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Atmospherically Deposited PBDEs, Pesticides, PCBs, and PAHs in Western U.S. National Park Fish: Concentrations and Consumption Guidelines

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Concentrations of polybrominated diphenyl ethers (PBDEs), pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbonsweremeasured in 136 fish from 14 remote lakes in 8 western U.S. National Parks/Preserves between 2003 and 2005 and compared to human and wildlife contaminant health thresholds. A sensitive (median detection limit, -18 pg/g wet weight), efficient (61% recovery at 8 ng/g), reproducible (4.1% relative standard deviation (RSD)), and accurate (7% deviation from standard reference material (SRM)) analytical method was developed and validated for these analyses. Concentrations of PCBs, hexachlorobenzene, hexachlorocyclohexanes, DDTs, and chlordanes in western U.S. fish were comparable to or lower than mountain fish recently collected from Europe, Canada, and Asia. Dieldrin and PBDE concentrations were higher than recent measurements in mountain fish and Pacific Ocean salmon. Concentrations of most contaminants in western U.S. fish were 1–6 orders of magnitude below calculated recreational fishing contaminant health thresholds. However, lake average contaminant concentrations in fish exceeded subsistence fishing cancer thresholds in 8 of 14 lakes and wildlife contaminant health thresholds for piscivorous birds in 1of 14 lakes. These results indicate that atmospherically deposited organic contaminants can accumulate in high elevation fish, reaching concentrations relevant to human and wildlife health.