

## **MONITORING FOR HISTORICAL AND EMERGING CONTAMINANTS IN RESIDENT FISH IN THE DELAWARE RIVER**

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### **ABSTRACT**

The mainstem Delaware River has been monitored for contaminants in fish tissue since 1990 by the Delaware River Basin Commission, an agency created to manage the water resources of this interstate waterbody bordered by Delaware, New Jersey, New York and Pennsylvania. The mainstem Delaware River flows from relatively pristine headwaters through the urban areas of Philadelphia, PA; Trenton, NJ and Wilmington, DE to the ocean at the mouth of Delaware Bay. The contaminant data are used to determine water quality impairments and fish consumption advisories in the mainstem river and bay for chemical compounds of historical interest such as PCBs and chlorinated pesticides. Since 2004, emerging contaminants such as flame retardants (PBDEs) and perfluorochemicals (PFCs) have been added to the suite of analysis along with dioxins/furans.

A generalized contaminant pattern is evident for both the historical and emerging chemicals with lower levels observed in the less urbanized, non-tidal portion of the river relative to the tidal areas that are adjacent to the urban areas. PCB levels (normalized to lipids) in the tidal portion of the river are 6 to 8 times higher than in the non-tidal portion with ~90% of the PCBs consisting of 4 homologs: tetra, penta, hexa and hepta-PCBs. Dioxin/furans are similarly distributed with peak concentrations of 11 pg/g total dioxins in channel catfish and 16 pg/g total furans in white perch in the lower tidal portion. PBDEs exhibited peak concentrations of 160 ng/g in the upper tidal portion of the river, principally in channel catfish. These levels are almost 2 times higher than tissue concentrations reported for other locations in North America. Perfluorooctanoic acids (PFOAs) were generally higher than perfluorooctanoic sulfonates (PFOSs) in the tidal portion of the river. Surprisingly, PFOSs exhibited peak concentrations in the lower non-tidal portion of the river. Each of these groups of PFCs was dominated by a single compound: perfluoroundecanoate in the PFOAs and perfluorooctansulfonate in the PFOSs.

Differences in concentrations of these contaminants within the Delaware River watershed imply local sources of these pollutants. Therefore strategies for identifying sources and reducing their pollutant loads can be tailored for specific areas.

### **KEYWORDS**

PCBs, PBDEs, Perfluorochemicals, Emerging contaminants