Lower Passaic River, New Jersey

Polymeric Sampling Device—Low Density Polyethylene Sampler (LDPE)

Summary

Media:	In situ sediment porewater and water column vs. fish
Study Type:	In situ
Technology:	Equilibration
Peer Reviewed:	Yes
Publication Date:	April 2019

Study Description

- The study included collection of biota samples (12 species from 3 locations), surficial sediment samples (18 locations), in situ LDPE (60 days) surface water (6 events at 6 locations), and ex situ LDPE (9 weeks) porewater (18 samples) from the Lower Passaic River. These samples were analyzed for hydrophobic organic contaminants (HOCs), including organochlorine pesticides (OCPs), polybrominated diphenyl ethers (PBDEs), polychlorinated biphenyls (PCBs) and polychlorinated dibenzo-p-dioxins/furans (PCDD/Fs). A subset of sediment and biota samples was analyzed for PFAS.
- Additionally, surface water grab samples (8 locations) were collected for PFAS.
- Freely dissolved concentrations were corrected for disequilibrium using a sampling rate model described in Booij and Smedes (2010).

Remedial Phase

Remedial investigation and feasibility study

Outcome

Porewater concentrations from passive sampling for HOCs and/or sediment geochemistry for PDBEs and PFAAs were good predictors of lipid-normalized tissue concentrations. Measured lipid-based tissue concentrations of the majority of HOCs exceeded the predicted concentrations from porewater by at least twofold, suggesting dietary uptake. The dominant exposure pathways for legacy HOCs in biota were porewater and sediments rather than the river water.

Case Study Source

Khairy, Mohammed A., Gregory O. Noonan, and Rainer Lohmann. 2019. Uptake of Hydrophobic Organic Compounds, Including Organochlorine Pesticides, Polybrominated Diphenyl Ethers, and Perfluoroalkyl Acids in Fish and Blue Crabs of the Lower Passaic River, New Jersey, USA. *Environmental Toxicology and Chemistry* 38(4): 872–882. https://doi.org/10.1002/etc.4354

References

Booij, Kees, and Foppe Smedes. 2010. "An Improved Method for Estimating in Situ Sampling Rates of Nonpolar Passive Samplers." *Environmental Science & Technology* 44(17): 6789–94. https://doi.org/10.1021/es101321v