

ABSTRACT

The sources of contaminants to the coastal marine environment are of increasing concern to those tasked with establishing Total Maximum Daily Loads (TMDLs). Shelter Island Yacht Basin (SIYB) in San Diego, California has a recently promulgated TMDL for dissolved copper. Recreational vessels are typically painted with copper-containing hull paint to inhibit marine fouling organisms. The passive input of copper to SIYB from anti-fouling paints has recently been studied. The objective of this study was to quantify both the dissolved and particulate fractions of copper emitted from copper-based anti-fouling coatings *in situ* as a result of routine active hull cleaning of recreational vessels. To accomplish this, *in situ* samples were collected using a specially designed enclosed chamber. Three different hull-cleaning methods were tested using two common paint formulations after one month and three months of natural fouling. The methods included minimally abrasive "best management practices" (BMPs) using a soft carpet, to more abrasive scouring pads and brushes. Hull cleaning generated an average emission rate of $10.0 \mu\text{g}/\text{cm}^2/\text{event}$ of dissolved copper following one month of natural fouling. This compares similarly to an estimated $8.5 \mu\text{g}/\text{cm}^2/\text{event}$ that was calculated in a related technical report (RWQCB, 2005). On a mass basis, the particulate copper loading from recreational vessels was estimated at 2,080 kg/year in SIYB. As a potential long term source in sediments, additional study is warranted to accurately assess the true copper loading on bottom sediments and potential impact to benthic life within SIYB.

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