

Environmental Trends in British Columbia: 2007

Contaminants

Over 23,000 chemicals are in use in Canada. Some are intended for controlled use (e.g., pesticides and water purification chemicals), some are released into the environment as by-products (e.g., from burning wood or petroleum products), and some are released accidentally through



Photo: BC Ministry of Transportation & Highways

The risk to human and ecosystem health from contaminants released into the environment varies depending on exposure, toxicity and persistence (ability of people and other organisms to break down contaminants into non-toxic components).

Persistent organic pollutants

Persistent organic pollutants (POPs) are mostly industrial chemicals, by-products of incineration or used as insecticides. The main groups of POPs discussed here include PCBs, dioxins and furans, PBDEs and DDT.

Some contaminants, including many POPs, have been banned from use in British Columbia due to the high risk posed by these contaminants.

As chemicals with known risks are being phased out (e.g., POPs), data on the persistence and risks of other chemicals are receiving more attention (e.g., PPDEs).

- POPs persist for a very long time in the environment and have a variety of toxic effects.
- POPs disrupt the hormone and immune systems of mammals.
- Predators that eat animals contaminated with POPs often have high levels concentrated in their bodies.



Photo: Ministry of Environment

The following indicators present data on persistent organic pollutants (POPs) in BC.

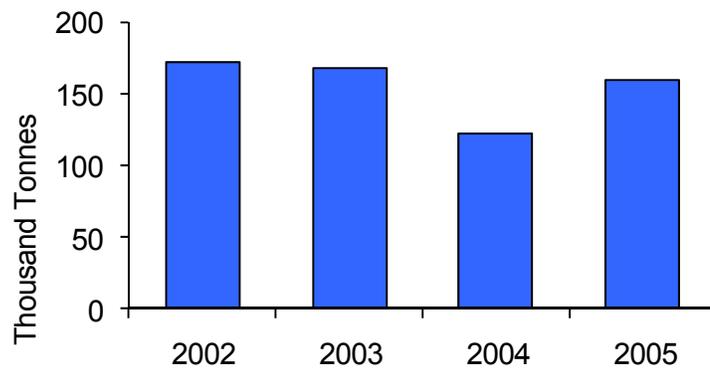
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On-site discharge of toxic substances in B.C.

The National Pollutant Release Inventory (NPRI) tracks the release, disposal and recycling of over 300 pollutants by industrial, commercial and institutional facilities in Canada.

- In 2005, 466 facilities in British Columbia reported on-site release and disposal of 160 thousand tonnes of toxic contaminants to the NPRI.
- In 2005, the four toxic pollutants discharged on-site in the largest quantities were hydrogen sulphide (46% of total release), sulphur dioxide (38%), ammonia (9%) and methanol (3%).

Total on-site discharges (on-site releases and on-site disposal) in B.C.



Note: Lower figures in 2004 were due to more hydrogen sulphide transferred off-site for underground injection than in other years.

Source: The National Pollutant Release Inventory, Environment Canada. 2007

Hydrogen sulphide is a flammable, poisonous gas that is removed as an impurity by natural gas extraction facilities and injected underground into reservoirs.

Sulphur dioxide is a toxic, colourless gas used in pulp and paper mills, ore refining, and as a solvent. It irritates the respiratory system and plays a part in acid rain.

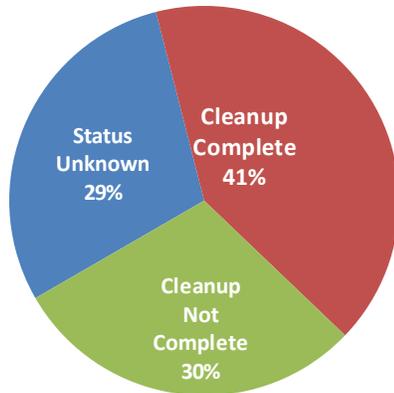
Substances not reported include pesticides and substances being phased out or banned, as well as the many small or non-point sources that release less than 10 tonnes per year (the reporting threshold for many substances under NPRI).

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Clean-up of contaminated sites in B.C.

Industrial activities in the past (up to a century or more ago) released toxic substances into the surrounding environment, infiltrating the food chain, entering the ground-water and contaminating neighbouring areas.

Status of contaminated sites in BC



Source: B.C. Ministry of Environment, Contaminated Sites Registry 2007

- There is no way to know how many contaminated sites exist in the province, but 41 % of the over 6,800 known contaminated sites entered in the B.C. Ministry of Environment Site Registry have been cleaned up.
- Another 30 % of sites are actively in the process of meeting cleanup requirements under the B.C. Environmental Management Act.
- There are also about 2,100 sites in the federal contaminated sites inventory, of which over 650 have been cleaned up or are in the process of being remediated.

Most known contaminated sites on the B.C. registry are cleaned up or are in the process of being cleaned up.

Long-term trends in persistent organic pollutants in bird eggs

Monitoring the concentration of contaminants in the eggs of three species of birds shows broad trends in environmental contamination.

Hérons, cormorants, and osprey feed mainly on fish, and therefore are sensitive to changes in the amount of contaminants entering the food chain. The contaminants rapidly show up in their prey and subsequently can be detected in their eggs.

Regulatory controls instituted on PCBs, dioxins and furans, DDE and other POPs in the 1970s to 1990s have resulted in the overall decrease of these substances in the environment.

	Dioxin-like compounds	PCBs	Chlordane	Dieldrin	DDE	PBDEs
Great Blue Heron	↓	↓ ^a	↓	↓	↓	↑
Double Crested Cormorant	↓	↓	↓	↓	↓	↑ ^a
Osprey	↓	↓	↓ ^b	↓	↓ ^a	↑

Source: Canadian Wildlife Service, Environment Canada

- A newer class of compounds, the PBDEs (polybrominated diphenyl ethers), has been increasing rapidly in recent years reflecting the widespread use of these compounds as flame retardants in consumer goods (e.g., furniture, carpets, computers).
- Between 1987 and 2002, PBDEs in Great Blue Heron eggs increased over 35 times (from 12.5 to 455 µg/kg wet weight).

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Persistent organic pollutants in tissues of marine mammals

Persistent organic pollutants (POPs) such as PCBs and PBDEs are fat soluble and persistent. These contaminants become more concentrated in animal tissue as they move up the food chain (a process known as biomagnification).

The persistence of these chemicals and the fact that they continue to be transported from land into the ocean means that POPs will continue to accumulate in the marine food chain for decades after measures to curtail emissions have taken effect.

A study of three distinct killer whale populations (transients and the southern and northern populations of resident whales) off the coast of BC revealed high concentrations of POPs in whale blubber.



Photo: BC Parks

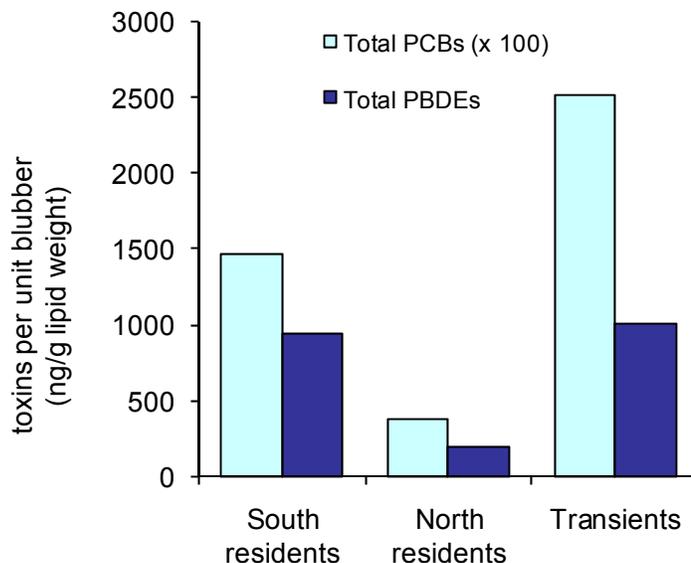
- Transient killer whales are the most contaminated. This is probably because they eat seals and other marine mammals, and therefore feed higher up the food chain than resident killer whales, which eat fish.

- Southern resident whales were more contaminated than northern resident whales, even though their diets are similar. The southern residents likely eat more contaminated fish from the industrialized areas of B.C. and Washington.

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- In all three killer whale populations, males were more contaminated with PCBs (but not PBDEs) than females. Females shed some of their body burden of PCBs through the birth and lactation of each calf, while males continue to accumulate

Persistent organic pollutants in male killer whales on the B.C. coast



Sources: Compiled from Rayne et al. 2004 and Ross et al. 2000.

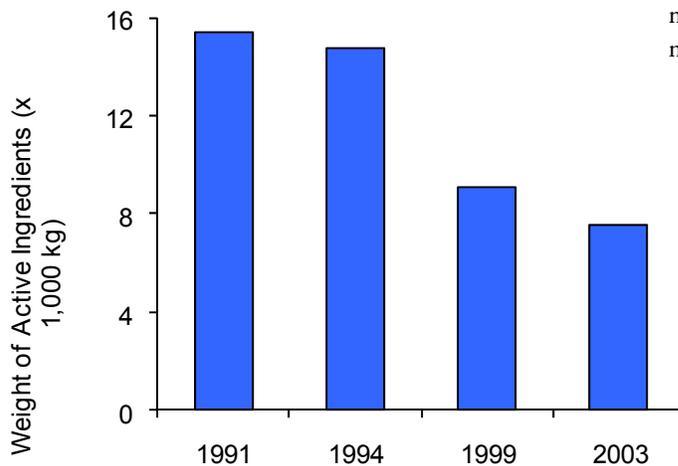
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Landscape pesticide use in the Lower Mainland

Pesticides are materials or micro-organisms that are used to prevent, destroy, repel or otherwise reduce pest populations.

Pesticides registered for use in Canada include a wide variety of active ingredients and modes of action. They range from high toxicity, persistent compounds to low-toxicity and non-toxic substances.

Pesticide use by professional landscape services in the Lower Mainland of BC



Source: BC Ministry of Environment

Since 1991, the B.C. government has had a policy to reduce and eliminate pesticide uses by promoting adoption of integrated pest management (IPM) programs, which are based on the prevention of pest problems.

- As a result, the amount of pesticides used by landscape services showed a significant decrease from 15,500 kg in 1991 to 7,500 kg in 2004, an overall decrease of 50%.
- By 2004, four of the six landscape pesticides of most concern in the Georgia Basin in 1991 were no longer in use.



The use of pesticides by B.C. landscape services in the Lower Mainland decreased by 50 % between 1991 and 2003.

Taking Action - What is being done?

The Canadian Environmental Protection Act (CEPA) Environmental Registry [www.ec.gc.ca/CEPARegistry/] provides access to toxic chemical assessments, inventories of substances and their toxicity, the industries they are associated with, and proposed management strategies and regulations. The Registry provides information to the public and supports public participation in environmental decisions.

The B.C. Environmental Management Act (2003) introduced new provisions for toxic substances and waste management and covers a broad range of environmental regulations [www.qp.gov.bc.ca/statreg/stat/E/03053_00.htm].

The Canadian Health Measures Survey [<http://www.statcan.ca/english/concepts/hs/measures.htm>] will survey Canadians for disease and nutrition health as well as test environmental exposure to contaminants.

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What can you do?

Around the Home

- Eliminate the use of toxic pesticides, paints and solvents, cleaners, glues and other household hazardous products.
- Use cleaning products with natural ingredients.
- Store hazardous products in their original, tightly closed containers in a well-ventilated area.
- Dispose of waste in special household hazardous waste depots. To find a drop-off depot near you see the [RCBC Recycling Hotline \[www.productcare.org\]](http://www.productcare.org) or call: 1-800-667-4321; in the Lower Mainland: 604-732-9253]
- Take used batteries, motor oil and filters, paints and solvents, electronic equipment, and waste prescription medicines to recycling and disposal centres near you. For information contact [RCBC Recycling Hotline \[www.productcare.org\]](http://www.productcare.org)

Build a healthy house

- [Canada Mortgage and Housing Corporation \[www.cmhc.ca\]](http://www.cmhc.ca) provides free information on building healthy homes and retrofitting homes to protect occupants from exposure to contaminants.

Around the Yard

- Learn how to prevent pest problems and manage weeds without using pesticides. See provincial Integrated Pest Management [publications \[http://www.env.gov.bc.ca/epd/epd/pal/ippmp/\]](http://www.env.gov.bc.ca/epd/epd/pal/ippmp/) or local municipal web sites and organic gardening web sites.
- Stop burning garbage or yard waste as it is a major source of dioxin and furan emissions. Have waste picked up or take it to a local landfill or transfer station. Recycle as much as possible, compost yard waste, rent a chipper to chip yard waste to make mulch. More information on how to [avoid backyard burning \[http://www.env.gov.bc.ca/air/\]](http://www.env.gov.bc.ca/air/)



For detailed information on these and other indicators, including an in-depth report [pdf], see the *Environmental Trends in British Columbia: 2007* website:

<http://www.env.gov.bc.ca/soe/et07/>