

Bonn, Bernadine A. "Polychlorinated Dibenzo-p-dioxin and Dibenzofuran Concentration Profiles in Sediment and Fish Tissue of the Willamette Basin, Oregon." *Environmental Science and Technology* 32.6 (1998): 729-734 (Reviewed by Lucy Cho)

This paper presented a study on a specific type of pollution of the Willamette River, and it was run by the U.S. Geological Survey and the Oregon Department of Environmental Quality (DEQ). Its focus was polychlorinated dibenzo-p-dioxins and dibenzofurans, or PCDD/F. Although the survey was not originally meant to target PCDD/F levels, it was found in the process that enough was detected to be of concern, and thus PCDD/Fs were included in the survey. These compounds are highly hydrophobic organic pollutants of the river that are also considered human carcinogens and endocrine disruptors in both humans and animals. The sources of PCDD/Fs include municipal and medical waste incineration, production of chlorinated aromatic compounds, bleaching of kraft pulp, metals production and chlorination of sewage effluent.

PCDD/F was measured in sediment and fish-tissue samples taken from 23 different sites of the river basin. It is known that these compounds are deposited atmospherically, and this was consistent with the data collected as well. For example, it was found that levels of PCDD/F were not very different upstream or downstream of a paper mill, although it was shown that the paper mill effluent had high levels of PCDD/F. This suggested that atmospheric deposition of PCDD/F derived from combustion is the most significant source of PCDD/F in the river sediment. To test this, other sources such as chlorine bleaching of paper pulp, PCB contamination, sewage sludge and washing machine effluent were considered as well.

Through analysis of their data, a trend was discovered in that total PCDD/F concentrations increased directly with the intensity of human activity of the sites where samples were collected. Therefore, industrial and urban sites proved to have the greatest total concentrations of PCDD/F. However, it is still unclear as to the causes and implications of this trend.

Critique

The experimental methods and reasoning were described with detail, although the paper was mainly geared toward those with professional knowledge. Nonetheless, it presented the data gathered in a very clear and concise manner. For example, the journal included a map of all of the sites in the Willamette River basin where they collected fish tissue and sediment samples. It provided graphs and charts that showed visually the trends they discovered in the process of their research. Also, the article went into much detail about what unique characteristics of the different PCDD/Fs explained their presence in specific sites, and in what sort of sediments they were found. This showed that they had done a very in-depth study of these compounds.

However, while their methods, data and results were described in detail, it failed to outline the major points of their research. For example it does not explain what concentrations of these pollutants could

affect the biota and humans. Also, it does not seem to provide clear and direct proof that these compounds are having an effect on the river and its inhabitants. It would have been good to show the significance of their research on this particular group of organic compounds perhaps by showing changes in the health or behavior of the animals and plants around the river. Instead, it only briefly explains that in a survey the levels of these compounds were enough to create concern.

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