AN ECOLOGICAL ASSESSMENT OF LAND USE IMPACTS IN SMALL WATERSHEDS OF THE CHESAPEAKE BAY

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The Chesapeake Bay, the nation's largest estuary, remains in relatively poor condition despite intensive public and scientific attention. In order to better understand the stressors and impacts occurring in the Bay as a result of land management decisions we conducted an assessment of both habitat condition and organismal response in three small watersheds of the upper Bay. We selected watersheds with different types of land use (agricultural, suburban, mixed-use). We collected samples in Spring, Summer, and Fall over three years, including measurements of organism health over a wide range of biological organization – from molecular to community level. Some responses followed predictable trends, such as poor benthic community condition in the highly urbanized watershed. Less obvious were findings that indicated there may be tradeoffs in the response of some organisms to stressors. For example, fish abundance and fish health were inversely related, with high abundances and poor condition in the agriculturally dominated watershed and the opposite occurring in the highly developed watershed. Our findings also agree with other studies that have discovered greater impacts to habitat condition in small, headwater tributaries close to land-based sources than in the mainstem. We subsequently extended the study to three other watersheds in the Chesapeake Bay in order to examine the same suite of stressors and responses in lower salinity rivers and to increase our understanding of land use effects on estuarine conditions. We collaborated with various stakeholders to conduct the study and are engaged with them to discuss application of the findings.

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