

OREGON



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Polychlorinated Biphenyls (PCBs) and Human Health Effects

For more info, contact Oregon PSR
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Polychlorinated biphenyls (PCBs) are a group of 209 liquid and solid manufactured chemicals sharing a common biphenyl structure, with varying numbers of chlorine atoms. PCBs had a number of industrial uses, typically for lubrication, insulation, and cooling of electrical equipment, such as transformers and capacitors. An estimated 1.5 billion pounds of these chemicals were made in the US alone. The widespread manufacture and use of PCBs stopped in 1977 when they were banned because of evidence they cause harmful health effects. However, their chemical stability, previously valued in industrial use, means PCBs have persisted in the environment, especially in bodies of water and equipment manufactured before 1979.

PCBs are ranked fifth on the Center for Disease Control (CDC)'s Agency for Toxic Substances and Disease Registry, 2011 priority list of 275 hazardous substances (1). They are chemicals of concern found in the Portland Harbor, occurring particularly in resident fish (bass, carp and bullhead catfish), and osprey birds that nest nearby (2). PCBs are odorless and colorless so you cannot see or taste them if you eat fish from the Harbor. These chemicals are commonly stored in tissues of the human body for long periods of time and have been detected in Oregonians—PCBs were found in the blood serum of all ten adults tested in a sample study done by the Oregon Environmental Council (3).

Human health effects associated with PCB exposure include neurologic disorders, cancer, liver toxicity, immunosuppression, endocrine disruption such as low thyroid (which can also affect a developing embryo), decreased reproductive ability, and other effects. Of major concern are neurological effects in children born to mothers exposed to PCBs before or during pregnancy, which may appear years later as learning disabilities, poor memory, reduced IQ, behavioral issues such as poor impulse control and disorganization, and conditions such as Attention Deficit Hyperactivity Disorder (ADHD) and autism (4,5,6,7). The number of neurodevelopmental disorders is increasing in children in the US and worldwide (8,9,10,11). Exposure to toxic chemicals in the environment such as PCBs and others may contribute to this, so it is worth taking seriously.



Image courtesy of PRNewswire

What you can do—become informed, consider taking action:

If you are a fisherman/woman, be aware that the City of Portland has issued this **Portland Harbor Fish Consumption Advisory**:

“Women of childbearing age (18-45), pregnant or breastfeeding women, children and people with weakened immune systems, thyroid or liver problems, should avoid eating all resident fish from Portland Harbor.

Healthy women beyond childbearing age and healthy adult males should restrict the amount of resident fish, such as carp, bass and catfish, eaten from Portland Harbor to no more than one 8-ounce meal per month.

Non-resident fish, such as salmon and steelhead, are considered an excellent high-protein, low-fat food source and have no restrictions on the amount eaten from Portland Harbor.

Anglers are encouraged to catch-and-release carp, bass and catfish, and larger sturgeon, because older and larger fish have greater amounts of PCBs in their tissues. Because PCBs are found in the fat, skin and organs, people should remove these parts before eating the fish and cook the fish in a way that allows the fat to drip off. Before cooking, fillet the fish to remove the skin, belly, back and side fat, eggs, eyes, head and organs (which contain higher concentrations of PCBs).”

<http://www.portlandoregon.gov/bes/article/174599> (click to see photos of fish species that have high levels of PCBs)

If you fish on other bodies of water, you can check local fish advisories for the current health report of your typical catch:

Oregon: <http://public.health.oregon.gov/newsadvisories/pages/recreation-aladvisories.aspx>

Washington: <http://www.doh.wa.gov/CommunityandEnvironment/Food/Fish/MercuryAdvisories.aspx>

For more information on fish and PCBs, visit these websites:

Excellent public health resource (by Dave Stone, OR Dept of Human Services) on fish from the Portland Harbor (shows photos of fish species that have high levels of PCBs):

<http://www.deq.state.or.us/lq/cu/nwr/portlandharbor/docs/DHSFishAdvisory.pdf>

OregonLive 2009 article about PCB hotspots in Willamette River:

http://www.oregonlive.com/environment/index.ssf/2009/02/pcb_hot_spots_pop_up_along_wil.html

Oregon Public Health article on PCBs:

[https://public.health.oregon.gov/HealthyEnvironments/EnvironmentalExposures/ToxicSubstances/Pages/Polychlorinatedbiphenyls\(PCBs\).aspx](https://public.health.oregon.gov/HealthyEnvironments/EnvironmentalExposures/ToxicSubstances/Pages/Polychlorinatedbiphenyls(PCBs).aspx)

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<http://www.scientificamerican.com/article.cfm?id=industrial-chemicals-linked-attention-problems-children>



*Portland Harbor Superfund Site
Image courtesy of Mother Nature Network*

If you are interested in further action, consider advocating for cleanup of the Portland Harbor by contacting the Portland Harbor Community Coalition at www.ourfuturesriver.org, ourfuturesriver@gmail.com, or call (503)662-2590.

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<http://www.atsdr.cdc.gov/SPL/index.html>

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<http://healthoregon.org/cdsummary>

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<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3002184/>

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<http://jama.jamanetwork.com/article.aspx?articleid=186163>

7. Mitchell, Michelle, et al, "Levels of select PCB and PBDE congeners in human postmortem brain reveal possible environmental involvement in 15q11-q13 duplication autism spectrum disorder," *Environmental and Molecular Mutagenesis*, October 2012, Vol 53, Issue 8, 589-598.

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9. CDC, 2010

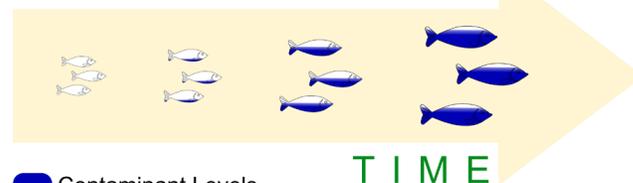
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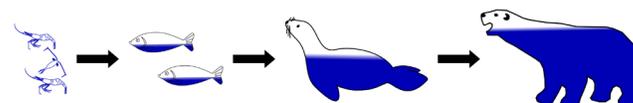
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Bioaccumulation



● Contaminant Levels



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Biomagnification

*Bioaccumulation and biomagnification
Image courtesy of MIT*