

## **Geographic Surveillance and Hotspot Detection for Homeland Security: Network Analysis of Biological Integrity in Freshwater Streams**

**Short Description** This study employs the network version of the upper level set scan statistic to characterize biological impairment along the rivers and streams of Pennsylvania and to identify subnetworks that are badly impaired.

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**Full Description** This study will employ the network version of the upper level set scan statistic to characterize biological impairment along the rivers and streams of Pennsylvania and to identify subnetworks that are badly impaired. The state Department of Environmental Protection is determining indices of biological integrity (IBI) at about 15,000 sampling locations across the Commonwealth. Impairment will be measured by a complemented form of these IBI values. We will also use remotely sensed landscape variables and physical characteristics of the streams as explanatory variables in order to account for impairment hotspots. Critical stream subnetworks that remain unaccounted for after this filtering exercise become candidates for more detailed modeling and site investigation. See Evans et al. (2003) Hawkins et al. (2000) and Wardrop et al. (2002, 2003).

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**Strategic  
Cycle  
Elements**

Prevention

**Project  
URL**

<http://www.stat.psu.edu/~gpp/PDFfiles/Prospectus%2016%20overview.pdf>  
<http://www.stat.psu.edu/~gpp/PDFfiles/Prospectus%2016.pdf>

**Sponsor**

NSF Digital Government Program, EPA STAR Grant Program

**Keywords**

Filtering for explanatory variables, index of biological integrity, hotspot detection