**CHEMISTRY: Analytical/Physical**

**Comparison of Inorganic Elemental Concentrations in Water Samples and Occurrence of Zebra Mussels in Kentucky Lake, USA**

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Zebra mussels (*Dreissena* *polymorpha)* are an exotic and invasive mollusk that spread extensively over various rivers and lakes in the United States. However, these mussels had been unable to reproduce and establish populations in the Kentucky Lake during the last several decades. Recently, zebra mussel colonies were frequently encountered in Kentucky Lake. This emergence of mussels in the waters generated interest in examining physical and chemical parameters that are vital to the reproduction and development of zebra mussels. The specific aim of this study was to examine various physical (DO, pH, light penetration) and chemical parameters (trace metals) in water samples collected from selected long-term monitoring stations in the Kentucky Lake. Surface and bottom water samples were collected during the Kentucky Lake sampling Cruise #572. Pre-cleaned high density polyethylene bottles were used to collect the water samples and filtered using 0.45 micron syringe filters. The filtrate was acidified to 2% nitric acid with trace metal grade nitric acid. Standard analytical procedures were followed including sample preparation, quality assurance protocols and analysis using Inductively Coupled Plasma (ICP) Optical Emission Spectrometer. Arsenic (As), barium (Ba), beryllium (Be), calcium (Ca), cadmium (Cd), chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), selenium (Se) and thallium (Tl) were measured in the samples. Elemental concentrations ranged from µg L-1 (ppb) to mg L-1 (ppm) depending on analyte type and sampling locations. Concentrations of some critical metals were compared with historical (pre-emergence period of zebra mussels) data from Kentucky Lake waters as well as concentrations of these metals in zebra mussel infested Ohio River water samples.