

Multimedia Monitoring of PCBs in the Delaware River Estuary in Support of TMDL Development

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Biographical Sketches of Authors

Edward D. Santoro is the Basin Monitoring Coordinator for the Commission and serves within the Modeling and Monitoring Branch. Mr. Santoro is responsible for conducting and coordinating monitoring activities within the Delaware River Basin. Previously, he worked with a private sector engineering firm for 15 years doing environmental & hazardous waste site activities, Environmental Impact Studies and wetland surveys. Prior to this he served with the U.S. Environmental Protection Agency, Region II for 8 years. While at USEPA he worked on a number of major activities including the NPDES permitting of power plants, the Ocean Disposal Program, wetland permitting and fisheries investigations. Mr. Santoro received a Master of Science in Marine & Environmental Science from Long Island University. He has published over 30 technical articles in the field.

Gregory J. Cavallo is the Project Manager for the Ground Water Team for the Commission and serves within the Modeling and Monitoring Branch. Mr. Cavallo is responsible for groundwater modeling, hydrologic assessments and PCB source identification in the basin. He also chairs the Data Quality subcommittee to the DRBC's Toxic Advisory Committee, and is responsible for managing data submission in support of the PCB TMDL for the Delaware Estuary. Previously, he served as the hydrologist directing review and analysis of ground water withdrawal projects within the Project Review Branch. Prior to his service with the Commission Mr. Cavallo was a hydrologist with the New Jersey Department of Environmental Protection, where he served as a case manager for remediation of polluted ground water facilities. Mr. Cavallo received his degree from State University of New York at Binghamton.

John R. Yagecic is a Water Resources Engineer and Modeler in the Modeling and Monitoring Branch. Mr. Yagecic is responsible for development of conceptual and mathematical models, and supporting data collection and engineering computations, to simulate and predict transport and fate of contaminants in the natural environment, in support of numerous programs and initiatives including total maximum daily loads (TMDLs). Prior to DRBC, he worked for the U.S. Army Corps of Engineers in Chicago and Galveston for nine years in several positions including Environmental Engineer and Regulatory Specialist. At the Corps, Mr. Yagecic was an Environmental Engineering Team Leader, performing engineering and assessments in support of military site cleanups, brownfields redevelopment, and dredging projects, as well as evaluation of wetland mitigation and creation projects. Mr. Yagecic received a Master of Science in Environmental and Water Resources Engineering from the University of Illinois at Chicago. He is a registered professional engineer.

Thomas J. Fikslin is the head of the Modeling and Monitoring Branch and the Director of the Estuary Toxics Management Program for the Commission. The branch is responsible for conducting and coordinating monitoring activities within the Delaware River Basin, as well as the development and implementation of hydrodynamic and water quality models for toxic and conventional pollutants. Previously, he worked with the U.S. Environmental Protection Agency, Region II for 19 years. From 1986 to 1989, he served as the Assistant Director of the U.S. EPA Region II laboratory in Edison, NJ. From 1979 to 1986 he directed the toxicity testing and microbiology section of the Region II laboratory. From 1974 to 1979, he was involved in the NPDES permitting of power plants, specializing in impacts to aquatic life. Dr. Fikslin received a Master of Science in Biological Sciences from the University of Delaware, and was awarded a Doctor of Philosophy in Ecology and Evolution from Rutgers University

Abstract

Polychlorinated biphenyls (PCBs) are present in the environment in various media including air, water and sediment. While the manufacture of PCBs was essentially banned in the late 1970's, they continue to be dispersed in the environment by human activity. They enter the atmosphere as a gas, spill into soils and waterways, and lodge in sediments. PCBs can also be generated as a byproduct by some industrial processes. The states of Delaware, New Jersey and Pennsylvania have listed the Delaware Estuary as impaired due to elevated levels of PCBs in the tissue of fish caught in this portion of the Delaware River. This required the development of TMDLs for an 85-mile reach of the estuary.

During the past three years the DRBC and Federal and State partners have embarked on an aggressive program to identify and characterize sources of PCBs by monitoring a number of different matrices in support of TMDL development. The types of matrices monitored were driven by the properties of PCBs, principal transport and fate mechanisms, and the need for data to inform the development of a PCB model.

The monitoring program included the collection and analysis of PCBs in air, ambient water, sediments including core samples collected in tidal marshes, NPDES dischargers and tributaries to the estuary during both dry and wet weather at varying freshwater inflow conditions. PCB Congener specific analyses have been undertaken in the various media and have achieved sample specific detection limits of 0.5 pg/L, when sample volumes of 20L were employed. A uniform list of 124 congeners has been analyzed for in the different media using Method 1668A or equivalent GC- ECD techniques.

The work also included the estimation of sedimentation rates through the collection of core samples and the analysis of Cesium-137, for use in a penta PCB homolog model. Sediment depositional, erosional and reworked areas were documented through the use of sidescan and chirp sonar.

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