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University of Pennsylvania



Institute for Environmental Studies

presents

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Quantification of the Effects of Urbanization  
on Valley Creek Watershed, Chester Co. PA

The goal of this work is to quantify the effects of development on the hydrology and ecology of a suburban stream system at the watershed scale. The typical impacts of urbanization in this 25-sq-mile watershed are evident, including observed increases in storm runoff, stream-bank erosion, and stream-bed sedimentation. In addition, contamination emanating from six hazardous waste sites and aquifer dewatering from limestone quarrying are known to have historically affected the quality and quantity of the water resources.

We have attempted to utilize previously-documented anthropogenic perturbations to yield quantitative information on the current functioning of the natural system. We have demonstrated: (1) the effects of urbanization on the spatial heterogeneity of fish species diversity, changes in fish diversity and abundance over time, and correlation of diversity to both degree of impervious area and groundwater influxes to the surface water system; (2) the importance of considering the impacts of groundwater quality on the ecology of the surface water system; (3) utilization of known groundwater contamination discharging into the stream as a natural tracer to assess the storage and dispersive characteristics of the surface water system; (4) the use of food web/stable isotope analysis to infer presence of anthropogenic sources of nitrogen in the stream, believed to be related to septic inputs; (5) correlation of sediment distribution, phosphorus uptake, and hyporheic residence time with construction activities; (6) the effect of an extensive system of stormwater detention basins in exacerbating stormwater flooding; and (7) the role of zoning boards in contributing to the sprawl process. An overview of results to date will be presented, with an emphasis on the interaction among the ecological, hydrologic, and social science components of the research.

Additional information on this project can be found at <http://www.pages.drexel.edu/~weltyc/wws.html>

**DIFFERENT DAY & DIFFERENT LOCATION**

**Date:** Wednesday, September 17, 2003

**Time:** NOON - 1:30 pm

**Place:** Carolyn Hoff Lynch Auditorium

On Penn's campus: Chemistry Building: 34<sup>th</sup> & Spruce St (enter on 34<sup>th</sup> St)

*No Food or Drink Permitted in the Auditorium*

**NO REGISTRATION REQUIRED**

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