



Polychlorinated Biphenyls

in the Georgia Basin

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What are PCBs?

PCBs are man-made chlorinated organic chemicals which have been sold in North America since the 1920s under the trade name Aroclor™. They have been used extensively worldwide as dielectric fluids in electrical equipment, heat exchanger fluids, investment casting waxes, and in various other products including paints, pesticides, plastics, and carbonless copy paper. Although they have never been manufactured in Canada, they were imported from the US. In 1979, their import into Canada was formally banned. Regulations controlling the import, use, storage and destruction of PCBs have been developed under the *Canadian Environmental Protection Act, 1999*. While the continued use of PCBs in older closed electrical equipment (such as transformers) is permitted until the end of their service life, all other uses are prohibited.

Why are they of concern?

Like other POPs, PCBs are P-B-T (persistent, bioaccumulative and toxic). They are lipid or fat soluble and can accumulate to high concentrations in the fatty tissues of organisms. Biomagnification through the food chain has been observed. In addition, they are resistant to degradation and persist for long periods of time in the environment. Since they are semi-volatile, atmospheric currents can transport PCBs long distances from their point of origin and ultimately deposit them in new locations, including northern regions and remote lakes. They are toxic to aquatic organisms at very low concentrations and can cause adverse effects including impaired survival, growth, development, metabolic function, and neurological development; behavioural abnormalities; suppressed immune function; liver damage; endocrine disruption; birth defects; and long-term reproductive and intergenerational effects. Long term exposure can cause a variety of similar adverse effects in birds and mammals.

How do they enter the Georgia Basin environment?

While strict controls and regulations have virtually eliminated the many past uses of PCBs and most of their sources to the environment, the extreme persistence of these chemicals has resulted in repositories of PCBs in soils and bottom sediments which remain available for recycling in the

environment. When PCBs volatilize from surface waters and contaminated soils, they are redistributed to other areas via long-range atmospheric transport. Long-range atmospheric transport is thought to be a significant source of some POPs, including PCBs, to the Georgia Basin. Other potential current sources of PCBs to the environment include municipal wastewater treatment plant effluents, contaminated sites, landfill leachate, incineration sources, and occasional spills from old PCB-containing electrical equipment still in use. Recently, studies have been conducted to help assess the sources and fate of PCBs in aquatic, marine, and terrestrial ecosystems of the Georgia Basin.

Are PCBs present in the Georgia Basin environment?

PCBs have been detected in water, sediments, fish, shellfish, birds, marine mammals, and atmospheric deposition in the Georgia Basin. In general, environmental concentrations were highest near urban and industrial areas and in harbours. Higher trophic level organisms accumulate higher body burdens of PCBs than do species at lower trophic levels and, in birds, the highest PCB concentrations have been detected in fish-eating species such as bald eagles, cormorants, heron, and osprey. Particularly high concentrations were detected in marine mammals, such as killer whales and harbour seals, from the Georgia Basin and Puget Sound in Washington State.

The existing regulations and controls on PCBs have been effective in reducing environmental concentrations. PCB concentrations have declined in sediments, fish, and wildlife in the Georgia Basin since their use was banned in Canada; however, elevated concentrations still persist in some areas.

Key Reference

(Information for this fact sheet was taken from the following publication)

Garrett, C.L. 2004. Priority substances of interest in the Georgia Basin: profiles and background information on current toxic issues. Technical Supporting Document of the Canadian Toxics Work Group of the Puget Sound/Georgia Basin International Task Force. GBAP Publication No. EC/GB/04/79. Environment Canada, Pacific and Yukon Region, Vancouver, BC.

Useful Websites

- [Environment Canada - PCBs](#)
- [US Environmental Protection Agency - PCBs](#)
- [US Environmental Protection Agency - PCBs\(2\)](#)
- [Health Canada - PCBs](#)
- [Aboriginal Affairs and Northern Development Canada - PCBs](#)