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Distribution and sources of polybrominated diphenyl ethers in the southern California Bight

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ABSTRACT

Abstract—Polybrominated diphenyl ethers (PBDEs) were measured in surface sediments from 121 locations within the Southern California Bight. Site selection was based on a probabilistic approach to determine the spatial extent and magnitude of PBDE concentrations with known confidence intervals. Coastal embayments (including estuaries, marinas, ports, and bays) and the continental shelf out to the lower slope were sampled. Thirteen PBDEs were detected at 92 of the sites, with a geometric mean and maximum of 4.7 and 560 ng/g dry weight (sum of 13 congeners), respectively. The PBDE concentrations were higher in coastal embayments than in offshore locations. Embayments had an area-weighted geometric mean total PBDE concentration of 12 (95% confidence interval, 8.0– 17) ng/g dry weight and a total PBDE mass of 110 (77–160) kg. The offshore stratum, which is 99% of the total area, had an area-weighted geometric mean total PBDE concentration of 2.0 (1.6–2.5) ng/g dry-weight and a total PBDE mass of 860 (700–1,100) kg. The five highest PBDE concentrations were associated with the mouths of urban rivers, indicating that urban runoff is likely a major input of PBDEs to these coastal marine waters. The outfalls of wastewater treatment plants were not observed to be major sources.