# Water-quality trends for selected sites at and near the Idaho National Laboratory, Idaho

Roy C Bartholomay
U.S. Geological Survey
1955 N Fremont, MS1160
Idaho Falls, ID 83415
208-526-2157
rcbarth@usgs.gov

Linda C. Davis
Jason C Fisher
Betty J Tucker
Flint A Raben

The U.S. Geological Survey, in cooperation with the U. S. Department of Energy, has maintained a water-quality monitoring network at the Idaho National Laboratory (INL) since 1949 to define the quality of water for human and industrial use and to better understand the location and movement of contaminants in the eastern Snake River Plain aquifer at the INL. Water-quality trends for 67 wells and 7 surface water sites were examined for selected constituents including cations, anions, nutrients, trace elements, and total organic carbon for data collected from 1949 through 2009. Water-quality trends were determined using the (1) nonparametric Kendall's tau correlation coefficient, p-value, Theil-Sen slope estimator, and summary statistics for uncensored data and (2) Kaplan-Meier method, Kendall's tau correlation coefficient, slope, p-value, Akritas-Theil-Sen slope estimator for robust linear regression, and summary statistics for censored data. Water-quality trends were determined to assist with future management decisions concerning the number of wells to sample and the type of constituents to monitor.

Chloride results indicate that water from 20 wells influenced by Big Lost River (BLR) recharge have decreasing concentration trends or variable patterns that correlate with wet and dry cycles of recharge. Water samples from four sites on the BLR also show a decreasing trend or no trend in chloride concentrations. Wet and dry cycles of recharge also correlate with concentration trends for sodium, sulfate, nitrate, and a few trace elements in several wells. Several wells that derive water primarily from regional sources show increasing trends in chloride, sodium, sulfate, and nitrate concentrations. These increases are attributed to agricultural and/or other anthropogenic influences upgradient of the INL. Increasing trends for selected constituents from several wells near INL facilities may be influenced by wastewater disposal at the facilities.