

## ENVIRONMENTAL IMPACT OF SHIPS

Shipping is responsible for transporting 90 per cent of the world's trade. This book provides a comprehensive review of the impact shipping has on the environment. Topics covered include pollutant discharges, such as atmospheric emissions, oil, chemical waste, sewage and biocides, as well as non-pollutant impacts, including invasive species, wildlife collisions, noise, physical damage and the environmental effects associated with shipwrecks and shipbreaking. The history of relevant international legislation is also covered. With chapters written by eminent international authors, this book provides a global perspective on the environmental impact of ships, making it a useful reference for advanced students and researchers of environmental science, as well as practitioners of maritime law and policy and marine business.

STEPHEN DE MORA recently retired as the chief executive of the Plymouth Marine Laboratory (PML) and PML Applications Ltd. Previously, he taught chemistry, environmental science and oceanography at universities in the UK (University of Lancaster), New Zealand (University of Auckland) and Canada (University of Quebec at Rimouski), and he worked at the International Atomic Energy Agency (IAEA) Marine Environment Laboratory in Monaco. Through the IAEA, he worked on several Regional Seas Programme and Global Environment Facility projects around the world. He was presented with a Distinguished Service Award in 2005, the same year in which the IAEA was a co-recipient of the Nobel Prize. He is the only *ad hominem* member of the UK Marine Science Coordination Committee. He serves as a Sargasso Sea Commissioner and on a number of other national and international committees.

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Frontmatter

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## Preface

Environmental impacts of shipping arise through port and channel development, and ships, of which only the latter are considered in this book. Shipping is a vital industry supporting global trade, with over 90 per cent of goods transported by sea. Most of the worldwide fleet comprises 90,000 cargo vessels of one type or another, but ships are diverse in type, function and region of operation. Given that cruise liners, fishing vessels, research ships and naval vessels are not necessarily confined to the major shipping lanes, but rather travel throughout the world's oceans, the impact of ships on the marine environment is present everywhere that ships can go. Moreover, these effects can be felt in inland waters that are navigable and/or are connected directly or indirectly to the seas, such as the Great Lakes and the Caspian Sea.

This edited book provides a comprehensive review of the multifarious effects that ships can have on the environment. Currently, no such authoritative text exists. Whilst the emphasis is on pollutant discharges (air, oil, waste, sewage and biocides) from normal operations, other effects are considered (invasive species, wildlife collisions, noise and physical damage). With respect to end of life, chapters are devoted to the environmental effects of both shipwrecks and shipbreaking. Finally, the history of relevant international legislation is covered, together with a perspective from the shipping industry. This holistic approach recognizes the need in the community to understand fully the environmental consequences of shipping.

The drivers, pressures, state, impact and response (DPSIR) framework provides a useful conceptual model for assessing and managing the problems arising from the interactions between ships and the environment. Research into marine pollution (including noise) and other deleterious consequences, such as wildlife collisions, has led to numerous requirements to alter behaviour and practices at sea. The most important responses involve legal instruments to mitigate, remediate and/or prevent

the impact of ships on the environment. Mechanisms encompass local by-laws, national regulations and international conventions, notably those of the International Maritime Organization. Thereafter, appropriate and responsible implementation by the shipping industry helps to protect marine and coastal environments.