

## **19e Environmental Fate of Brominated Flame Retardants in Lake Huron Sediments and Aquatic Organisms**

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Brominated flame retardants (BFRs) are used to impart flammability resistance to plastic and foam components utilized in a large number of household products and consumer goods, including mattresses, upholstered furniture, television cabinets and circuit boards. Aromatic bromine compounds are particularly effective BFRs because of their thermal stability relative to aliphatic bromines. However, in recent years it has been recognized that BFRs may pose a worldwide pollution problem due to their persistence, long-range transport capability and predisposition to bioaccumulate. BFRs such as polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyls (PBBs) share structural similarities to polychlorinated biphenyls (PCBs) and dichlorodiphenyltrichloroethane (DDT) and hence are suspected endocrine disruptors. The exponential increases of BFR concentrations in the serum and tissues of humans and wildlife have focused concern on the environmental fate of these substances and their effects on exposed populations.

We report results for a Level IV fugacity-based model of the fate of hexabrominated biphenyl discharges into the Saginaw Bay region of Lake Huron. PBBs were manufactured at the Pine River facility of the Michigan Chemical Corporation as the active ingredient in the FireMaster flame retardant compound until 1977, when production was halted in the aftermath of a 1973 food chain contamination episode in which FireMaster was inadvisedly used as a calcium supplement in cattle feed at several farms in southeastern Michigan. We present a multimedia environmental model that predicts transient concentration profiles of hexabromobiphenyl in Lake Huron water and sediment during the 1970s, 1980s and 1990s. The PBB concentrations in the environmental compartments are used as inputs into a food web model for Lake Huron aquabiota, and we compare the predicted bioconcentration factors from trophic modeling with measurements of PBB concentrations in salmonids during the period 1983-1997.