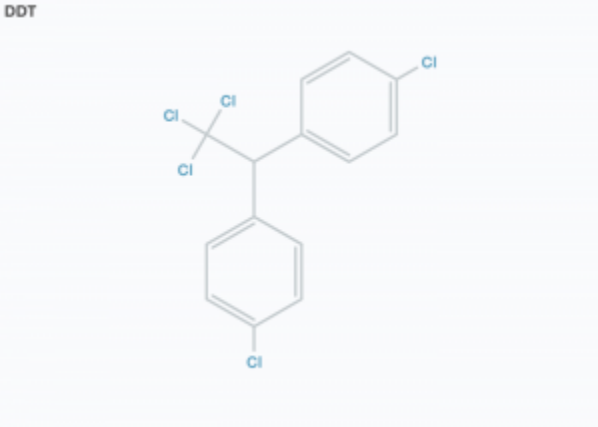
PollutionTracker Fact Sheet

Legacy pesticides

What are they?

Legacy pesticides are found in the environment long after they were banned from use. Most organochlorine pesticides (OCPs) are also known as legacy pesticides. The use of most OCPs was banned or restricted in the 1970s and 1980s in North America and many other countries, yet they persist in the environment today. Beginning in the 1940s, OCPs were widely used in agriculture and for general pest control. Nine of the 12 most hazardous persistent organic pollutants (POPs) targeted by the Stockholm Convention in 2001 for elimination on a global scale are OCPs: dichlorodiphenyltrichloroethane (DDT), dieldrin, aldrin, chlordane, mirex, endrin, heptachlor, hexachlorobenzene, and toxaphene.[1] However, not all countries are signatories to the Stockholm Convention, and use of OCPs continues in some parts of the world.



Which ones were detected?

Aldrin
Insecticide to control termites and other insect pests.
Banned in Canada and most other countries. Rapidly converts to dieldrin.

Chlordane
Insecticide to control termites and agricultural insect pests.
Banned in Canada and most other countries.

Dichlorodiphenyltrichloroethane (DDT)
DDT is a broad-spectrum pesticide, widely used for insects on crops. DDE and DDD are metabolites of DDT. DDE has no commercial use while DDD was also used as a pesticide.
Banned in Canada and most other countries, but still used in some parts of the world for control of malaria-carrying mosquitoes.

Dieldrin
Insecticide used to control termites, textile pests, insect-borne diseases, and insects in agricultural soils.
Banned in Canada and most other countries.

Endosulfan
Insecticide to control crop pests, tsetse flies, cattle ectoparasites; wood preservative.
Banned in Canada and banned or restricted in most other countries, but still used in some parts of the world for control of malaria-carrying mosquitoes.

Endrin
Insecticide sprayed on crops and for control of rodents.
Banned in Canada, and banned or restricted in most other countries.

Heptachlor
Insecticide for soil insects and termites, crop pests, and malaria-carrying mosquitoes. The metabolite heptachlor epoxide is more likely to be found in the environment than heptachlor.
Banned in Canada, and banned or restricted in most other countries. May still be used in the United States for control of fire ants in underground power transformers.[4]

Hexachlorobenzene (HCB)
Fungicide to treat seeds of food crops. Produced unintentionally as a byproduct of the manufacture of certain industrial chemicals.
Banned in Canada and most other countries, but continues to enter the environment in small amounts as a by-product of some industrial processes. Was never manufactured in Canada.

Hexachlorocyclohexane (HCH)
Gamma-HCH (lindane): Broad-spectrum insecticide for seed and soil treatment, tree and wood applications, veterinary and human applications for ectoparasites (e.g., lice and scabies).
Still used in some parts of the world for mosquito/malaria control but largely banned or restricted elsewhere.

Alpha-HCH, Beta-HCH: Insecticides
Still produced unintentially as by-products of gamma-HCH.

Methoxychlor
Insecticide used for agricultural, household pests, and parasites on cattle. Has relatively low toxicity and short persistence in biological systems relative to other OCPs.
Banned in Canada and most other countries.

Mirex
Insecticide for ants and termites; fire retardant in plastics, rubber, and electrical goods.
Banned or restricted in Canada and most other countries. Was never registered for use as a pesticide in Canada.

How to do they get into the ocean?

Historically, OCPs entered the marine environment through waste water discharges and run-off from agricultural lands. Today, where OCPs are banned or heavily restricted, redistribution of OCPs that persist in soil and sediment, and global transport via atmospheric and oceanic currents are the main sources.

OCPs are persistent, remaining in the environment for decades. They are also soluble in lipids, allowing them to accumulate in the fatty tissues of organisms.[5]

Are they a problem?

Organochlorine pesticides have a range of toxic effects in humans and other organisms, including damage to reproductive and neurological functions, ability to cause cancer, and hormone disruption.[5]

FACT: The endocrine-disrupting properties of DDT contributed to what is likely to be the classic case of ‘cause-and-effect’ in wildlife toxicology. Populations of fish-eating birds, including eagles, cormorants and pelicans declined or disappeared from large areas of North America and Europe because of DDT-associated eggshell thinning.

OCPs such as DDT and lindane are acutely toxic to a wide range of aquatic species. DDT is also highly toxic to bird embryos and can impair egg-shell quality. The reproductive success of bald eagles and other raptors was highly compromised in the 1950s and 1960s partly as a result of DDT exposure. Bald

eagle populations began to recover in the 1970s following the ban on DDT in Canada and the United States.[5]

In salmon, agricultural OCPs have been shown to impair their sense of smell and disrupt their ability to return to their natal streams.[5]

What is being done?

Organochlorine pesticide use is largely banned in North America, greatly reducing new inputs to the environment. Since OCPs are no longer imported or used in Canada, clean-up of contaminated areas is key to prevent further marine pollution.

Canadian federal and provincial marine sediment quality guidelines are available for several OCPs, and tissue residue quality guidelines for the protection of wildlife consumers of aquatic biota are available for DDT and toxaphene.

On a global scale, the Stockholm Convention aims to eliminate the use of the most toxic OCPs. Reductions in the global use of OCPs will help decrease inputs and adverse human and environmental effects in both source regions and other parts of the world.

What can you do?

Although the use of legacy OCPs is not permitted in Canada today these persistent compounds remain in the environment, and new pesticides have been developed to replace them. Individuals and organizations can:

- Learn more about organochlorine pesticides and their current-use alternatives using the resource links below
- Reduce or eliminate the use of chemical pesticides around the household and garden
- Recycle and dispose of waste according to local regulations

More Information?

[1] Stockholm Convention. 2017. The POPs. Available at: http://chm.pops.int/TheConvention/ThePOPs/tabid/673/Default.aspx

[2] Health Canada. 2017a. List of toxic substances managed under Canadian Environmental Protection Act. Available at: https://www.canada.ca/en/environment-climate-

change/services/management-toxic-substances/list-canadian-environmental-protection-act.html

[3] Health Canada. 2017b. Chemicals at a glance. Available at: https://www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/chemicals-glance.html

[4] ATSDR. 2017. Toxic Substances Portal. Available at: https://www.atsdr.cdc.gov/toxfaqs/index.asp

[5] Garrett C and Ross PS. 2010. Recovering resident killer whales: a guide to contaminant sources, mitigation, and regulations in British Columbia. *Canadian Technical Report of Fisheries and Aquatic Sciences* 2894.