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Profiles and Levels of SOCs and Mercury in Fish from Western U.S. and Alaska National Parks

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Accumulation of contaminants such as mercury and pesticides in aquatic foodwebs and its effects on aquatic biota are of growing concern both for the health of the fish and the piscivores that prey upon them. This is of particular concern for high latitude and high altitude national parks because it is known that mountainous and Arctic areas are sinks for some contaminants. Therefore, in 2002, the Western Airborne Contaminants Assessment Project (WACAP) was initiated, in part, to evaluate the risk to park ecosystems from airborne contaminants. Concentrations of mercury and semi-volatile organic compounds (SOCs) including pesticides, polychlorinated biphenyls, and polybrominated diphenyl ethers (PBDEs) were measured in fish from 14 remote lakes in 8 western U.S. and Alaskan national parks between 2003 and 2005 and compared to human and/or wildlife contaminant health thresholds. Contaminant health thresholds for humans were exceeded due to concentrations of mercury (20 of 169 fish; 6 lakes; 5 parks), dieldrin (76 of 136 fish; 12 lakes; 7 parks), and DDT (16 of 136 fish; 3 lakes; 2 parks). Concentrations of mercury, DDT, and/or chlordanes also exceeded risk thresholds for health impacts to piscivorous birds and/or mammals. Concentrations of PBDEs and other measured historic and current-use pesticides in fish were an order of magnitude or more below contaminant health thresholds. Additionally, intersex male fish and/or males producing the female specific protein vitellogenin were found in 10 lakes at 3 parks. These results indicate that atmospherically deposited contaminants are accumulating in fish in remote ecosystems, and exceeding concentrations relevant to established human and wildlife health thresholds. Findings add considerably to the state of the science concerning biological and ecological effects of contaminants in remote ecosystems in the western U.S. and Alaska, and provide a basis for evaluating future changes.

Presentation preference: Poster

I am not a student and therefore do not wish to be considered for the Best Student Paper Award.