



THE DISTRIBUTION OF METAL INDUSTRY WASTES IN
INTERTIDAL SEDIMENTS NEAR WHYALLA, IN UPPER
SPENCER GULF, SOUTH AUSTRALIA

A thesis for the degree of
Master of Environmental Studies
at The University of Adelaide

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March, 1980

Awarded 12th September 1980

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ABSTRACT

Intertidal sediments near the B.H.P. steelworks at Whyalla, on the west coast of Spencer Gulf, were analysed by Atomic Absorbtion spectrometry to determine sedimentary, geochemical, and biological factors controlling the distribution and mobility of metals in the nearshore environment. Selective extraction procedures were used in an attempt to distinguish metals likely to be available to biota under a range of surface water conditions, from the total metal content of sediments.

The region is characterized by intertidal mudflats up to 2 km wide, with extensive mangrove vegetation, high day temperatures, low but often torrential rainfall, and high salinity in shallow water. Wind data and subtidal topography shown in aerial photographs suggest prevailing longshore transport of sediments to the north. Sheltered conditions favour the deposition of fine particulates and associated metals, while wide fluctuations in pH, salinity, and temperature may enhance the impact of metals on intertidal organisms.

The results show that zinc in surface sediments is particularly mobile. Cadmium, chromium, copper, and some lead could become available at lower pH, or under oxidizing conditions, but the 'scavenging' action of suspended iron and manganese particulates may exert some control on the concentration of other metals in the overlying water.

Mangrove swamps may provide optimum conditions for the accumulation of metals. They also shelter juvenile stocks of commercial fish species, which could be affected if metals are released from disturbed sediments.

STATEMENT

The thesis contains no material which has been accepted for the award of any other degree or diploma in any university, nor does it contain any material previously published or written by another person, except where due reference has been made in the text.

I.P. HARBISON.

ACKNOWLEDGEMENTS

I am indebted to Dr. V. Gostin for his guidance and supervision in the sedimentary aspects of the study, and for making the facilities of the Department of Geology, The University of Adelaide, available for all laboratory work.

The staff of this department have kindly assisted with many practical problems. Dr. K. Turnbull and Mr. P. McDuire are particularly thanked for helpful discussion and advice on laboratory procedures throughout the project.

My external supervisor, Dr. H. Veeh at the School of Earth Sciences, Flinders University of South Australia, provided valuable advice on analytical techniques, and I am most grateful for his criticism of the geochemical section of the manuscript, and of my interpretation of the data.

The study was partly supported by a grant from the Broken Hill Proprietary Company Ltd (B.H.P.) at Whyalla. The co-operation and assistance of company personnel, particularly Mr. S. Abdelmalek, Mr. B. Hassel, and Mr. A. Lang, was very much appreciated.

Finally, I sincerely thank Miss Joy McCann for her patient and capable deciphering of my notes, and typing of the manuscript.

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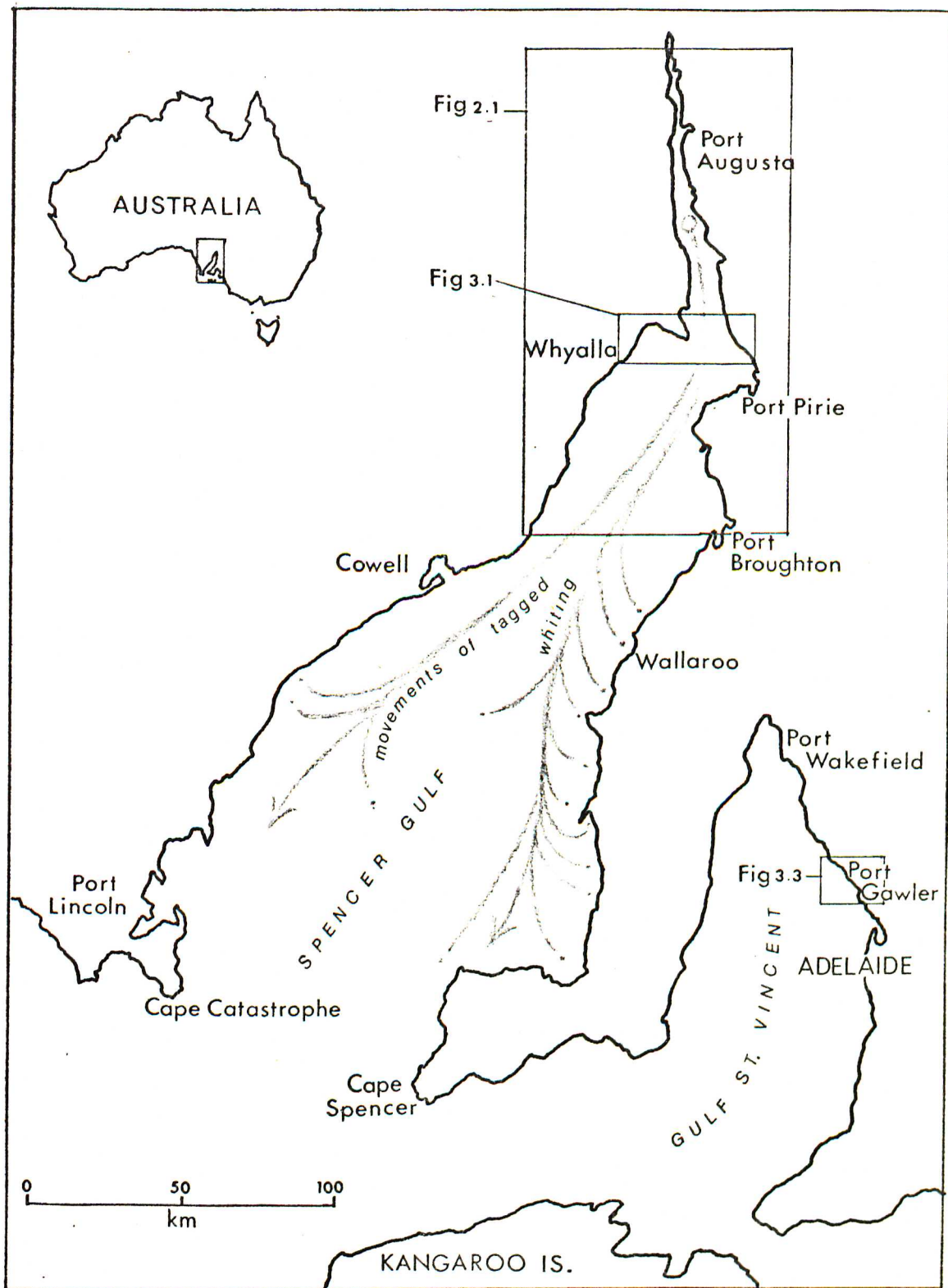


FIG. 1.1 Location of study areas in Spencer Gulf and Gulf St. Vincent. Movement of tagged whiting in Spencer Gulf adapted from Department of Agriculture and Fisheries (1979).