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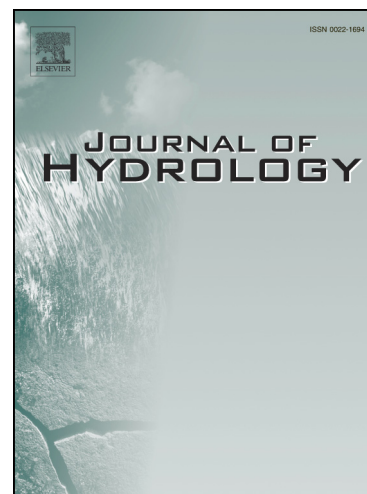
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**THE ECONOMIC VALUE OF THE FLOW REGULATION ENVIRONMENTAL
SERVICE IN A BRAZILIAN URBAN WATERSHED**

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Abstract

Urban flood management have often focused either on the capacity expansion of drainage systems or on artificial detention storage. While flood control should take part early on urban planning, not enough is known to guide such plans and provide incentive to land use decisions that minimize the vulnerability to localized floods. In this paper, we offer a broader perspective on flood protection, by treating the original hydrologic flow regulation as an environmental service, and exploring how the value of this environmental service drives economic land use decisions that convert original (permeable) land into urbanized (impermeable). We investigate the relationship between land use decisions and their hydrologic consequences explicitly, and uses this relationship to simulate resulting land use scenarios depending on the value attached to the environmental service of flow regulation. Rainfall-runoff simulation model results are combined to an optimization model based on two-stage stochastic programming approach to model economic land use decisions. The objective function maximizes the total expected land use benefit in an urban area, considering the opportunity cost of permeable areas in the first stage and the resulting loss of the environmental service of flow regulation on the second stage, under several probable hydrological events. A watershed in the city of Belo Horizonte, Brazil, is used to demonstrate the approach. Different values attached to the environmental service were tested, from zero to higher than the opportunity cost of land, and artificial detention infrastructure

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