

# Use of LIDAR to Monitor Stream Morphology Changes Due to Urbanization of a Suburban Watershed

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## Emerging Technologies

Our Study Area is the Clarksburg Maryland Special Protection Area (SPA):

**The Problem:**  
 Urban Effects on Streams

Urban stream bank undercutting due to high volume flows

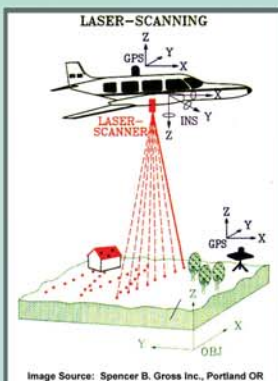


### Our Research Partners:

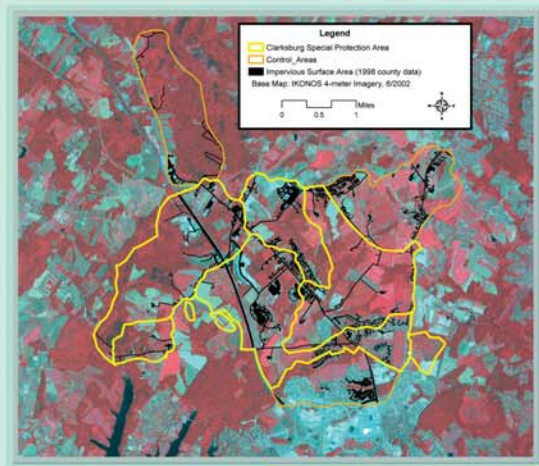
Montgomery County, Maryland  
 Department of Environmental Protection  
 Division of Watershed Management

University of Maryland, Baltimore County  
 UMBC Department of Geography and Environmental Systems  
 The Center for Urban Environmental Research and Education (CUERE)

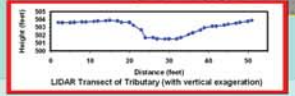
### Our Emerging Technology Tool: LIDAR



LIDAR (Light Detection and Ranging) technology uses laser pulses to measure the distance from an aircraft to environmental surfaces. GPS (Global Positioning System) receivers and on-board inertial systems are used to accurately determine the position of the aircraft and the surface sensed with LIDAR. The final result is a very accurate and high-resolution Digital Elevation Model (DEM) of the environmental surfaces remotely sensed with LIDAR.



Changes in stream structure will be mapped from LIDAR and compared to changes in watershed development over time.

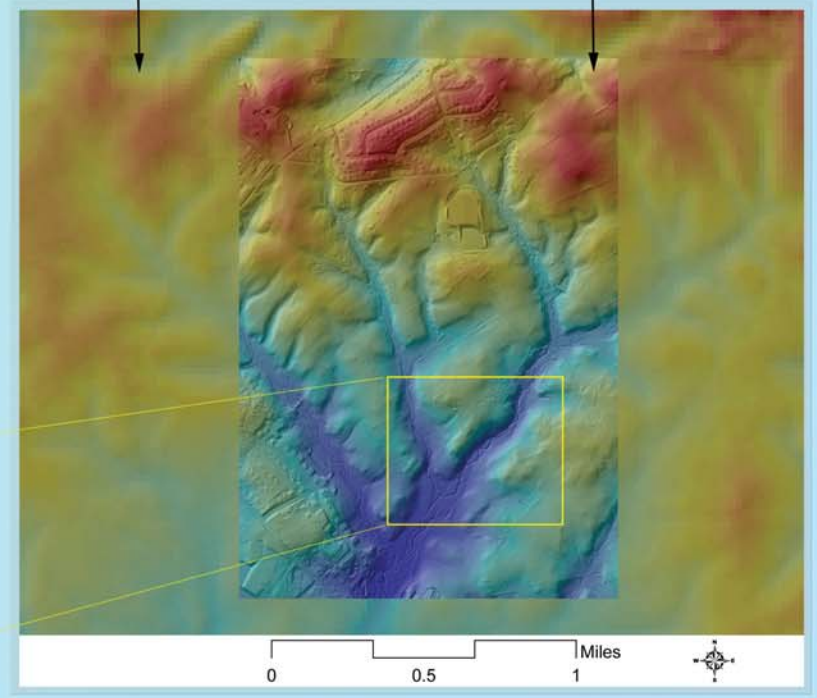


### Our Research Plan:

Our research will combine remotely sensed imagery, GIS (Geographic Information Systems), and LIDAR to map and monitor development of the Clarksburg SPA and the streams' responses. We hope to learn what BMPs (Best Management Practices) work best in mitigating the effects of urban development on streams. Monitoring will include biological and physical water quality, streamflow, precipitation, and topography.

Shaded Relief from National Elevation Data (NED, 30 m DEM)

Shaded Relief from LIDAR (0.5 m DEM)



Above: Satellite classification of urban land cover 1970s - 2000. The Clarksburg SPA (yellow outline above) is at the edge of the current development extent of the Washington DC metropolitan area.

- = 1970's NALC urban
- = 1992 NLCD urban
- = 2000 NLCD urban

