ABSTRACT

THESIS PROJECT: Fish Assemblage Variation in the Wabash River, Indiana: Covariation with Hydrology and Substrates

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The local substrate composition of large rivers varies with local current velocity and high flow events. We evaluated effects of hydrology on local substrate variation for 28 Wabash River sites from 2005-08, and subsequent variation in fish assemblages using multivariate analyses. Sites were 500-m in length and fish were collected by boat electrofisher. Substrate collection methods were compared by way of habitat pole, developed by Ohio River Valley Sanitation Commission (ORSANCO), and substrate grabs. We characterized hydrologic variation with the Indicators of Hydrologic Alteration (IHA) software. We determined important driving variables of fish assemblages, substrates, and hydrology with Principle Components Analysis. Temporal effects of hydrology and substrate variation on taxonomic and functional fish assemblages were determined by repeated measures ANOVA. The analyses resulted in annual variation in fish assemblage structure, substrates and hydrologic variation. Significant relationships were found for fish assemblage structure, substrate variation, and hydrologic variation. Our Mantel tests resulted in significant concordance among hydrology, local substrate variation, and fish assemblage structure variables in years 2005, 2006, and 2008, but not in 2007. These results demonstrated that Wabash River fish assemblages respond to substrate variation and substrate
variation is controlled largely by hydrology. A comparison of substrate quantification approaches demonstrated that the habitat pole and substrate grabs are both effective ways to describe fish assemblages but the costs of grabs outweigh the cost of the pole method.