SCCWRP # 0737

ORGANIC CONTAMINANTS OF EMERGING CONCERN IN SEDIMENTS AND FLATFISH COLLECTED NEAR OUTFALLS DISCHARGING TREATED WASTEWATER EFFLUENT TO THE SOUTHERN CALIFORNIA BIGHT

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ABSTRACT

To investigate the occurrence and bioaccumulation of organic contaminants of emerging concern (CECs) near four major wastewater ocean outfalls in the Southern California Bight, more than 75 pharmaceutical and personal care products, current-use pesticides, and industrial/commercial chemicals were analyzed in sediment and liver tissues of hornyhead turbot (Pleuronichthys verticalis) using gas and liquid chromatography–mass spectrometry. Although most CECs targeted were infrequently detected or not detectable, triclosan, 4-nonylphenol (4-NP) and bis(2-ethylhexylphthalate) were detected in all sediments at median (maximum) concentrations of 5.1 (8.6), 30 (380), and 121 (470) mg/kg, respectively. In the liver, 4-NP and polybrominated diphenyl ether (PBDE) congeners 47 and 99 were detected in >90% of samples at median (maximum) concentrations of 85 (290) and 210 (480) mg/kg, respectively. The sedative diazepam was detected in all liver samples, but was infrequently detected in sediments. Sediment and liver concentrations across outfall locations ranged over several orders of magnitude and were elevated relative to a reference site. Relative to sediment, accumulation in liver of PBDEs 47 and 99 was comparable to that for legacy organochlorines, confirming their high bioaccumulation potential and suggesting their inclusion in future tissue monitoring studies. Mean tissue PBDE and diazepam concentrations were higher in livers from male versus female P. verticalis, suggesting that gender differences also be considered in designing such studies.

Full Text

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