

LAND USE AND THE SPATIAL DISTRIBUTION OF LIPOPHILIC CONTAMINANTS AS MEASURED IN THE BLUBBER OF BOTTLENOSE DOLPHINS (*TURSIOPS TRUNCATUS*)

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Emerging contaminants such as perfluorinated compounds (PFCs) and polybrominated diphenyl ethers (PBDEs) have come under increased scientific scrutiny. However, their use in a number of consumer and industrial products and subsequent input into estuarine systems continues. Legacy contaminants such as polychlorinated biphenyls (PCBs) and certain organochlorine pesticides (e.g. dichlorodiphenyltrichloroethane (DDT), dieldrin, chlordane, etc.), though banned from use, continue to be detected in estuarine systems due to their persistent and bioaccumulative properties. In a previous investigation, we found a positive correlation between developed land use and the concentrations of PFCs detected in the plasma of bottlenose dolphins sampled in the estuarine waters near Charleston, SC. This study investigated the relationship between developed land use and the spatial distribution of lipophilic contaminants as detected in the blubber of bottlenose dolphins sampled in estuarine waters near Charleston, SC. The study site was partitioned into four different subareas (ACW, CHS, SRE, and CST) based upon habitat and land use characteristics. Blubber samples from male bottlenose dolphins (n=42) were analyzed to determine pesticide, PCB, and PBDE concentrations. Long-term monitoring data from photo-identification surveys were used to group the dolphins based on their proportions of sightings in the different subareas and, in conjunction with the 2001 National Land Cover Database (NLCD), to establish associations with developed, wetland, agriculture and forested land use classes. Spearman's Rank Correlation was used to examine the relationships between the total lipid-normalized concentrations of the different contaminant classes and their associations with the developed land use class. Of the three contaminant classes only PBDEs were found to be significantly correlated ($p = 0.52$, $p < 0.001$) with the developed land use class. Kruskal-Wallis tests were also performed to examine differences in total contaminant concentrations for the different subarea-affiliated groups. Significant differences ($p < 0.01$) in PBDEs were detected between the groups. A post-hoc Kruskal-Wallis multiple-comparison z-value test indicated that dolphins affiliated with the subarea characterized by the highest amount of developed land use (ACW) had significantly higher concentrations of PBDEs than the two subareas with the lowest amount of developed land use (SRE and CST). No significant differences were detected between the groups for pesticides or PCBs. The findings imply that the distribution of emerging contaminants within an estuary is related to the degree of developed land use and can be somewhat local in extent. Legacy contaminants, however,

were found to be more uniformly distributed throughout the estuary, most likely due to the persistence of the contaminants and the well-mixed nature of the estuarine system.

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