

# Persistent Organic Pollutants

By Steven Jackson



# What are POP's?

- POP's are organic compounds which are resistant to degradation by chemical, biological and photolytic processes.
- Due to this persistence they are able to accumulate in the environment and travel long distances.
- Can cause significant effects to human health and the environment.



# The 'Dirty Dozen'

Aldrin<sup>1</sup> - (Insecticide)

Chlordane<sup>1</sup> - (Insecticide)

Dichlorodiphenyl trichloroethane (DDT)<sup>1</sup> - (Insecticide)

Dieldrin<sup>1</sup> - (Insecticide)

Endrin<sup>1</sup> - (Insecticide)

Heptachlor<sup>1</sup> - (insecticide)

Mirex<sup>1</sup> - (insecticide)

Toxaphene<sup>1</sup> - (insecticide)

Hexachlorobenzene<sup>1,2</sup> - (Fungicide)

Polychlorinated biphenyls (PCBs)<sup>1,2</sup> (Industrial processes eg paint additives)

Polychlorinated dibenzo-p-dioxins<sup>2</sup> (Unintentionally formed in combustion)

Polychlorinated dibenzofurans<sup>2</sup> - (Unintentionally formed in combustion)

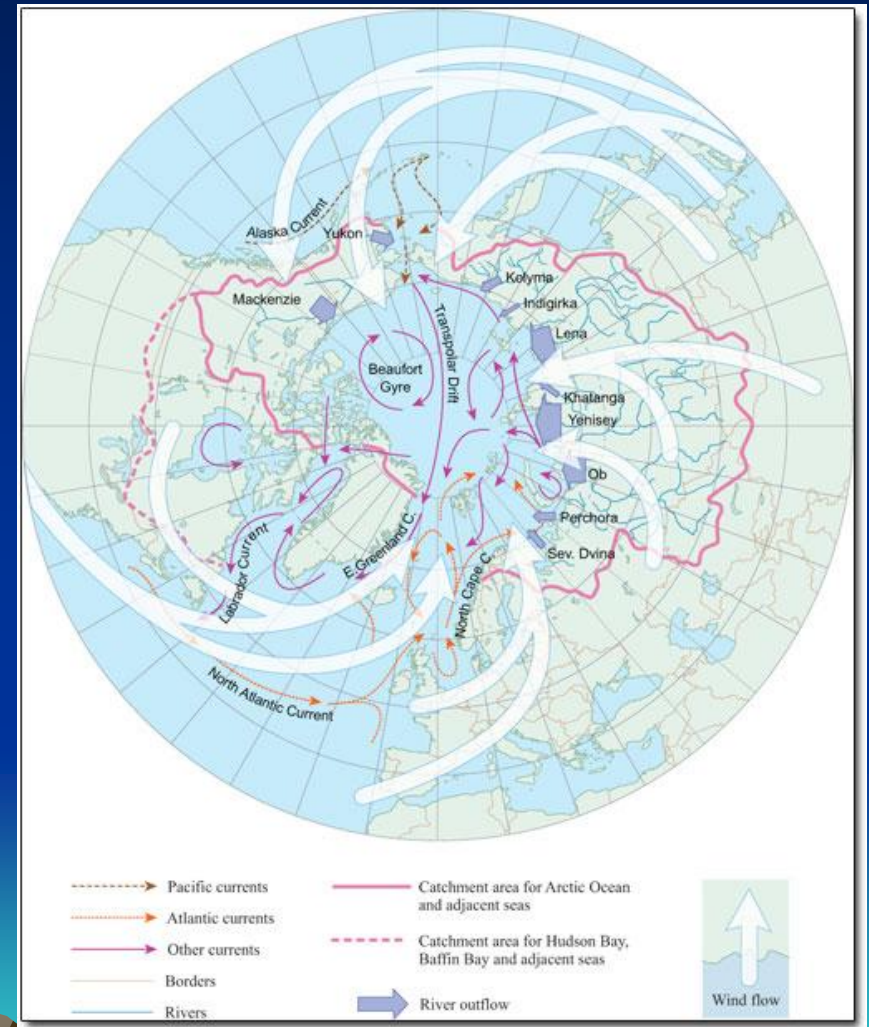
1-Intentionally Produced.

2-Unintentionally Produced - Result from some industrial processes and combustion.



# Transport and Bioaccumulation

- Transport- long-range atmospheric transport, rivers and surface ocean water.
- Bio accumulation- POPs work their way through the food chain by accumulating in the body fat of living organisms and becoming more concentrated as they move from one creature to another.



# Effects to the wildlife

- POP's have lead to declines in populations of fish, birds and mammals.
- Also caused behavioural abnormalities and birth defects in fish bird and mammals.



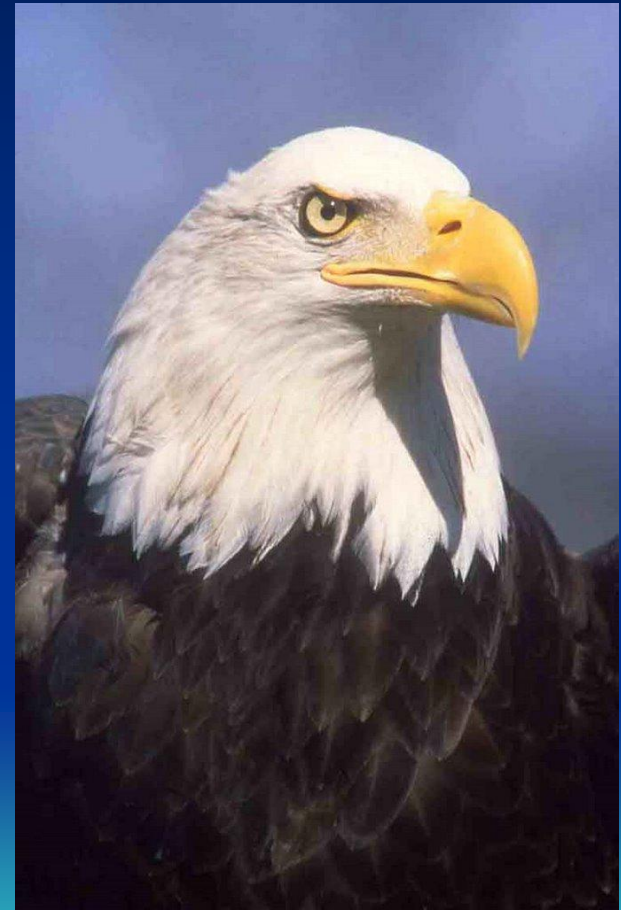
# Effects to Humans

- In people, reproductive, developmental, behavioural, neurologic, endocrine, and immunologic adverse health effects have been linked to POPs.
- People are mainly exposed to POPs through contaminated foods.
- POPs can be transferred through the placenta and breast milk to developing offspring.



# DDT

- DDT was used extensively in agriculture, also used to help protect from insect borne diseases like malaria.
- Heavy use of DDT lead to its accumulation in people and wildlife.
- Caused egg shell thinning in some bird species meaning they could not reproduce effectively.
- The bald eagle- The eagles' decline and the possibility of other long-term harmful effects of DDT exposure to both humans and wildlife prompted the Environmental Protection Agency (EPA) to cancel the registration of DDT in 1972.
- The bald eagle has since experienced one of the most dramatic species recoveries in history.



# Stockholm Convention

- The Stockholm Convention on Persistent Organic Pollutants, which entered into force in 2004, is a global treaty whose purpose is to safeguard human health and the environment from highly harmful chemicals that persist in the environment and affect the well-being of humans as well as wildlife. The Convention requires parties to eliminate and/or reduce POPs, which have a potential of causing devastating effects such as cancer and have the ability to travel over great distances.



On May 23, 2001, Christine Todd Whitman, EPA Administrator, signed the Convention for the United States in Stockholm, Sweden.



# References

- <http://www.epa.gov/international/toxics/pop.htm>
- **Investigating the occurrence of persistent organic pollutants (POPs) in the arctic: their atmospheric behaviour and interaction with the seasonal snow pack, Crispin J. Halsall, Environmental Science Department, Lancaster University**

