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Do Airborne Contaminants Affect Fish in the Lakes of Western U.S. National Parks? A.R. Schwindt^{*}, Schreck, C.^a, Landers, D.^b, Ackerman, L.^c, Usenko, S.^c, Ramsay, J.M.^a, Simonich, S.^{c,d}, Kent, M.^e, ^aDepartment of Fisheries and Wildlife, ^bU.S. Environmental Protection Agency, Corvallis, OR 97333, ^cDepartment of Chemistry, ^dDepartment of Environmental and Molecular Toxicology, ^eDepartment of Microbiology, Oregon State University, Corvallis, OR; ^{*}Oregon State University, Department of Microbiology, Nash 220, Corvallis, OR 97331-3804; 541-737-1889.

Researchers have detected airborne contaminants in snow, lake sediment and water, and fish in alpine aquatic ecosystems in Canada and Europe. However, little information exists for similar occurrence in alpine areas of the U.S. despite the suspected preferential deposition of some airborne contaminants in high-elevation ecosystems. Therefore a multidisciplinary study was initiated to assess the levels and potential effects of contaminants in alpine aquatic ecosystems in eight western U.S. national parks (http://www2.nature.nps.gov/air/Studies/air_toxics/wacap.htm). Sampling matrices include, snow, lake water and sediment, lichens and willow bark, moose meat, and fish, all of which are analyzed for contaminants. This study is unique in that sampling sites range from southern California to arctic Alaska, and from sea level to more than 3,000m. Furthermore, the lakes sampled represent as near-pristine conditions as potentially found in the world. We have been assessing endocrine and other physiological factors as indicators of endocrine disruption in fishes in these systems.

To determine if airborne contaminants adversely affect alpine aquatic biota, salmonid fishes were captured in the summer of 2003, from five total lakes in Sequoia, Rocky Mountain, and Olympic National Parks to be analyzed for contaminants, health, age, diet, sex steroids, plasma vitellogenin, and an assessment of melano-macrophages. Upon capture, each fish was examined macroscopically for condition with nothing unusual noted. As indicated by otolith examination, fish age ranged from one to 10 years which will assess if contaminants bio-accumulate. Microgram per milliliter concentrations of plasma vitellogenin were detected in 30-50% of male and immature female fishes at Rocky Mountain National Park indicating that endocrine disruption is likely occurring. This is most likely due to the deposition of xenoestrogens by atmospheric sources. Results from other analyses will be discussed. Fishes and the other matrices will be sampled in the summer of 2004 from lakes in three Alaskan National Parks and included in the discussion as appropriate.