Geophysical Research Abstracts
Vol. 14, EGU2012-3628, 2012
EGU General Assembly 2012

Integrating Data from Geological Investigations into Urban Watershed Restoration Efforts

M. Kaufman (1), D. Rogers (2), and K. Murray (3)

(1) University of Michigan-Flint, Flint, USA, (martyk@umflint.edu), (2) Amsted Industries, Chicago, IL, USA, (drogers@amsted.com), (3) University of Michigan-Dearborn, Dearborn, USA, (kmurray@umich.edu)

To improve urban watershed restoration efforts, a framework for integrating the outputs from subsurface geological investigations into land use planning is developed. This framework synthesizes the data generated at the individual parcel scale, including a full inventory of water flows on the surface and within the subsurface, and the synergy between contaminant properties and the geological environment. Using a case study approach, over 3000 sites of environmental contamination were investigated in the heavily urbanized Rouge River watershed of southeastern Michigan, USA. Analysis of the remediation costs at these contaminated sites and the patterns of groundwater contamination strongly suggest that land use planning in this region has not incorporated the basic sciences of geology and geomorphology. At a broad geographical scale, the siting of cities near flowing water and their industries above vulnerable geology resulted in large extents of contamination that are costly to remediate. This historical process was complicated by the unplanned nature of urban sprawl, as industrial sites were located in areas of high groundwater vulnerability, and their spatial juxtaposition created unintended consequences by expanding the pathways for contamination transport. To help remedy this situation, it is recommended that urban watershed restoration efforts include groundwater vulnerability studies, and these studies should become a basic component of the land use planning process, much as environmental site assessments are for the real estate industry. Moreover, through source control, the parcel scale is where science-based landscape planning can most effectively aid in urban watershed restoration efforts and prevent further environmental damage to land being considered for new development or redevelopment.