

# Advanced Water Quality Monitoring and Sampling Technology in the Study of Deicers at Dallas/Fort Worth International Airport, Texas

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## Biographical Sketch of Author

Kurt Kraske is a hydrologist with the U.S. Geological Survey, Fort Worth Field Office, with a background in geology/hydrogeology and extensive training and experience in environmental field investigations throughout the United States. Kurt has served in the Fort Worth area since 2002, and has been a primary water quality team member on the Dallas/Fort Worth International Airport project. He has also served as a hydrologic technician and volunteer with the USGS Water Resources Division in DeKalb, Illinois.

## Abstract

The U.S. Geological Survey is using state-of-the-art remote sampling and monitoring technology in a water quality study at Dallas/Fort Worth International Airport (DFW), Texas. The DFW study focuses on determining the potential water quality effects of deicing fluids on receiving water bodies. Potential effects may include increased biological oxygen demand, subsequent decreases in dissolved oxygen concentrations, and toxicity. Sampling/monitoring stations were established at 8 locations throughout the Big Bear Creek watershed and Trigg Lake. Flow-weighted samples are collected at 5 of the stations continuously and during selected storm events. Samples are analyzed for constituents such as biological and chemical oxygen demand, ethylene and propylene glycol, surfactants, *Microtox*, and tolytriazoles. Manual samples are also collected at specific times for analysis of chronic/acute bioassay and glycol-hydrolyzing bacteria.

The technology used in the DFW study makes real-time, remote monitoring and sampling information available at the office desktop, as well as allowing complete control of all remote sampling/monitoring stations from a personal computer. Most monitoring data is continuously displayed on a website, including stream water level and discharge, precipitation amount and intensity, water and air temperature, and water dissolved oxygen. Sampling data can also be monitored in real-time. Communication software, in combination with a cellular telephone system, allows the user to control such items as: 1) changing the bottle into which samples are collected by each automatic sampler, 2) changing the flow-weight volume for each sample bottle, and 3) the station paging the user when pre-set sampling conditions are met. Each sampling/monitoring station is automated, with power supplied and regulated automatically at the site, through a combination of AC power, batteries, solar panels, and propane generators. Floating water quality monitoring stations operate independently at the lake site, transmitting data through a radio system, as well as storing it on the raft as a back-up.