

## **Designing a complex multi-objective water quality monitoring network: the New York City water supply example**

**David G. Smith and Richard E. Corradi**

New York City Department of Environmental Protection, 465 Columbus Avenue, Valhalla, NY 10595  
dsmith@dep.nyc.gov

### **Biographical Sketch of Author**

David G. Smith is Section Chief, Information Management and Reporting, for New York City's Bureau of Water Supply. His background in the design of water quality monitoring networks began with the design of New Zealand's national network for rivers and lakes in 1989. Subsequently he successfully managed that network and produced several papers on the topic including its design, status interpretation, sampling and analytical requirements for trend detection, and trend detection itself. He used this experience to lead the redesign of the complex monitoring network for New York City's drinking water supply. He also has numerous publications in the field of human perception of natural waters and has co-authored a book on optical water quality.

### **Abstract**

The design of a water quality monitoring network with many stakeholders and multiple objectives can be daunting. The starting point, and key to successful design, is the derivation of an appropriate set of objectives that are based on stakeholders' requirements. These objectives should be defined as precisely as possible, although this step may not be easy. Next, based on the requirements of each objective, the field sampling (including frequency) and measurement, and the laboratory analytical requirements are rigorously specified. The setting up of a database and reporting requirements also require addressing. Many of these requirements have been discussed in the literature but the starting position, the derivation of objectives, has received little attention. This paper describes this process in the way it led to the design of the New York City water supply system monitoring network. It also describes some aspects of this network, which are a consequence of, and highly dependent on, each independent objective. The Hydrology monitoring Program will be discussed as an example of the processes involved, especially the derivation of the objectives.