

## Metals in Marine Sediments Near a Large California Municipal Outfall

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### ABSTRACT

Elevated concentrations of trace metals in surficial sediments off Palos Verdes Peninsula, site of the Los Angeles County outfall system, clearly reflect the submarine discharge of treated municipal (domestic and industrial) wastewater. The following contamination factors (median outfall/median baseline) were obtained for the eight metals measured in a 45 km<sup>2</sup> region of the outfall monitoring zone: Ag-27; Cd-36; Cr-12; Cu-20; Hg-23; Ni-5.4; Pb-17; Zn-7.7.

The discharge of municipal wastewater via submarine outfalls is the dominant source of most toxic trace metals to the southern California coastal marine (Young *et al.*, 1978). The largest of these inputs results from the ocean discharge of primary treated effluent from the Joint Water Pollution Control Plant (JWPCP) of the Los Angeles County Sanitation Districts (LACSD). The outfall diffusers are located approximately 3 km off Palos Verdes Peninsula, in 60 m of water. At the time of this survey (1975), the Palos Verdes Shelf had been a LACSD discharge site for 38 years; this wastewater system serves a highly urban and industrialized area of 1600 km<sup>2</sup>, a population of 365 million persons, with total employment of 1.5 million (LACSD, 1976).

The present average daily flow rate is approximately 365 million gallons per day ( $1.38 \times 10^9$  l. d<sup>-1</sup>). Typically, this discharge has contained 260-330 mg l.<sup>-1</sup> suspended solids, yielding an annual mass emission of about 130-170 thousand tonnes (1971-75). A large percentage of the metals are associated with the particulate fraction of the discharge (Young *et al.*, 1973).

This paper reports the resultant contamination of the bottom sediments of the outfall region by eight trace metals. Concentrations from various control region are presented for comparison.

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