A Toxic-Free Future Factsheet
January 2019

PRIORITY CLASSES OF CHEMICALS OF SIGNIFICANT CONCERN TO VULNERABLE POPULATIONS AND ORCAS

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	Found In								Environmental Concerns	Human Health Effects	Key Facts	Uses
	Wasterwater Treatment Discharges	Storm Water	Sediments	Fish and Wildlife	Surface Water	People	Breastmilk	House Dust				
PFAS (Poly- and perfluoroalkyl substances)	✓	✓	✓	✓	✓	✓	✓	✓	- persistence - mobility - immune suprression - food web impacts	- kidney and testicular cancer - thyroid disease - infertility	Nearly every person in the US has these industrial chemicals in their bodies.[1] Exposure to PFAS has been linked to immune suppression and die-offs in marine mammals.[2,3]	- textiles and other products - food packaging - firefighting foams
Phthalates	✓	✓	✓	✓	✓	✓	✓	✓	- hormone disrpution - increased mortality in fish	- reproductive toxicity - early puberty - learning disabilities	Due to constant recontamination, phthalates increased in Commencement Bay sediments despite years of cleanup.[4] Phthalates in household products can get into the environment via laundry water and wastewater.[5]	- personal care products - soft plastics - vinyl toys, flooring, and other products
Organohalogens & Other Flame Retardants of Concern	✓	✓	✓	✓	✓	✓	✓	✓	- persistence - bioaccumulation	- thyroid disruption - lower IQ - hyperactivity - cancer	TCPP flame retardants are found in such high concentrations in wastewater treatment plant discahrges, that loading to the Columbia River from a single treatment plant was estimated at up to 250 pounds per year.[6] Toddlers can have new generation flame retardants in their bodies at levels up to 5 times that in their mothers.[7] While levels of PBDE flame retardants have declined in some Puget Sound fish and wildlife, NOAA has expressed concern that newer chemicals will increase rapidly in the environment.[8,9]	- foam products - furniture - children's toys
PCBs	✓	✓	✓	✓	✓	✓	✓	✓	- reproductive effects - immune system effects - harm to brain development	- cancer -immune suppression -reproductive effects	Young orcas have the highest levels of persistent toxics like PCBs, likely because their mothers transfer them during pregnancy and in milk.[10]	- indirectly produced in some dyes and inks - detected in packaging, paper products, and paints
Alkylphenols (APEs)	✓	✓	✓	✓	✓	✓	✓	✓	- reproductive effects, possibly leading to disruption of fish populations	- hormone disruption - reproductive effects - altered immune function	APEs have been found at some of the highest concentrations in wastewater treatment plant discharges, as well as in house dust. [11,12]	- personal care products including shampoo, lotions, and cosmetics - detergents, cleaning products - paints
Bisphenols	✓	✓	✓	✓	✓	✓	✓	✓	- reproductive effects, possibly leading to disruption of fish populations	- hormone disruption - diabetes - learning issues - behavioral effects	BPA has been detected in Puget Sound fish, potentially contributing to feminization and reproductive problems.[13]	- food cans - plastics

Endnotes

1. Kato, K., Wong, L.-Y., Jia, L.T., Kuklenyik, Z., Calafat, A.M. (2011). Trends in exposure to polyfluoroalkyl chemicals in the U.S. population: 1999-2008. Environmental Science & Technology 45 (19): 8037-8045.

2 Kannan, K.; Perrotta, E.; Thomas, N., Association between perfluorinated compounds and pathological conditions in southern sea otters. Environmental Science and Technology 2006, 40 (16), 4943-4948.

3. Kuehl, D.; Haebler, R.; Potter, C.; Lahvis, G.; Donahue, M.; Regal, R., PFOS and PFOSA in bottlenose dolphins: an investigation into two unusally high mortality epizootics. Reproductive Toxicology 2009, 27, 421.

4. Tetra Tech ED Inc. Results of year 5 operations, maintenance, and monitoring plan sampling: Head of the Thea Foss Waterway remediation project. Prepared for PacifiCorp Environmental Remediation Company and Puget Sound Energy, 2009.

5. Schreder, E.; Trim, H. Puget Sound Down the Drain; 2009. https://toxicfreefuture.org/science/research/puget-sound-down-the-drain-1/

6. Schreder, E.; La Guardia, M., Flame retardant transfers from U.S. households (dust and laundry wastewater) to the aquatic environment. Environ Sci Technol 2014, 48, 11575-11583.

7. Butt, C., Congleton, J., Hoffman, K., Fang, M., Stapleton, H. Metabolites of organophosphate flame retardants and 2-ethylhexyl tetrabromobenzoate in urine from paired mothers and toddlers. Environ Sci Technol 2014, 48917): 10432-10438.

8. NOAA Fisheries. 10 Years of Research & Conservation: Southern Resident Killer Whales; 2014. https://www.nwfsc.noaa.gov/research/divisions/cb/ecosystem/marinemammal/documents/bigreport10814.pdf.

9. Mongillo, T.; Ylitalo, G.; Rhodes, L.; O''Neill, S.; Noren, D.; Hanson, M. Exposure to a Mixture of Toxic Chemicals: Implications for the Health of Endangered Southern Resident Killer Whales; 2016.

10. Ylitalo, G.; Matkin, C.; Buzitis, J.; Krahn, M.; Jones, L.; Rowles, T.; Stein, J., Influence of life-history parameters on organochlorine concentrations in free-ranging killer whales (Orcinus orca) from Prince William Sound, AK. Sci Total Environ 2001, 281, 183-203.

11. Meador, J.; Yeh, A.; Young, G.; Gallagher, E., Contaminants of emerging concern in a large temperate estuary. Environ Poll 2016, 213, 254-267.

.12. Rudel, R.A, Camann, D.E., Spengler, J.D., Korn, L.R., Brody J.G. Phthalates, alkylphenols, pesticides, polybrominated diphenyl ethers, and other endocrine-disrupting compounds in indoor air and dust. Environmental Science & Technology 2003 37(20): 4543-4553.

13. da Silva, D.; Buzitis, J.; Reichert, W.; West, J.; O''Neill, S.; Johnson, L.; Collier, T.; Ylitalo, G., Endocrine disrupting chemicals in fish bile: a rapid method of analysis using English sole (Parophrys vetulus) from Puget Sound, WA, USA. Chemosphere 2013, 92, 1550-1556.

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