, -99, -100, -153, -209. **Trends of non-PBDE HFRs::** Western Hudson Bay Southern Hudson Bay *p = 0.09

2010

2000

BB-153

2005

2010

300

200

100

202

weight) in the Southern and Western Hudson Bay polar bears.

BB-153

1990

300

200

100



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