



Bulletin No. 28

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"Salmon packed with pollutants" - Hype, not Help

Public Health responds to media coverage of PCB transport by salmon

Introduction

Recently, a study documenting transport of polychlorinated biphenyls (PCBs) to Alaska lakes via spawning salmon was published in the journal *Nature*.¹ Researchers from the University of Ottawa measured PCB concentrations in sediment samples from 8 Alaskan lakes, and in 5 sockeye salmon collected from Frazer Lake. In response to this study, several alarmist news articles were published that contained errors in characterizing the study's results.

Background

Due to their environmental persistence, PCBs have become distributed in small concentrations throughout the globe. One way these chemicals reach Alaska is through global wind and water currents. PCBs can also be transported in the bodies of migrating animals. Salmon can pick up trace quantities of PCBs from the large water bodies where they feed and grow and then transport the PCBs to the rivers and lakes when they return to spawn. The transport of PCBs via anadromous fish has previously been described in other ecosystems, such as the Great Lakes and its tributaries.² In 1998, Ewald et al. documented that migrating salmon can transport PCBs to Alaska fresh water rivers and lakes.³ The recent article in *Nature* provided further evidence of this transport mechanism.

Public Health Evaluation

The *Nature* article demonstrated that salmon are a source of PCBs to some remote Alaska ecosystems, due to the large number of returning fish. **However, PCB levels in individual Alaska salmon are very low, and consuming them does not pose a human health risk.**

The study published in *Nature* was not designed to comprehensively evaluate PCB levels in individual Alaska salmon or the human health implications of salmon consumption. Only five fish were analyzed to explore their PCB congener patterns. The limited data confirm the earlier results of Ewald's study that found that sockeye salmon in the Copper River had "**concentrations of pollutants far below the levels that have caused concern with regard to human consumption or fish reproduction.**"

The Alaska Division of Public Health (DPH) has a long history of scientifically evaluating contaminant levels in Alaska wild foods, and assessing nutrient and health benefit information, to derive consumption advice.⁴ Fish from Alaska waters are very nutritious and provide a number of important health benefits. Fish are an important protein source that is low in saturated fat. Wild Alaska salmon are a particularly good source of healthful omega-3 fatty acids, which provide protection from cardiovascular disease and diabetes, improved maternal nutrition, and improved neonatal and infant brain development. Any potential health risks posed by ultra-trace contaminant levels detected in fish are far outweighed by the many health benefits of fish consumption. We recommend the unrestricted consumption of fish from Alaska waters. The international Arctic Monitoring and Assessment Programme also emphasizes the nutritional and physiological benefits of traditional Arctic diets, and advises local public health policy makers to encourage continued traditional food use when indicated by risk-benefit analyses.⁵

The DPH is engaged in a number of ongoing activities to ensure the provision of optimal consumption advice. We work closely with agencies that test contaminant levels in wild Alaska foods to analyze their data from a public health perspective and assure the safety of consumers. Contaminant levels in wild Alaska salmon have recently been investigated by the U.S. Fish and Wildlife Service and the Alaska Department of Environmental Conservation. The DPH will review the data from these studies as soon as they are available and will issue summary bulletins of their findings. The DPH is also establishing a human biomonitoring program to assess contaminant levels in traditional food consumers. By determining actual human exposure levels, we will further ensure the safety of traditional foods such as fish.

Conclusions

- The *Nature* article by Krümmel et al. (2003) is a basic environmental science article adding to the knowledge base of PCB transport mechanisms;
- The findings are not a surprise, as salmon have already been shown to transport PCBs to spawning areas in Alaska and elsewhere;
- These data extend the findings of Ewald et al. (1998) by providing a correlation between lake sediment PCB concentrations and accumulation rates with the density of returning salmon;
- PCB levels found in individual Alaska salmon are low, and are not of human health concern;
- The Alaska Division of Public Health recommends continued unrestricted consumption of fish from Alaska waters, especially salmon; and
- Alaska fish are a healthy food choice, with many documented health benefits including protection from cardiovascular disease and diabetes, improved maternal nutrition, and improved neonatal and infant brain development.

References:

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