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EMERGING AND LEGACY CONTAMINANTS IN POCIS, SPMDS, BED SEDIMENTS, AND LARGESCALE SUCKER (*CATOSTOMUS MACROCHEILUS*) IN THE LOWER COLUMBIA RIVER – USGS CONHAB PROJECT

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ABSTRACT: An interdisciplinary study, USGS Columbia River Contaminants and Habitat Characterization (ConHab) project investigates transport pathways, chemical fate and effects of polybrominated diphenyl ethers (PBDEs) and other endocrine disrupting chemicals (EDCs) in aquatic media and the foodweb in the lower Columbia River. Polar organic chemical integrative samplers (POCIS) and semipermeable membrane devices (SPMDs) were co-deployed at each of 10 sites in 2008 to provide a measure of the dissolved concentrations of select PBDEs, chlorinated pesticides, and other EDCs. PBDE-47 was the most prevalent of the PBDEs detected. Numerous organochlorine pesticides, both banned and current-use, were measured at each site including hexachlorobenzene, pentachloroanisole, dichlorodiphenyltrichloroethane (DDT) and its degradates, chlorpyrifos, endosulfan, and the endosulfan degradation products. EDCs commonly detected included a series of polycyclic aromatic hydrocarbons (PAHs), fragrances (galaxolide), pesticides (chlorpyrifos and atrazine), plasticizers (phthalates), and flame retardants (phosphates). The site near Columbia City tended to have the highest concentrations of contaminants in the Lower Columbia River. In 2009 and 2010 passive samplers were deployed, resident largescale suckers (*Catostomus macrocheilus*) and surface bed sediments were collected at three of the original sites representing a gradient of exposure based on 2008 results. Brain, fillet, liver, stomach, and gonad tissues were analyzed. Chemical concentrations were highest in livers, followed by brain, stomach, gonad, and lastly, fillet. Concentrations of halogenated compounds in tissue samples ranged from <1 to 400 ng g⁻¹ wet tissue. PBDEs, organochlorine pesticides, DDT and its degradates, and polychlorinated biphenyls (PCBs) were detected at all sites in nearly all organs tested. PBDE congeners most frequently detected and at the highest concentrations were PBDE-47 > PBDE-100 > PBDE-154 > PBDE-153. Concentrations in tissues and in sediments increased moving downstream from Skamania to Columbia City to Longview. Preliminary biomarker results indicate that fish at the downstream sites experience greater stress relative to the upstream site based on gonad, kidney, spleen, and liver histopathology. These results support the hypothesis that contaminant concentrations in the environment correlate to bioaccumulation in the foodweb.

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