

Title: Habitat Use and Trophic Position Effects on Contaminant Bioaccumulation in Fish Indicated by Stable Isotope Composition

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Abstract: The objective of our study was to determine the relationship between fish tissue stable isotope composition and total mercury or polychlorinated biphenyl (PCB) concentrations in a Great Lakes coastal food web. We sampled two resident fishes, Yellow Perch (*Perca flavescens*) and Black Crappie (*Pomoxis nigromaculatus*), and two migratory fishes, Northern Pike (*Esox lucius*) and Walleye (*Sander vitreus*) of varying size and from locations spread across the St. Louis River estuary, the largest coastal wetland complex in Lake Superior. At all locations, mercury concentration increased with size, whereas PCB concentration did not. We found robust habitat-based differences in contaminant concentration and stable isotope composition, though results varied by species. For both mercury and PCBs, increasing diet from Lake Superior was associated with decreasing contaminant concentrations. PCB concentrations were highest in the industrial portion of the river. Within a species, we found poor relationships between stable isotope composition and contaminant concentration, owing to the river's complex biogeochemistry. We conclude that spatial-patterns in both isotopic composition and contaminant concentration across a mosaic of coastal habitats can be complex and vary among isotopes, contaminants and species. Undertaking careful measurements of isotopic baselines is critical for data interpretation, and can be used to reveal spatial patterns in contaminants that would otherwise be difficult to detect.