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Managing Stream Channel Erosion and Deposition: Development of Tools for Hydromodification Assessment and Management

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Abstract

The process of urbanization has the potential to affect stream courses by altering watershed hydrology. Development and redevelopment can increase impervious surfaces on formerly undeveloped landscapes and reduce the capacity of remaining pervious surfaces to capture and infiltrate rainfall. The result is that as a watershed develops, a larger percentage of rainfall becomes runoff during any given storm. In addition, runoff reaches the stream channel much more efficiently, so that the peak discharge rates for floods are higher for an equivalent rainfall than they were prior to development. This process has been termed hydromodification. Hydromodification can result in adverse effects to stream habitat, surface water quality, and water supply, and stream erosion can threaten infrastructure, homes, and businesses. Intermittent and ephemeral streams that possess riparian and wetland habitat are at particular risk from effects of hydromodification. In response to the effects of hydromodification, state and local agencies have developed standards and management approaches to control and/or mitigate the effects of hydromodification on natural and semi-natural stream courses. Successful implementation of these regulatory programs requires development of tools to better assess hydromodification effects and develop appropriate mitigation and management strategies. This presentation will provide an overview of tools and approaches developed over the past ten years to help support assessment and management of hydromodification effects. Specifically, the approaches are intended to answer the following questions: 1) Which streams are at the greatest risk of effects of hydromodification? 2) What are the anticipated effects in terms of increased erosion, sedimentation, or habitat loss, associated with increases in impervious cover? 3) What are some potential management measures that could be implemented to offset hydromodification effects and how effective are they likely to be? 4) How can a combination of site-based and watershed-scale management actions be used to address hydromodification effects.