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**Metal concentrations in Milford Haven  
sea bed sediments - data storage,  
analysis and initial interpretation**

*A report to Milford Haven Waterway Environmental Steering  
Group from the Field Studies Council Research Centre*

by

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Database design and  
implementation  
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Graphics  
Major and trace element data  
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Secretarial

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## Summary

- A survey of sediment major and trace element concentrations in the benthic sediments of the Milford Haven waterway was carried out between March and June 1993. Single samples were taken at 85 stations within the waterway and also at a control station near Skomer island. The samples were analysed by the National Rivers Authority Llanelli laboratories and the data were submitted to FSCRC for storage, analysis and interpretation. The project is intended primarily to supplement a macrobenthic survey of the waterway carried out in October 1993.
- Data from this survey and also from a water quality monitoring programme carried out throughout 1993 were stored on a computer database implemented using *VP-Info* running on an IBM-compatible personal computer. The database consists of four linked tables and was designed to allow flexible retrieval of the information. The main data table contains a total of 5489 entries. Checksum validation of the data entry showed a transcription error rate of approximately 0.25%. All detected errors were corrected.
- Minimum sediment metal concentrations were found in the lower estuary, west of Stack Rock. In comparison with a world-wide standard shale, many elements had elevated concentrations; copper and zinc were enriched at all stations and lead at all but five stations. Anthropogenic inputs of these metals were considered to be responsible for at least part of this enrichment. However, copper in particular may also have a natural source within the waterway. Sewage, refinery effluents and road runoff were considered to be important anthropogenic sources for those metals exhibiting elevated concentrations.
- Elemental concentrations within sediments of the Milford Haven Waterway were compared to those from 24 estuaries in south west Britain. All mean elemental concentrations except copper were equal to or lower than values from these estuaries. Maximum concentrations of all metals except cobalt were within the ranges of concentrations determined elsewhere.