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GUIDELINES FOR THE CONDUCT OF SURVEYS FOR DETECTING INTRODUCTIONS OF NON-INDIGENOUS MARINE SPECIES BY BALLAST WATER AND OTHER VECTORS - AND A REVIEW OF MARINE INTRODUCTIONS TO AUSTRALIA.

Final report to FIRC, FIRTA 86/110.

Pat Hutchings,
Jos van der Velde,
Steve Keable

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The Australian Museum
6-8 College Street
Sydney NSW 2000

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PREFACE

The Australian Museum received funding from FIRTA to undertake a baseline survey of Twofold Bay, New South Wales one of the ports where Japanese ships regularly discharge ballast water.

Twofold Bay was one of the Bays previously identified as receiving ballast water containing live organisms and there was considerable concern as to whether any of these organisms had become established in the Bay and could potentially become pests.

While undertaking this baseline survey it became apparent that a major review of the potential problems of discharging large quantities of ballast water into Australian ports needed to be undertaken.

This review was subsequently undertaken together with a summary of all the reported marine introductions into Australian waters. FIRTA provided additional funds to ensure that this review was freely available as an Occasional Reports Series (No. 3) of the Australian Museum.

Additional copies are available from the authors at the Australian Museum, Sydney.

SUMMARY

The discharge of ballast water from one port into another is not a recent phenomena, although its importance as a dispersal mechanism for marine species has only been fully realised in the last decade with increasing volumes of ballast water being discharged and more studies being carried out on the marine fauna. Australia with its large number of ports, and increasing volumes of ballast water arriving, is certainly at risk from ballast water introductions.

We have summarised the existing literature on introductions of marine organisms in Australia and have discussed possible ways in which these organisms have arrived in Australia. Some species may have arrived via ballast water but to date, the evidence is largely inferential rather than direct. However, we do know that organisms in ballast water may survive discharge and could potentially settle and establish populations which may have an impact on natural fauna.

At this stage it seems that the evidence is not strong enough to warrant expensive control measures for ensuring that the ballast water discharged is sterile.

Also to date, no successful control measures have been implemented in the world, largely on account of the problems of enforcing the necessary legislation. Effective legislation could only be implemented after both international agreement and determination of the funding of control measures proposed.

Whilst accepting the possibility that some ballast water introductions may have occurred into Australia, we need to improve the documentation of these cases and to ascertain if any of these introductions are posing a threat to our natural marine fauna. Such information can only be obtained by the

implementation of large scale monitoring programmes to initially determine the natural fauna of an area and identify any introductions which have occurred. Specific studies should then be initiated to study these introductions and to assess the impact, if any, on the natural fauna. Also, such 'baseline' studies would enable any subsequent introductions to be easily recognised.

Australian ports receiving large volumes of ballast water, especially from areas of similar latitude and/or water temperature regimes, are potentially those most at risk. In these ports, baseline studies together with a follow up programme of regular monitoring should be undertaken urgently to document the natural fauna and any introductions.

Only when this sort of data has been amassed, together with good evidence of the impact these introductions are having on the natural marine fauna, will it be feasible to press for control measures to be implemented.

Finally, we discuss some of the control measures which have been suggested. However, the main conclusion we draw from this review of ballast water introductions is that considerably more substantial data is required before any control measures can realistically be proposed and implemented.