

## **Geographic Surveillance and Hotspot Detection for Homeland Security: Drinking Water Quality and Water Utility Vulnerability**

**Short Description** New York City has installed 892 drinking water sampling stations. Currently, about 47,000 water samples are analyzed annually. The ULS scan statistic will provide a real-time surveillance system for evaluating water quality across the distribution system.

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**Full Description** New York City has installed 892 drinking water sampling stations across the five boroughs. Each 4.5-foot high station is located outdoors and draws water from a nearby water main. The purpose is to monitor general water quality, detect potential health threats, and thwart bioterror activity. Sampling frequency was increased after the 9/11 attacks and, currently, about 47,000 water samples are analyzed annually. Parameters analyzed include: bacteria, chlorine, pH, inorganic and organic pollutants, color, turbidity, odor, and many others. The network version of the ULS scan statistic will provide a real-time surveillance system for detecting and evaluating water quality hotspots within the distribution system on a parameter-by-parameter basis.

An overall assessment of water quality at each sampling station taking all parameters into account is achieved by employing recent progress on multi-criterion ranking using poset (partially ordered set) prioritization.

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**Strategic  
Cycle  
Elements**

Prevention  
Crisis Management

**Project  
URL**

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

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**Keywords**

Multi-criterion prioritization and ranking methods, partially ordered set, upper level set scan statistic, water quality, water quality parameters