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Partnering to Protect Human Health and the Environment

Proposed Water Quality Surveillance Network using Physical, Chemical and Biological Early Warning Systems (BEWS)

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Year of Water: Thirty Years of Progress Through Partnering

The Homeland Protection Act of 2002 specifically calls for the investigation and use of Early Warning Systems (EWS) for water security reasons. The proposed water quality surveillance network couples the "Canary in the coal mine" approach with the latest in behavioral, physiological, and physical/chemical monitoring techniques and current computing and communications equipment, to provide time-relevant data and analysis over a range of spatial scales (e.g., watersheds or regions).

Many organizations in Europe currently use water quality early warning systems to monitor water supplies (Figure 1). Enforcement and remediation actions are taken by European agencies charged with the protection of water quality using information gained from continuous early warning systems. There are relatively few water quality early warning systems in the U.S.

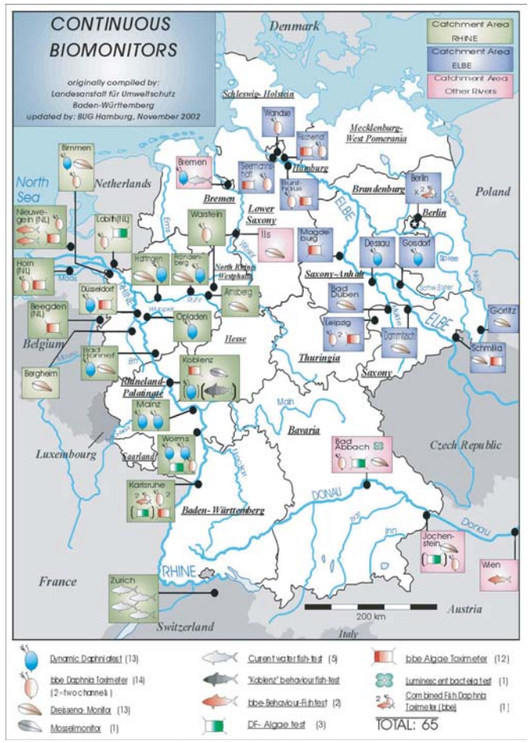

Figure 1. Maps of BEWS deployed in Northern Europe.

We would like to thank C. Moldaenke of bbe Moldaenke, Kronshagen, Germany, and M. Marten, of Environmental Protection, Baden-Wuertemberg Germany, for sending and preparing this information.

Water Quality Early Warning

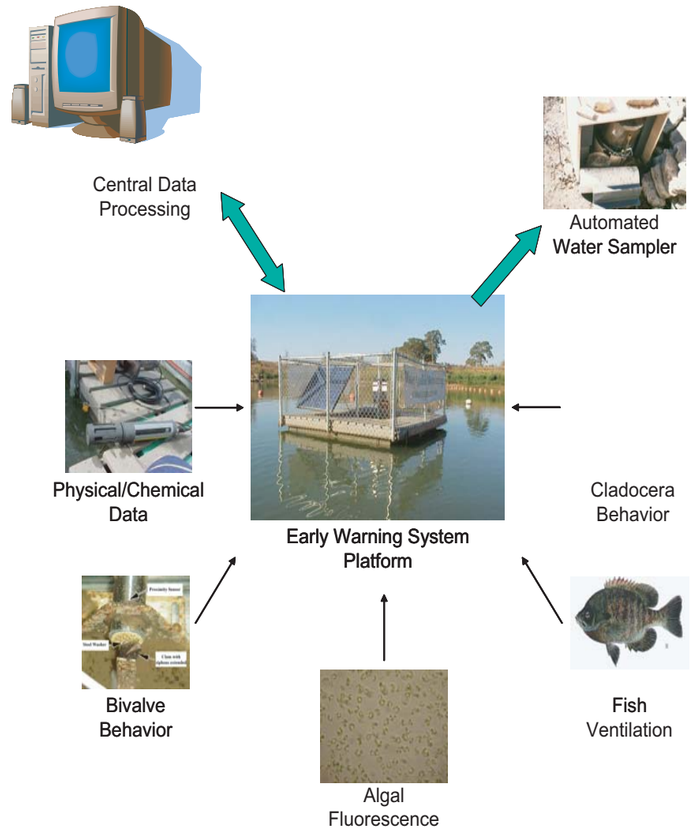

Figure 2. Early Warning System and its components.

An EWS (Figure 2) is a suite of time-relevant biological and physical/chemical water quality monitors that acts as a screening tool for detecting changes in source water and distribution system water quality. It can provide critical information to water resource managers and decision-makers and measure the success of water quality control programs implemented under the Clean Water Act.

Pilot EWS Surveillance Network

Continuous, online EWS deployed in strategic locations in source water and distribution systems

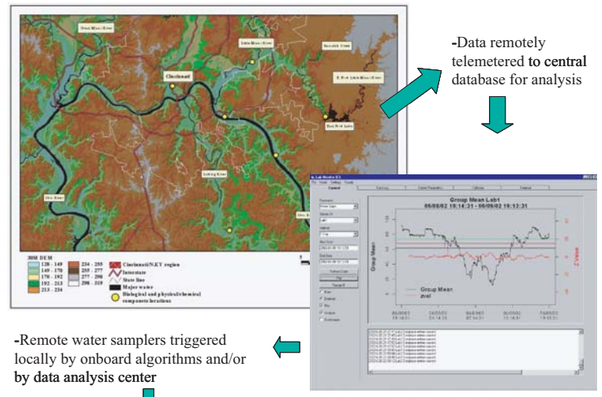

Figure 3. Proposed EWS pilot surveillance network.

The Molecular Ecology Research Branch (NERL) and the Water Quality Management Branch (NRMRL) propose to go beyond the European approach by investigating the use of advanced whole-organism and molecular technologies in a time-relevant network.

A model data collection, storage, and analysis infrastructure will be created to collate and analyze data from the EWS for detection and tracking of water quality events.

Ultimately, we envision setting up a continuous, time-relevant national water quality surveillance network in all major rivers in the U.S. used for water supplies and their distributions systems.

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