Understanding Relations between Urbanization and Stream Habitat Degradation – is it Possible with Traditional Habitat Assessment Methods?

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ABSTRACT

Habitat assessments are useful for measuring the physical conditions that may limit aquatic biological community health and structure. Recently, habitat data have been used to assess physical and geomorphic responses to watershed-scale land disturbance, such as urbanization. Physical responses include changes in channel geometry and hydraulics, substrate size, habitat complexity and cover, habitat volume, and bank/riparian conditions. These responses are caused by changes in flood characteristics and source and amount of sediment loads associated with land clearing and increased impervious surfaces. The cause/effect relations among urbanization and habitat conditions are difficult to determine for a variety of reasons, including (1) differences in local geologic setting can account for more variability in physical conditions than those caused by urbanization; (2) habitat measurements are usually done only once during low flow; (3) physical conditions are representative of complex geomorphic processes that vary longitudinally depending on spatial position within a stream network; (4) geomorphic responses vary temporally due to fluctuations in the source and amount of sediment load as urbanization progresses; and (5) physical conditions may reflect legacy conditions from historical channel modification. Habitat and geomorphic data collected from 10 metropolitan areas across the U.S. will be used as examples to illustrate that in order to link stream physical responses to urbanization. Additional data are needed that encompass temporal and longitudinal trends, drainage network connectivity, local variations in geologic setting, and history of channel modifications.

KEYWORDS

habitat assessment, urbanization, national, geomorphic processes, channels

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