Xenobiotics

Xenobiotics are defined as chemical compounds, such as pesticides and polynuclear aromatic hydrocarbons, that are present in, but foreign to, biological systems. In the Ohio River Basin, xenobiotics are likely substantially due to the diverse anthropogenic activities which occur, including mining, agriculture, industrialization, urbanization, permitted and unpermitted discharges and spills. Among the prominent xenobiotic compounds in the Ohio Valley are Chlorinated Dibenzo Dioxins, Polychlorinated Biphenyls and Chlordane, which have resulted in fish tissue consumption advisories.

To address xenobiotics, capabilities with regard to pinpointing sources and non-point sources of pollution, understanding transport and fate, and presence assessments must be improved. This is a particular need in the Ohio Valley, given the multi-use nature of water resources, industrial development and the interconnection of states and other political jurisdictions.

Examples of Research Needs:

Assessments

- Development of better techniques to determine and forecast biotic and abiotic degradation, including the development of bioaccumulation constants
- Development of data to support equilibrium and kinetic sorption modeling between column water, pore water and sediments
- Develop or improve existing models to assess the fate and transport of xenobiotics

Methodologies

- Improve analytical techniques for measurement of non-volatile and difficult to extract organic and inorganic compounds
- Development of field analytical methods to permit real-time assessments
- Development of analytical methods permitting speciation of metals (i.e., redox state) and form (i.e., chemical or complex)