

RESEARCH HANDBOOK ON
**International Marine
Environmental Law**

Edited by
Rosemary Rayfuse



Research Handbook on International Marine Environmental Law

Edited by

Rosemary Rayfuse

*Professor, UNSW Australia and Conjoint Professor, Lund University,
Sweden*

RESEARCH HANDBOOKS IN ENVIRONMENTAL LAW



EE Edward Elgar
PUBLISHING

Cheltenham, UK • Northampton, MA, USA

© The Editor and Contributors Severally 2015

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical or photocopying, recording, or otherwise without the prior permission of the publisher.

Published by
Edward Elgar Publishing Limited
The Lypiatts
15 Lansdown Road
Cheltenham
Glos GL50 2JA
UK

Edward Elgar Publishing, Inc.
William Pratt House
9 Dewey Court
Northampton
Massachusetts 01060
USA

A catalogue record for this book
is available from the British Library

Library of Congress Control Number: 2015940681

This book is available electronically in the **Elgaronline**
Law subject collection
DOI 10.4337/9781781004777



ISBN 978 1 78100 476 0 (cased)
ISBN 978 1 78100 477 7 (eBook)

Typeset by Columns Design XML Ltd, Reading
Printed and bound in Great Britain by TJ International Ltd, Padstow

RESEARCH HANDBOOK ON INTERNATIONAL MARINE ENVIRONMENTAL LAW

RESEARCH HANDBOOKS IN ENVIRONMENTAL LAW

This highly topical series addresses some of the most important questions and areas of research in Environmental Law. Each volume is designed by a leading expert to appraise the current state of thinking and probe the key questions for future research on a particular topic. The series encompasses some of the most pressing issues in the field, ranging from climate change, biodiversity and the marine environment through to the impacts of trade, regulation, and sustainable development.

Each *Research Handbook* comprises specially-commissioned chapters from leading academics, and sometimes practitioners, as well as those with an emerging reputation and is written with a global readership in mind. Equally useful as reference tools or high-level introductions to specific topics, issues and debates, these *Handbooks* will be used by academic researchers, post-graduate students, practising lawyers and lawyers in policy circles.

Titles in the series include:

Research Handbook on Climate Change Adaptation Law

Edited by Jonathan Verschuuren

Research Handbook on Climate Change Mitigation Law

Edited by Geert Van Calster, Wim Vandenberghe and Leonie Reins

Handbook of Chinese Environmental Law

Edited by Qin Tianbao

Research Handbook on International Marine Environmental Law

Edited by Rosemary Rayfuse

Contributors

Marie Bourrel, Deep Sea Minerals Project – Legal Adviser, Geoscience Division, Secretariat of the Pacific Community, Suva, Fiji

Robin Churchill, Professor of International Law, School of Law, University of Dundee, UK

Elisabeth Druel, Institute for Sustainable Development and International Relations (IDDRI), Paris, France

James Harrison, Senior Lecturer in International Law, University of Edinburgh School of Law, UK

Tore Henriksen, Professor and Director, K.G. Jebsen Centre for the Law of the Sea, Faculty of Law, University of Tromsø, Norway

Katherine Houghton, Research Fellow, Institute for Advanced Sustainability Studies, Potsdam, Germany

Anna-Maria Hubert, Doctoral Candidate, MARUM and Bremen International Graduate School for Marine Sciences, University of Bremen, Germany; Project Scientist, Institute for Advanced Sustainability Studies (IASS), Potsdam, Germany; Associate Fellow, Institute for Science, Innovation and Society (InSIS), University of Oxford, Oxford, UK

Nengye Liu, Senior Lecturer, School of Law, University of New England, Australia

Michael Lodge, Deputy to the Secretary-General and Legal Counsel, International Seabed Authority, Kingston, Jamaica

Joanna Mossop, Senior Lecturer, Victoria University of Wellington, New Zealand

Nilufer Oral, Professor, Law Faculty, Istanbul Bilgi University, Turkey; Distinguished Fellow, Law of the Sea Institute, University of California, Berkeley, USA

David Osborn, Director, IAEA Environment Laboratories, Department of Nuclear Sciences and Applications, International Atomic Energy Agency, Principality of Monaco

Alexander Proelss, Professor, Faculty of Law, Trier University, Germany

Henrik Ringbom, Professor II, Scandinavian Institute of Maritime Law, Faculty of Law, University of Oslo; Adjunct Professor (Docent) Department of Law, Åbo Akademi University, Turku/Åbo, Finland

Julien Rochette, Institute for Sustainable Development and International Relations (IDDRI), Paris, France

Karen N. Scott, Professor, School of Law, University of Canterbury, Christchurch, New Zealand

Tim Stephens, Professor of International Law, Australian Research Council Future Fellow, Faculty of Law, University of Sydney, Australia

Yoshifumi Tanaka, Professor, Faculty of Law, University of Copenhagen, Denmark

Dire Tladi, Professor of International Law, University of Pretoria, South Africa; Member, United Nations International Law Commission

David L. VanderZwaag, Professor and Canada Research Chair in Ocean Law and Governance, Marine & Environmental Law Institute, Dalhousie University, Canada

David Vousden, Professor of Ocean Governance, Rhodes University, Grahamstown South Africa; United Nations Advisor on Ocean and Coastal Management

Hai Dang Vu, Institute for East Asian Studies, Faculty of International Law, Diplomatic Academy of Vietnam

Robin Warner, Professor, Australian National Centre for Ocean Resources and Security (ANCORS), University of Wollongong, Australia

Glen Wright, Institute for Sustainable Development and International Relations (IDDRI), Paris, France

Foreword

At 3 am in the morning of Saturday 24 January 2015, nine hours after the meeting was scheduled to have ended and while a snowstorm raged outside the UN HQ in New York,¹ an historic document was concluded. The so-called BBNJ Working Group reached consensus on the text of its final recommendations to the UN General Assembly. The process of reaching this consensus has taken nearly a decade; the first meeting of what is properly called the ‘United Nations Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction’ was held in 2006.

The agreed text recommends that the UN General Assembly ‘Decide to develop an international legally-binding instrument under the [Law of the Sea] Convention on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.’² This agreement, to start the process of negotiating what is expected to be a third Implementing Agreement to the 1982 UN Law of the Sea Convention, is indeed historic.

Elsewhere I have called the governance of marine areas beyond national jurisdiction the ‘final frontier’.³ These areas are the last great global commons areas on Earth – covering nearly half the surface of the planet. Moreover, it has also been suggested that the current characteristics of the ABNJ regime with regulatory and governance gaps,⁴ weak implementation and enforcement of existing rules⁵ and widespread illegal, unreported and unregulated fishing⁶ are reminiscent of the nineteenth century frontier

¹ I am grateful to Kristina Gjerde for the context, and for staying to the end of the meeting.

² The text is at http://www.un.org/ga/search/view_doc.asp?symbol=A/69/780 (last accessed 3 June 2015). The recommendations of the Working Group also envisage the establishment of a preparatory committee, to begin work in 2016 and to report to the UN General Assembly (UNGA) in 2017 with recommendations on a text. These recommendations were adopted by the UNGA on 19 June 2015 in UNGA Resolution A/69/L.65, available at <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N15/138/14/PDF/N1513814.pdf?OpenElement> (last accessed 3 July 2015).

³ David Freestone, ‘The Final Frontier: The Law of the Sea Convention and Areas beyond National Jurisdiction’ in *Proceedings of the 2012 Law of the Sea Institute Conference on Securing the Ocean for the Next Generation*, vol. 1, (Martinus Nijhoff, 2013) 1–15.

⁴ See K. Gjerde, H. Dottinga, S. Hart, E.J. Molenaar, R. Rayfuse and R. Warner, *Regulatory and Governance Gaps in the International Regime for the Conservation and Sustainable Use of Marine Biodiversity in Areas beyond National Jurisdiction* (Gland: IUCN, 2008), available at http://cmsdata.iucn.org/downloads/iucn_marine_paper_1_2.pdf (last accessed 3 June 2015).

⁵ See David Freestone, ‘Problems of High Seas Governance’ in Davor Vidas and Peter Johan Schei, eds, *The World Ocean in Globalisation: Challenges and Responses*, (Martinus Nijhoff, 2011) 99–130. See also R. Warner, *Protecting the Oceans beyond National Jurisdiction: Strengthening the International Law Framework* (Martinus Nijhoff, 2009).

⁶ Mary Ann Palma, Martin Tsamenyi and William Edeson, *Promoting Sustainable Fisheries: The International Legal and Policy Framework to Combat Illegal, Unreported and*

areas of the ‘wild west’ in the USA.⁷ The good news is that the recommendation of the BBNJ Working Group to begin a new negotiation presents the opportunity for the international community to provide more effective approaches to many of the issues not specifically addressed by the 1982 Law of the Sea Convention itself.⁸

For generations we have regarded the sea as unpredictable, dangerous and limitless. Four hundred years ago, in *De Mare Liberum*, Hugo Grotius described the sea as ‘common to all, because it is so limitless that it cannot become a possession of any one’.⁹ The ‘Cruel Sea’ as he describes it, has traditionally been seen as a realm in which seafarers risk their lives; the primal forces of ocean tides and waves presenting a danger to seafarers as well as coastal dwellers. This traditional perspective has humankind at the mercy of the unpredictable ocean.

In the last half century however we have had to begin to change this long held view. Air travel, scientific advances, including communications technology, has made the world appear smaller and its resources more finite. Now, we discover, we are the dangerous ones; the sea has become the victim.

We still know little about the open ocean. It is said that we know more about the surface of the moon than about the deepest parts of the ocean. However, we do know beyond doubt that we have already had major negative impacts upon oceans everywhere. Anthropogenic pollution has already affected ecosystem functioning in the deep ocean.¹⁰ Plastics and other wastes are accumulating in the great gyres of the Pacific and the Atlantic, contaminating and suffocating pelagic creatures. Our fishing technology has allowed us to increase catches and to push out into deeper and more remote waters, so that fish stocks are failing throughout the world, and deep sea species are being depleted before biologists can determine basic information about them.

High-seas fish stocks are a valuable source of protein for human consumption – but there is evidence of serious depletion in the larger pelagic species, such as tunas and billfishes, resulting in fishing for smaller species, lower down the trophic levels.¹¹ This gives rise to serious questions about the impact of such fishing on the whole marine

Unregulated Fishing (Martinus Nijhoff, 2010) xi, who suggest that one-third of all fish harvested are from IUU operations.

⁷ Freestone, above n 3, 15.

⁸ The recommendations of the BBNJ Working Group propose that negotiations will address the topics identified in the package agreed by the Working Group in 2011, namely the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction, in particular, together and as a whole, marine genetic resources, including questions on the sharing of benefits, measures such as area-based management tools, including marine protected areas, environmental impact assessments and capacity building and the transfer of marine technology.

⁹ Hugo Grotius, *The Freedom of the Seas* (Latin and English version, Magoffin trans.) [1608] James Scot Brown (ed.) available at <http://oll.libertyfund.org/titles/552> (last accessed 3 June 2015).

¹⁰ Through the work of the Census of Marine Life. See, eg, R. Danovaro et al., ‘Exponential Decline of Deep-Sea Ecosystem Functioning Linked to Benthic Biodiversity Loss’ (2008) 18 *Current Biology* 1.

¹¹ See D. Pauly et al., ‘Fishing Down Marine Food Webs’ (1998) 279 *Science* 860, 862–3.

ecosystem and its long-term sustainability.¹² Economists, as well as biologists, have voiced serious concerns for sustainability, in light of the huge amounts of money spent each year to support fisheries.¹³

At the same time that we discover the important role that the oceans provide as the lungs of the planet, we are also discovering that human industrial emissions are poisoning those lungs. CO₂ is increasing the acidity of the oceans. Research had suggested that, at 450 ppm, corals and shellfish, and perhaps even plankton, will have problems in creating and maintaining their carbonate structures¹⁴ but some of these negative impacts are already being felt. Climate change precipitated by emissions of greenhouse gases is also warming the oceans and already causing sea levels to rise.¹⁵

However, as the BBNJ decision demonstrates, it is not all bad news. And the developments discussed in this book also provide us reason for optimism. Article 192 of the 1982 Law of the Sea Convention provides that 'States have the obligation to protect and preserve the marine environment.' There are few obligations in international law that are so unqualified and unequivocal.

Thirty years ago a book of this kind would have been much shorter – it would doubtless have looked at the work of the International Maritime Organization on vessel source pollution, perhaps also at off-shore oil drilling and the work of the 1972 London Dumping Convention (of course, the last has been so successful in limiting deliberate dumping that it has dropped the word 'dumping' from its name, becoming the London Convention). Such a volume might also have considered the work of the Global Program of Action on Land based Sources of Pollution and the early Regional Seas Agreements. However there would probably have been little consideration of the environmental impacts of seabed mining or of exploitation of the extended continental shelf – although both were contemplated by the 1982 LOSC they still looked technologically unfeasible in the 1980s. Similarly we knew little about seabed vents or cold seeps, and the unique life forms that surround them – or even of the existence of ancient deep cold water corals.

Professor Rayfuse has tasked the authors of the various chapters of the book with documenting critically the progress that has been made under international law in addressing some of the key sectoral activities which pose threats to the marine environment; laying out the positive aspects of these measures as well as their shortcomings. It is a highly topical review of contemporary issues surrounding the regime created by the 1982 Law of the Sea Convention and as a research handbook it surely demonstrates effectively the areas for further work which still exist.

¹² See the suggestion that the high seas be closed to fishing, examined by R. Sumaila et al., 'Winners and losers in a world where the high seas is closed to fishing', *Scientific Reports* 5, Article number: 8481. DOI:10.1038/srep08481.

¹³ See study by the World Bank and FAO, *The Sunken Billions: The Economic Justification for Fisheries Reform* (Washington, DC: The World Bank, 2009), that estimated that USD 1.05 is spent for every USD 1 of fish produced.

¹⁴ O. Hoegh-Guldberg et al., 'Coral Reefs under Rapid Climate Change and Ocean Acidification,' (2007) 318 *Science* 1737–42.

¹⁵ See IPCC Assessment Report 5: *Climate Change 2013: The Physical Science Basis*, 1140, available at http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf (last accessed 3 June 2015).

It is a great pleasure for me to have been invited to write this Foreword. I commend the editor and her team of authors and am pleased to recommend this volume as an important, well informed and highly contemporary discussion of this relatively new but important field – marine environmental law.

David Freestone
Executive Secretary, Sargasso Sea Commission
Washington, DC
February 2015

Preface

In Frank Schatzing's epic science fiction thriller, *The Swarm*, the oceans bite back. From destructive seabed worms to murderous whales, from leaching methane hydrates and underwater land-slides to massive tsunamis that wipe out much of the populated world, from armies of toxic jelly fish and marauding crabs to the mysterious 'yrr', the oceans and their inhabitants wage war against the very humanity that emerged, along with them, from the primordial soup. And who can blame them? Humans have not exactly been kind to the oceans. We have helped ourselves to their resources. We have used them as highways for our unbridled expansion across the earth's surface. We have turned them into dumping grounds, theatres of war, objects of inspiration and wonder and objects of fear, loathing and derision. Through all of this the oceans have stood by us, impressing us with their apparently limitless capacity to provide, inspiring us with their apparently unfathomable depths, and reassuring us with their apparently infinite ability to weather every storm, be it natural or human induced, literal and metaphorical, that comes their way.

Of course, in *The Swarm*, humanity wins – or is at least granted a reprieve from total annihilation. But real life seldom has the happy endings that sell popular fiction and keep movie-goers rapt in an endless suspension of disbelief. In real life bad things happen; and as the chapters in this *Handbook* chronicle, they are happening to the oceans. More than 85 per cent of the world's fish stocks are either fully exploited or over-exploited. Ever increasing numbers of marine species are threatened or endangered as a result of human activities. Destructive fishing practices, ship source pollution, marine debris, noise pollution, construction of artificial islands and pipelines, offshore oil and gas exploration, seabed mining, bioprospecting and marine scientific research all present increasing threats to the health and well-being of the oceans. Add to these the increasingly negative effects of climate change and ocean acidification and the picture becomes bleak indeed.

It is entirely possible for the oceans to exist without humans. However, it is probably not possible for humans to continue to exist on this earth without the food, ecosystem and other services the oceans provide. So it is not only important, but absolutely imperative that we respect, care for and provide for the oceans as they have cared and provided for us. This *Handbook* is in part about the misuse of the oceans. But it is also about giving back to the oceans through contributing to the design and implementation of effective regulation and management of human activities that perturb the marine environment.

The chapters in this *Handbook* are intended to provide a critical survey of the current state of legal research in selected issue areas relating to the legal regime for the protection of the marine environment. The authors were also tasked with going beyond a mere survey of existing law to identify legal lacunae and areas of critical research need for filling those lacunae. Given the potential breadth of the topic and the need to keep the book to a manageable size, hard decisions were necessary as to content and

focus. A comprehensive global study of marine environmental law writ large could be expected to fill many volumes. The first decision was thus to restrict consideration to the international legal regime for the protection of the marine environment. Even here, an astute reader might question the comprehensiveness of this volume omitting, as it does, dedicated chapters on important topics such as control of alien invasive species, noise pollution, marine genetic resources, emerging techniques for area based management, protection of vulnerable marine ecosystems, and a number of major regional frameworks. However, the more astute reader will notice that each of these topics is, in fact, addressed in the chapters which are presented under the general rubrics of the legal framework for protection of the marine environment, pollution of the marine environment, seabed activities and the marine environment, protection of marine biodiversity, regional approaches to the protection of the marine environment and climate change and the marine environment. Together, it is hoped that these chapters provide both a representative and extremely thorough, even if not entirely comprehensive, analysis of the critical issues in the spotlight today and that by doing so they will shed some light on the way forward towards ensuring the health and fecundity of the oceans for generations to come.

As with any edited volume, this *Handbook* would not have been possible without the generosity, understanding and hard work of the authors who have persevered with the project even in the face of innumerable delays, or what has elsewhere euphemistically been referred to as a 'lengthy incubation period'. Preparation of the volume has taken place within the law faculties at two institutions, UNSW Australia (formerly known as The University of New South Wales), my home institution, and Lund University, where I am fortunate to enjoy a conjoint visiting professorship. I am indebted to my colleagues at both institutions for their intellectual companionship and the stimulating and interesting environments in which I work. I am grateful to Ms Anisa Kozoei at UNSW Australia for providing general editorial assistance and, finally, I am indebted to Ben Booth and Laura Mann at Edward Elgar for their vision for and support of this project and for their patience in seeing it through to fruition.

Rosemary Rayfuse
Sydney and Lund
February 2015

Contents

<i>List of contributors</i>	vii
<i>Foreword</i>	ix
<i>Preface</i>	xiii

PART I THE LEGAL FRAMEWORK FOR THE PROTECTION OF THE MARINE ENVIRONMENT

1 The LOSC regime for protection of the marine environment – fit for the twenty-first century? <i>Robin Churchill</i>	3
2 Principles of international marine environmental law <i>Yoshifumi Tanaka</i>	31
3 Actors and institutions for the protection of the marine environment <i>James Harrison</i>	57

PART II POLLUTION AND THE MARINE ENVIRONMENT

4 Land-based pollution and the marine environment <i>David Osborn</i>	81
5 Vessel-source pollution <i>Henrik Ringbom</i>	105
6 The international control of ocean dumping: navigating from permissive to precautionary shores <i>David L. VanderZwaag</i>	132

PART III SEABED ACTIVITIES AND THE MARINE ENVIRONMENT

7 Protecting the marine environment of the deep seabed <i>Michael Lodge</i>	151
8 Reconciling activities on the extended continental shelf with protection of the marine environment <i>Joanna Mossop</i>	170
9 Protection of the marine environment from offshore oil and gas activities <i>Nengye Liu</i>	190
10 Protection and preservation of the marine environment from seabed mining activities on the continental shelf: perspectives from the Pacific Islands region <i>Marie Bourrel</i>	206

PART IV PROTECTION OF MARINE BIODIVERSITY

- | | | |
|----|--|-----|
| 11 | Protecting marine species | 229 |
| | <i>Alexander Proelss and Katherine Houghton</i> | |
| 12 | Conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction: towards an implementing agreement | 259 |
| | <i>Dire Tladi</i> | |
| 13 | Marine protected areas in areas beyond national jurisdiction | 272 |
| | <i>Glen Wright, Julien Rochette and Elisabeth Druel</i> | |
| 14 | Environmental assessment in marine areas beyond national jurisdiction | 291 |
| | <i>Robin Warner</i> | |
| 15 | Marine scientific research and the protection of the seas and oceans | 313 |
| | <i>Anna-Maria Hubert</i> | |

PART V REGIONAL APPROACHES TO THE PROTECTION OF THE MARINE ENVIRONMENT

- | | | |
|----|---|-----|
| 16 | Forty years of the UNEP Regional Seas Programme: from past to future | 339 |
| | <i>Nilufer Oral</i> | |
| 17 | Protecting polar environments: coherency in regulating Arctic shipping | 363 |
| | <i>Tore Henriksen</i> | |
| 18 | Large marine ecosystems and associated new approaches to regional, transboundary and 'high seas' management | 385 |
| | <i>David Vousden</i> | |
| 19 | Towards a regional regime for the establishment of a network of marine protected areas in the South China Sea | 411 |
| | <i>Hai Dang Vu</i> | |

PART VI CLIMATE CHANGE AND THE MARINE ENVIRONMENT

- | | | |
|----|---|-----|
| 20 | Ocean acidification | 431 |
| | <i>Tim Stephens</i> | |
| 21 | Geoengineering and the marine environment | 451 |
| | <i>Karen N. Scott</i> | |
| | <i>Index</i> | 473 |

PART I

THE LEGAL FRAMEWORK FOR THE PROTECTION OF THE MARINE ENVIRONMENT

