

Title: Investigations of Sample Stability in Water Chemistry Samples: Implications for the National Aquatic Resource Surveys

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Water samples collected for the EPA's National Aquatic Resource Surveys (NARS) typically arrive at an analytical laboratory 2 or 3 days after collection (longer if collected from a remote location), at which point they are stabilized (filtration and/or acid preservation) until analysis. We collected replicate samples from four streams and one pond in the Willamette River basin, OR. Samples were kept in darkness at 4 °C until stabilization (on day 0, 3, 7, and 14). We will use repeated measures ANOVA to test for effects of time before stabilization on analyte concentration. In addition, we will compare the observed differences in analyte concentrations to analytical precision criteria.

Target holding times for NARS water chemistry analyses are 28 days or less for all analytes except the major cations. We examined the stability of stabilized aliquots after 4 months and 10 months by re-analyzing interlaboratory performance evaluation samples (from natural sources representing a wide range of concentrations) obtained from Environment Canada's National Water Research Institute. In 2011, we reanalyzed preserved aliquots from samples originally collected in 2009 as part of the National Rivers and Streams Assessment (2 years after initial analysis). We will use geometric mean functional regression (GFMR) to predict the re-analyzed analyte concentration of a sample from the initial concentration, determine if the regression line has an intercept of 0 and a slope of 1, and compare the observed differences to analytical precision criteria.

Results from the study of unstabilized samples will give us information as to potential effects from not being able to stabilize samples until they arrive at a laboratory. A more definitive investigation would require samples from locations across the US and the ability to stabilize a sample from each site on the day of collection. Results from the studies of stabilized samples will provide information as to whether the current target holding times can be exceeded without compromising sample integrity.

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