

VARIATIONS IN TRACE ELEMENT CONCENTRATIONS IN
SEDIMENTS AT FOUR SAMPLING SITES AT ORDNANCE REEF,
WAIANAE, HAWAI'I

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ABSTRACT

The Ordnance Reef Project aims to evaluate potential threats to human and ecological health in a coastal marine ecosystem from heavy metals and other trace elements (TE) associated with discarded military munitions, non-point source pollution, and the Waianae wastewater treatment plant. TE concentrations in sediments are presented with special attention paid to four contaminants of potential concern (COPC): Cu, Zn, Pb, and As. Strong enrichments of Cu, Zn, and Pb were observed in sediments collected in the discarded military munitions (DMM) stratum, whereas As enrichments were found in the conservation (CON) stratum. It is determined that actual DMM are the primary source for Cu, Zn, and Pb. Although potential sources have been hypothesized for As enrichments, the actual source has not been identified. Concentrations of TE associated with Hawaiian soils are also presented and discussed. Principal component analysis (PCA), a statistical tool, groups variables into three components that account for most of the variance within the entire data set. We identified these components as Factor 1: elements associated with volcanic and terrestrial material, Factor 2: elements of marine origin, and Factor 3: elements associated with anthropogenic activity