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Mercury and methylmercury relationships in contaminated streams G.R. Southworth*, and M.A. Bogle, Oak Ridge National Laboratory, Oak Ridge, TN, USA and R.R. Turner, RRT Geosciences, Inc., Squamish, British Columbia, Canada.

Field and laboratory studies have demonstrated that concentrations of methylmercury in freshwater systems are influenced by the concentrations of precursor inorganic mercury. Because the production of methylmercury from inorganic mercury is influenced by a large number of chemical and ecological factors, extrapolations of observed relationships between precursor mercury and methylmercury in specific aquatic systems to other systems generally fail. However, in chemically and ecologically similar lakes and streams, generalizations concerning the relationship between inorganic mercury and methylmercury in water may be more universal. We measured total mercury and methylmercury in filtered and unfiltered water samples from 28 sites in 13 freshwater streams in Tennessee, Kentucky, Virginia, and North Carolina. All sites were sampled under warm weather baseflow conditions. Seven of the streams had a previous or ongoing history of mercury contamination from point sources, while three others were suspected to be contaminated based on concentrations of mercury in fish. Three were presumed to be influenced primarily by atmospheric and geologic sources of mercury. Total mercury concentrations varied more among the 28 sites than did methylmercury concentrations, and regression of methylmercury versus total mercury did not yield evidence of a strong relationship. However, when data from contaminated sites receiving discharges from Dept. of Energy facilities in Oak Ridge, TN were excluded, there was a much stronger relationship. We hypothesize that some chemical characteristic of these streams associated with the industrial discharges lessens the net methylation rate of inorganic mercury.