

# Bioavailability of Persistent Organic Pollutants (POPs) in the Westerschelde estuary, The Netherlands

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**Abstract.** Many apolar (non-water soluble) organic contaminants are present in the aquatic environment. Due to the very low water solubility of these chemicals, highest concentrations are found in sediments.

Persistent pollutants (PCBs, OCPs, and heavy metals) released in the past (1970s) therefore continue to pose a risk even though the pollutant is no longer being produced. These polluted sediment layers may be covered by recent deposits, thus reducing the ecological availability of the pollutants. However, bed erosion and upturning of sediments by storm events, bioturbation, channel dredging, or sludge dredging may cause a re-exposure and mixing of polluted and recent (less polluted) sediments. As a result, bed sediments may have a higher concentration of pollutants than would be expected on the basis of present-day concentrations or output.

Here we demonstrate the accumulation (and degradation) of compounds in the food chain. Bioavailability and accumulation of POPs (Persistent Organic Pollutants) depends on the concentration in sediments, the bioavailability and the biology and physiology of the organisms involved.

In the present case study, the route of brominated flame retardants is traced from Westerschelde estuary sediments into the

food chain. Because flame retardant compounds could not be determined in the water phase, we measured concentrations in sediment cores, crustaceans, fish, and in the eggs of the Common Tern (*Sterna hirundo*).

We demonstrate rapid uptake and spread of contaminants in the food chain and identify risk areas associated with prolonged deposition, and erosion due to (planned) infrastructural activities.