

## **A COMPARISON OF EFFECTS OF CLIMATE CHANGE AND URBANIZATION ON STREAM HYDROLOGY: IMPLICATIONS FOR BIOASSESSMENT PROGRAMS**

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### **ABSTRACT**

The influence of landscape-level impacts relative to climate change and their interactions has implications for the long-term management of bioassessment programs, including applications of analytical approaches, protection and appropriate characterization of reference conditions, and potentially other adaptive strategies. Urbanization is a landscape-level impact that is similar to climate change effects in many ways. For example, urbanization is typified by increased flashiness of runoff and stream flow, increases in water temperatures, and changes in non-point source loadings (e.g., nutrients, sediments). Changes in these parameters due to climate change will be confounded, and potentially obscured, by similar changes due to urbanization. Efforts to develop a national-scale land use data base that reflects expectations for changes in population growth, housing, and impervious surface that represent different IPCC future climate change scenarios offers a unique opportunity to examine the closely related and otherwise confounded effects of climate change and urbanization on streams and rivers. We used long-term hydrologic and precipitation data along with land cover information to compare hydrologic responses associated with urbanization to those due to climate predictions for the Mid-Atlantic region. We found that high-flow characteristics responded to urbanization more strongly than to anticipated changes in precipitation patterns. In contrast, low-flow characteristics more often responded more strongly to precipitation changes than to urbanization.

### **KEYWORDS**

Climate change, land use change, urbanization, biological indicators, aquatic ecosystems