



PUBLICATIONS ON OCEAN DEVELOPMENT

NON-USE MEASURES FOR GLOBAL GOODS AND COMMONS IN INTERNATIONAL LAW

Edited by
Solène Guggisberg
and Catherine Blanchard

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Non-use Measures for Global Goods and Commons in International Law

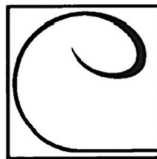
Publications on Ocean Development

A SERIES OF STUDIES ON THE INTERNATIONAL, LEGAL,
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VOLUME 105



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Library of Congress Cataloging-in-Publication Data

Names: Guggisberg, Solène editor | Blanchard, Catherine editor

Title: Non-use measures for global goods and commons in international law / edited by Solène Guggisberg and Catherine Blanchard.

Description: Leiden ; Boston : Brill, 2025. | Series: Publications on ocean development, 0924-1922 ; 105 | Includes bibliographical references and index.

Identifiers: LCCN 2025018156 (print) | LCCN 2025018157 (ebook) | ISBN 9789004730564 hardback | ISBN 9789004730571 ebook

Subjects: LCSH: Global commons | Global commons–Antarctica | Law of the sea | Fishery law and legislation | Ocean mining–Law and legislation | Antarctic Treaty system | Environmental law, International

Classification: LCC KZ1322 .N66 2025 (print) | LCC KZ1322 (ebook) | DDC 341.4–dc23/eng/20250415

LC record available at <https://lcn.loc.gov/2025018156>

LC ebook record available at <https://lcn.loc.gov/2025018157>

Typeface for the Latin, Greek, and Cyrillic scripts: “Brill”. See and download: brill.com/brill-typeface.

ISSN 0924-1922

ISBN 978-90-04-73056-4 (hardback)

ISBN 978-90-04-73057-1 (e-book)

DOI 10.1163/9789004730571

Copyright 2025 by Solène Guggisberg and Catherine Blanchard. Published by Koninklijke Brill BV, Plantijnstraat 2, 2321 JC Leiden, The Netherlands.

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This book is printed on acid-free paper and produced in a sustainable manner.

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Acknowledgements

It was in March 2022, in the midst of an umpteenth pandemic lockdown, that we first sat together – on Teams – to talk about non-use measures. Our colleague Erik Molenaar had wisely suggested we brainstorm on the possibility of joining forces and exploring together non-use measures in our respective fields of research. We sincerely thank Erik for his guidance throughout the project, but also for planting the seed in our heads that eventually grew into the first comprehensive volume addressing the notion of non-use measures for global goods and commons in international law.

This initial brainstorming session evolved into a project proposal and then a call for abstracts, through which we received impressive submissions, some on cornerstone non-use measures and others introducing us to non-use measures that we did not even know could exist. It quickly became apparent that we would be able to put together an excellent team of authors, ranging from senior scholars to early career researchers, from academics to practitioners, from lawyers to (social) scientists, and representing different regions of the world.

On 9–10 May 2023, we organized a workshop in Utrecht, the Netherlands, to discuss the initial draft chapters that all authors had diligently prepared. We take this opportunity to thank all workshop participants, authors, contributors who could ultimately continue with the project, and colleagues alike, for their valuable input and comments, which have undoubtedly shaped the orientation and structure of the volume. The workshop was a milestone in the preparation of this book, and several people have contributed to its success. We wish to thank Samantha Robb for her assistance in organizing and hosting the workshop; Mathilde Hoarau for her useful note-taking; as well as Miranda Walraven and Inge Terwan for their administrative assistance in preparing the workshop.

We thank all authors for their hard work on their respective chapters throughout the project, as well as for their constructive and inspiring comments on each other's chapters during and after the workshop. We further thank all authors for their active engagement, their patience with our multiple requests during the editing process, and for their understanding that our need for coherence across chapters sometimes led to a strong editorial hand. We learned so much from all of them and enjoyed the pleasant and collegial atmosphere that guided our exchanges.

This book would not have been possible without the financial support of the projects *Proactive Management of Antarctic Tourism* (a collaboration

between Groningen University, Utrecht University, and Wageningen University, running from 2021 to 2026) and *Protecting deep seabed hydrothermal vent fields through area-based management tools* (a collaboration between Utrecht University and the Royal Netherlands Institute for Sea Research (NIOZ), running from 2021 to 2023), both funded by the Dutch Research Council (NWO). Not only did the funding grant us with the research time for this project, it also bore the expense of the 2023 workshop and now allows us to publish a large part of this book Open Access, therefore strengthening knowledge sharing and transparency in research. We also sincerely thank the authors who provided the necessary funds to make their respective chapters available Open Access.

There are finally a number of other people we would like to express our gratitude to for their assistance at different stages of the project: Alex Oude Elferink for his guidance during the submission process to the publisher; Anna-Marie Ritter and Tony Guggisberg for their diligence in editing and revising the chapters; and colleagues at the Netherlands Institute for the Law of the Sea (NILOS) and the Utrecht Center for Water, Oceans and Sustainability Law (UCWOSL) of Utrecht University for their continuous support. Our appreciation also goes to Beth Derr, Marie Sheldon, and Kan Wai Min for getting this book ready for submission to its intended audience.

Little did we know that the first Teams meeting back in March 2022 would lead to many virtual and in-person discussions, brainstorming sessions, hair-pulling but also eureka moments. During this time, we not only deepened our relationship as colleagues, but also as friends. This project started in a difficult period for both of us, and it has been a rewarding journey to transform initial ideas into the final output that is now this volume. Yet, supported by an excellent team of authors, and by the patience and understanding of our respective families and friends, we are happy to share – Open Access! – a volume that, we believe, makes an important contribution to the global goods and commons scholarship in international law.

Solène Guggisberg and Catherine Blanchard

The Hague and Ottawa

1 May 2025

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Acronyms

ABMT	Area-Based Management Tool
ABNJ	Areas Beyond National Jurisdiction
AiNP	Area in Need of Protection
AIS	Automatic Identification System
AMLR	Antarctic Marine Living Resources
APEI	Area of Particular Environmental Interest
ASMA	Antarctic Specially Managed Area
ASPA	Antarctic Specially Protected Area
ASTI	Area of Special Tourist Interest
ATCM	Antarctic Treaty Consultative Meeting
ATCP	Antarctic Treaty Consultative Parties
ATS	Antarctic Treaty System
AWI	Alfred Wegener Institute
BB	Building Blocks
BBNJ	Biodiversity Beyond National Jurisdiction
BBNJ Agreement	Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction
CAMLR Convention	Convention on the Conservation of Antarctic Marine Living Resources
CAO	Central Arctic Ocean
CAOFA	Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean
CBD	Convention on Biological Diversity
CBDR	Common But Differentiated Responsibilities
CBS	Central Bering Sea
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCAS	Convention for the Conservation of Antarctic Seals
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CCT	Cirrus Cloud Thinning
CCZ	Clarion-Clipperton (Fracture) Zone
CFC	Chlorofluorocarbon
CHM	Common Heritage of Mankind
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLCS	Commission on the Limits of the Continental Shelf

CLRTAP	Convention on Long-Range Transboundary Atmospheric Pollution
CM	Conservation Measure
CMA	Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement
CMM	Conservation and Management Measure
CMS	Convention on Migratory Species
CO ₂	Carbon Dioxide
COP	Conference of the Parties
CRAMRA	Convention on the Regulation of Antarctic Mineral Resource Activities
DSM	Deep-Seabed Mining
DWFN	Distant Water Fishing Nation
EAMPA	East Antarctic Marine Protected Area
EBSA	Ecologically or Biologically Significant Marine Area
eDNA	Environmental DNA
EEC	European Economic Community
EEZ	Exclusive Economic Zone
EF-WG	Working Group on Exploratory Fishing
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
ENMOD	Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques
ESA	Endangered Species Act
EU	European Union
FAD	Fish Aggregated Devices
FAO	Food and Agriculture Organization
FiSCAO	Fish Stocks in the Central Arctic Ocean
FPZ	Fisheries Protection Zone
FRZ	Fisheries Research Zone
GFCM	General Fisheries Commission for the Mediterranean
GHG	Greenhouse Gas
GPZ	General Protection Zone
HFC	Hydrofluorocarbon
HSM	Historic Site and Monument
IAATO	International Association of Antarctica Tour Operators
IAEA	International Atomic Energy Agency
IATTC	Inter-American Tropical Tuna Commission
ICC	Inuit Circumpolar Council
ICCAT	International Commission for the Conservation of Atlantic Tuna

ICRW	International Convention for the Regulation of Whaling
IFB	Instruments, Frameworks and Bodies
IGC-3	Third Intergovernmental Conference on an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction
IGY	International Geophysical Year
ILC	International Law Commission
IMO	International Maritime Organization
IOTC	Indian Ocean Tuna Commission
IPCC	Intergovernmental Panel on Climate Change
ISA	International Seabed Authority
ISRU	In-situ Space Resource Utilization
ISS	International Space Station
ITLOS	International Tribunal for the Law of the Sea
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported and Unregulated
IWC	International Whaling Commission
JNRFC	Joint Norwegian Russian Fisheries Commission
JPSRM	Joint Program of Scientific Research and Monitoring
KFZ	Krill Fishing Zone
KRZ	Krill Research Zone
LTC	Legal and Technical Commission
MARPOL	International Convention for the Prevention of Pollution from Ships
MCB	Marine Cloud Brightening
MEPC	Marine Environmental Protection Committee
MLF	Multilateral Fund for the Implementation of the Montreal Protocol
MMPA	Marine Mammal Protection Act
MOP	Meeting of the Parties
MOTU	Molecular Taxonomic Unit
MPA	Marine Protected Area
MSY	Maximum Sustainable Yield
NAP	National Antarctic Program
NASCO	North Atlantic Salmon Conservation Organization
NDC	Nationally Determined Contribution
NEAFC	North-East Atlantic Fisheries Commission
NGO	Non-Governmental Organisation
N-MAR	Northern Mid-Atlantic Ridge

NPFC	North Pacific Fisheries Commission
NPFMC	North Pacific Fishery Management Council
NUA	Non-use Agreement (for Solar Geoengineering)
OBIS	Ocean Biodiversity Information System
ODS	Ozone Depleting Substance
OSPAR Convention	Convention for the Protection of the Marine Environment of the North-East Atlantic
OST	Outer Space Treaty
PSCG	Provisional Scientific Coordination Group
QELR	Quantified Emission Limitations Reduction
REA	Regional Environmental Assessment
REMP	Regional Environmental Management Plan
RFMA	Regional Fisheries Management Arrangement
RFMO	Regional Fisheries Management Organisation
RoP	Rules of Procedure
RSR	Reciprocating States Regime
SAI	Stratospheric Aerosol Injection
SCG	Scientific Coordinating Group
SDC	Seabed Dispute Chamber
SDG	Sustainable Development Goals
SEAFO	South-East Atlantic Fisheries Organization
SEMPIA	Strategic Environmental Management Plan for Mining in the Mid-Atlantic
SiNP	Site in Need of Protection
SIOFA	Southern Indian Ocean Fisheries Agreement
SMS	Seafloor Massive Sulfides
SPRFMO	South Pacific Regional Fisheries Management Organisation
SPZ	Special Protection Zone
SRA	Scientific Reference Area
SRM	Solar Radiation Modification
SRZ	Special Research Zone
STB	Scientific and Technical Body
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNCOPUOS	United Nations Committee on the Peaceful Uses of Outer Space
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFSA	United Nations Fish Stocks Agreement
UNGA	United Nations General Assembly

UNHE	United Nations Conference on the Human Environment
UNOOSA	United Nations Office for Outer Space Affairs
USA or US	United States of America
USSR	Union of Soviet Socialist Republics
VME	Vulnerable Marine Ecosystem
VSG	Visitor Site Guideline
WAG	Waste Assessment Guidelines
WCPCFC	Western and Central Pacific Fisheries Commission
WSMPA P1	Weddell Sea Marine Protected Area, Phase 1
WWF	World Wildlife Fund

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- Agreement on the establishment of the General Fisheries Council for the Mediterranean (adopted 1 November 1949, entered into force 20 February 1952) 126 UNTS 237.
- Statute of the International Atomic Energy Agency (adopted 26 October 1956, entered into force 29 July 1957) 276 UNTS 3.
- Convention on the High Seas (adopted 29 April 1958, entered into force 30 September 1962) 450 UNTS 11.
- Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71.
- International Convention for the Conservation of Atlantic Tunas (adopted 14 May 1966, entered into force 21 March 1969) 37 UNTS 63.
- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205.
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- Vienna Convention on the Law of Treaties (adopted 23 May 1969, entered into force 27 January 1980) 1155 UNTS 331.
- Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (adopted 15 February 1972, entered into force 1 May 1974) 932 UNTS 3.
- Convention on International Liability for Damage Caused by Space Objects (adopted 29 March 1972, entered into force 1 September 1972) 961 UNTS 187.
- Convention for the Conservation of Antarctic Seals (adopted 1 June 1972, entered into force 11 March 1978) 1080 UNTS 175.
- Convention Concerning the Protection of the World Cultural and Natural Heritage (adopted 16 November 1972, entered into force 17 December 1975) 1037 UNTS 151.
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted 29 December 1972, entered into force 30 August 1975) 1046 UNTS 120.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (adopted 3 March 1973, entered into force 1 July 1975) 993 UNTS 243.
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- Convention on Long-Range Transboundary Air Pollution (adopted 13 November 1979, entered into force 16 March 1983) 1302 UNTS 217.
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Notes on Contributors

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is a recognised leader and international expert in marine and environmental governance, policy, planning and conservation. Currently, he is the Africa Oceans Director for The Nature Conservancy (TNC). Previously, he led the Commonwealth Blue Charter, a unique international agreement that he conceived and established. Dr Ardron is a co-founder of two NGOs, three international initiatives, and a board member of several others. He is also a researcher and author, with over 60 papers in the peer-reviewed literature and a co-authored textbook on international marine policy. He holds a PhD in Ocean and Earth Science from the University of Southampton, UK, and an MSc in Environment and Management from Royal Roads University, Canada.

Catherine Blanchard

previously worked as Assistant Professor of Public International Law at Utrecht University. Her research and teaching activities focused on the regulation of deep-seabed mining, marine environmental protection, areas beyond national jurisdiction, fisheries law and ocean governance. Catherine presented her work in international journals and at international conferences and workshops in Europe and North America, and her latest research showcased the interactions between international law and marine sciences through her collaboration with marine biologists. Catherine attended several meetings of the BBNJ process, and acted as legal adviser to the Deep-Ocean Stewardship Initiative during meetings of the International Seabed Authority.

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Rebecca Konijnenberg

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Elisabetta Menini

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Erik J. Molenaar

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was chairperson of the Commission of the South Pacific Regional Fisheries Management Organisation (SPRFMO) and the compliance committees in the Commission for the Conservation of Antarctic Marine Living Resources and SPRFMO. He is also a permanent consultant on international fisheries for the Food and Agriculture Organization of the United Nations.

PART 1

Introductory Matters



Introduction

Catherine Blanchard and Solène Guggisberg*

1 Premise of the Research

Our current geological era, the Anthropocene, is characterised by the ubiquitous impacts of human activities on the environment. The issue of environmental degradation is even more acute when it comes to global goods and commons, such as the high seas, the atmosphere, and outer space. These areas and the natural resources found therein do not belong to one State in particular, but rather to the international community. Consequently, efficient and sustainable management would require at the very least (near)-universal participation. In practice, unfortunately, most global goods and commons are heavily exploited, or are likely to become so as soon as technology puts them within our reach.

The majority of regulatory frameworks in international law have been framed from the perspective of the use of natural resources or space. However, in light of often unsuccessful resource management regimes, in particular for shared resources, increasing demand of natural resources, and climate change's impact as an additional stressor on many components of the environment, non-use measures are discussed in several legal regimes. They are therefore likely to become more relevant – and controversial – in the future. Widening the scope of available measures to include those prohibiting use can be justified, not only because, practically, they add a potentially efficient tool to other conservation and management strategies, but also because, conceptually, non-use can generally be considered as equally legitimate to use when it comes to global goods and commons.

* The views expressed in this chapter derive exclusively from my former affiliation as Assistant Professor of Public International Law, Utrecht University (The Netherlands) and are not endorsed by nor represent the views of my current employer.

2 Genesis and Aims of the Project

So what if we looked at resource management and conservation from the perspective of non-use? How common are non-use measures in the regulation of global goods and commons? What do such measures entail and aim towards? Under which conditions have they, in the past, been successful in achieving their goals? Are there new non-use measures currently being discussed and developed? And are these questions even more complex/pressing when discussing global goods and commons?

These are some of the questions that came up when we started conducting our respective research. Solène was working on tourism in Antarctica, and Catherine was focusing on the environmental regulation of deep-seabed mining. We realised that some measures limiting the use of Antarctica for tourist activities and others limiting the exploration for and extraction of deep-seabed minerals could both be considered non-use measures. Those are only examples of non-use, joining better-known existing measures such as the whaling moratorium, the abstention from fishing in the high seas portion of the central Arctic Ocean, and measures for the protection of the ozone layer.

These measures, however, have never been studied under the angle of non-use per se. Indeed, the concept of non-use has only been explored to a limited extent in legal academia, a typology of non-use measures has never been developed, and the variety of non-use measures in regimes regulating global goods and commons has not been comprehensively examined.

Considering the overlaps in our research interests, we saw an opportunity to join forces. We decided to work on non-use measures in the management of global goods and commons, focusing on environmental considerations. This emphasis on the protection of the environment flowed logically from our angles of research and is unavoidable in the face of the triple planetary crisis (pollution, climate change, and biodiversity loss). Additionally, with our research interests deeply rooted in international law, we decided to centre our examination on global goods and commons, as some of the issues arising in the governance of areas beyond national jurisdiction (ABNJ) and the natural resources therein are unique to such regimes. Since other questions raised in relation to global goods and commons are equally relevant for other international law regimes, the lessons learnt in this book can also, in large parts, be transposed to the context of shared resources. Yet, as the focus on ABNJ does not fully align with realities of the geophysical world, some contributions touch upon measures that might also be applicable to areas under national jurisdiction. For thematic coherence, we have left aside some regimes, such as the governance of artificial intelligence or weapons control, that do include

or might need to develop non-use measures, but that raise less direct environmental questions.

We decided to bring together multi-disciplinary experts in the regimes of various relevant global goods and commons, in order to better understand how specific non-use measures were developed, adopted (or were not adopted), and with what effects. In addition to international law specialists, the project hence gathers experts in other academic fields, such as marine environmental sciences and social sciences. Their perspectives on why a non-use measure might be necessary and how one would monitor its impact provide an important context for understanding how non-use measures position (or could position) themselves within the various regulatory frameworks.

3 Structure of the Book

In order to better understand selected non-use measures in each regime under examination, contributors were asked to reflect on a series of questions. These guiding questions (see Annex I to this chapter) reflect our interest in clarifying the conditions under which non-use measures were successfully adopted, their effectiveness in reaching their intended goals, and the role they play (and might increasingly do so) in addressing the environmental challenges of our time. The book consequently provides a regime-by-regime exploration of non-use measures, before turning to a cross-sectoral analysis, where potential conditions for successful adoption and implementation are identified.

Following the introduction, the book is composed of 19 chapters, starting with a substantive analysis of the concepts related to non-use. It is then divided in four main parts, each addressing a global common: the high seas, the deep seabed, Antarctica, and the atmosphere and outer space. Each part starts with a case-study, and then turns to selected specific non-use measures. We acknowledge that some chapters could have found their place under different parts, which shows how interrelated all the issues presented in this book are. Finally, a conclusion brings together the cross-cutting issues identified in the book.

The book's first substantive chapter, by Solène Guggisberg, presents a conceptual framework for the analysis of non-use measures. After discussing the concepts of use and non-use, the author develops an innovative typology of non-use measures, highlighting a variety of characteristics of these measures. The author finally explores the aims, stated or otherwise, behind the adoption of non-use measures.

Chapters 3–8 delve into the analysis of specific regimes, starting with different non-use measures proposed or established for the high seas. First, Guillermo Ortuño Crespo examines, from a multidimensional and interdisciplinary perspective, the proposal of closing the high seas to fishing. Bastiaan Klerk introduces the concept of marine protected areas (MPAs) as non-use measures, using the regime focusing on the protection of the marine environment of the North-East Atlantic, OSPAR, as an illustration, and explores the potential of dynamic MPAs for adaptive environmental protection, especially after the adoption of the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement). Osvaldo Urrutia examines non-use measures adopted under existing regional fisheries management organisations (RFMOs), a practice which is particularly interesting since RFMOs are mostly use-focused. Erik Molenaar presents the Central Arctic Ocean Fisheries Agreement, which deals with a unique scenario: in an area of the high seas where no fishing has ever taken place, this instrument suspends the possibility of starting commercial fishing until certain conditions are met. Cameron Jefferies and Kate Latos unpack the circumstances leading up to the adoption of the moratorium on commercial whaling, one of the most iconic non-use measures of all times. Lastly, James Harrison studies the evolution of the regime for dumping at sea, which started with a prohibition on the dumping of certain materials only, and later evolved into a regime that prohibits dumping altogether, unless an exception is explicitly provided.

Chapters 9–11 focus on the deep seabed in light of the current debate on deep-seabed mining. First, Sabine Gollner, Patricia Esquete, and Jesse van der Grient present a case-study on the limited environmental knowledge of deep-sea ecosystems, and discuss the implications of such scientific gaps for use and non-use of the deep sea. Then, Aline Jaeckel, Jeff Ardron, Laisa Branco de Almeida, and Pradeep Singh present potential non-use measures as they pertain to deep-seabed mining in the Area and focus specifically on the possible moratorium on deep-seabed mining that is currently discussed by member States and observers of the International Seabed Authority. Lastly, Elisabetta Menini, Catherine Blanchard, and Marzia Rovere examine existing non-use measures specifically targeting environmental protection in the deep-seabed mining regime, by analysing the processes leading to the establishment of Regional Environmental Management Plans.

Chapters 12–15 focus on Antarctica. Katharina Teschke and Rebecca Konijnenberg first present a case-study on the proposal for an MPA in the Weddell Sea under the Convention on the Conservation of Antarctic Marine Living Resources, discussing the science behind this proposal and its

interaction with governance processes. Solène Guggisberg provides an overview of MPAs established by the Commission for the Conservation of Antarctic Marine Living Resources and those proposed but not (yet) adopted, highlighting the reasons for the current deadlock and the potential role that the BBNJ Agreement could play in resolving the Antarctic MPA impasse. Nicolas Kempf examines the mining moratorium in Antarctica, more particularly the reasons behind the adoption of such non-use measure and the challenges that could potentially lead to its termination. Finally, Ricardo Roura and Solène Guggisberg focus on tourism in Antarctica, highlighting the limited extent to which the regulation of such activity is characterised by non-use measures (notwithstanding that some non-use measures have been put forward) and discussing the reasons behind this policy choice.

Chapters 16–19 move upwards and focus on the atmosphere and the outer space. Jeroen Oomen first presents a case-study on solar geoengineering, calling for a non-use agreement and arguing that solar radiation modification presents unacceptable geophysical, ecological, and political risks. Solène Guggisberg and Mitchell Lennan explore the two main global regimes that relate to the planet's atmosphere, finding that, while the one focused on ozone protection includes non-use measures and the climate change regime clearly does not, this major difference is a symptom rather than the cause of these regimes' distinct levels of success. Thomas Cheney focuses on the usability of space resources, arguing that, in light of the current environmental crisis caused by climate change, the freedom of use found in the Outer Space Treaty ought to be interpreted in a novel and restrictive manner. Finally, Anne-Sophie Martin explores the potential development of restrictions to use in a regime that emphasises the freedom of use, by presenting safety zones on the Moon and discussing whether they might be stepping stones to non-use measures in outer space.

On the basis of the regime-by-regime analysis conducted throughout the volume, the concluding chapter first reflects on the complexity of the non-use concept once applied to actual examples. Despite the diversity of the non-use measures analysed, it then provides a comparative discussion of the conditions under which non-use measures were successfully adopted and under which they best reached their intended goals. The conclusion finally considers potential future non-use measures, paths forward, and overarching questions, such as the interactions between non-use measures and climate change, and the potential unintended consequences of such measures.

Finally, it is to be noted that the last substantive revisions of the different chapters were done between the second half of 2024 and February 2025, which explains that subsequent developments are not considered in the book.

Annex I – List of Guiding Cross-Cutting Questions

Under which conditions have non-use measures been successfully adopted?

How have conditions of adoption impacted the success of non-use measures (and how can success be defined)?

Do the mandate of international bodies and/or their decision-making procedures impact the development of non-use measures and/or their effectiveness in reaching the objectives set?

How have modalities of non-use measures' applicability vis-à-vis Parties/Members (e.g. opting out and reservations) coloured the level of participation in those measures and/or their effectiveness in reaching the objectives set?

What is the impact of the rights of non-members and *pacta tertiis* on the development of non-use measures and on their effectiveness in reaching the objectives they set?

What are the challenges to successful non-use measures under international law?

What are the prospects of adoption of the measures under discussion in relation to high seas fishing, Antarctic tourism, deep-seabed mining, MPAs in ABNJ, and carbon emissions?

As limited-use/non-use measures are an intrinsic part of the new Agreement on the Conservation and Sustainable Use of Marine Biodiversity of Areas beyond National Jurisdiction (the BBNJ Agreement), what could this Agreement learn from existing non-use measures, both in terms of 'do's' and 'don'ts'? And how will the BBNJ Agreement, by its application to ABNJ at sea worldwide, interact with existing institutions to uphold existing non-use measures and establish new non-use measures?

How, and to what extent, are the discussed measures an embodiment of the precautionary approach?

How, and to what extent, are the discussed measures related to the global issue of climate change?

From an environmental sciences' point of view, what is the gain of non-use and the risk of use?

From an environmental sciences' point of view, what is the proven effectiveness of existing MPAs?

From an environmental sciences' point of view, what is the role of science in non-use measures at various stages of the process (e.g. in discussing the need for non-use measures, in adopting them, in implementing and monitoring them, in ending them)?

A Conceptual Framework of Non-use and Non-use Measures

Solène Guggisberg

1 Introduction

Large-scale environmental degradation, species extinction, and the climate crisis more generally demonstrate that the current global governance regimes are not adequate to respond to the many environmental challenges our world is facing. This dire reality has led to some attempts to find solutions through profound rethinking of global governance and international law, in particular through the Earth Governance System,¹ Earth System Law,² and the concept of rights of nature.³ At present and although they are the object of intense academic research, these new paradigms have limited practical applicability under international law. That is where ‘non-use measures’ could be seen as a reasonably practical alternative – or a stepping stone – to such radical rethinking. Measures that focus on not using a resource can indeed serve a variety of goals, from supporting the long-term recovery and sustainable use of

- 1 On Earth System Governance, see eg F. Biermann et al, “Earth system governance: a research framework” (2010) 10 *International Environmental Agreements* 277–298; S. Burch et al, “New directions in Earth System Governance Research” (2019) 1 *Earth System Governance* 100006.
- 2 On Earth System Law, see eg L. J. Kotzé and R. E. Kim, “Earth system law: The juridical dimension of earth system governance” (2019) 1 *Earth System Governance* 100003; L. J. Kotzé and R. E. Kim, “Exploring the Analytical, Normative and Transformative Dimensions of Earth System Law” (2020) 50(6) *Environmental Policy and Law* 457–470; L. J. Kotzé et al, “Earth system law: Exploring new frontiers in legal science” (2022) 11 *Earth System Governance* 100126; L. Mai and E. Boulot, “Harnessing the transformative potential of Earth System Law: from theory to practice” (2021) 7 *Earth System Governance* 100103.
- 3 On the rights of nature, see eg D. R. Boyd, *The Rights of Nature – a Legal Revolution That Could Save the World* (ECW Press 2017); S. Emmenegger and A. Tschentscher, “Taking Nature’s Rights Seriously: The Long Way to Biocentrism in Environmental Law” (1994) 6 *Georgetown International Environmental Law Review* 545–742; C. M. Kauffman and P. L. Martin, *The Politics of Rights of Nature – Strategies for Building a More Sustainable Future* (MIT Press 2021); C. D. Stone, “Should Trees Have Standing? Toward Legal Rights for Natural Objects” (1972) 45 *Southern California Law Review* 450–501; M. Tănăsescu, *Understanding the Rights of Nature: A Critical Introduction* (Transcript Verlag 2022).

a resource to creating refugia for species, to even, ultimately, giving effects to the substance of the rights of nature.⁴

Non-use measures exist but are not very widespread, especially when it comes to global commons where the focus is usually on how to manage a resource and how to share the benefits. They are, however, increasingly discussed in international regimes dealing with resources such as deep seabed and outer space minerals, high seas' biodiversity, or Antarctica. Nonetheless, with the traditional focus on using resources, little academic attention has been paid to non-use measures as a separate type of measures at the international level. After reviewing the concept of use, offering a definition, outlining a typology, and providing some examples of what constitutes use in relation to global goods and commons (section 2), this chapter turns to non-use. It first presents the research that does exist on that concept (section 3). It then develops a typology of non-use measures (section 4), before discussing the rationales and objectives behind the adoption of such measures (section 5).

2 Use

'Use' and 'non-use' are two concepts of relevance in all regimes managing resources and addressing conservation. To examine non-use, one first needs to clarify what should be understood by use. Hence, this section presents the working definition of use for the purpose of this book (2.1), as well as offers a typology of use (2.2). Next, it examines resource domains, presenting those under analysis in this research, and discusses the types of resources, or goods, that can be found therein (2.3). Finally, this section provides some examples of uses, or activities, that take place in the relevant resource domains (2.4).

2.1 *Definition of Use*

'Use' refers to any activity that targets or otherwise impacts a resource. As such, any activity, even the most benign, is in fact a form of use of the environment, whether by using the resources the environment contains (natural resources) or the resources this environment represents (spatial-extension resources).⁵

Use of natural resources consists of extracting resources from the environment. Such activities include mining for minerals or petroleum, fishing, or

4 On the complex interrelations between non-use measures and the rights of nature, see eg S. Guggisberg, "Rights of Nature and Non-use of Nature for Environmental Protection in Antarctica" 2024 14(2) *The Polar Journal* 446–474.

5 S. J. Buck, *The Global Commons: An Introduction* (Island Press 1998) 3.

whaling. In each case, a resource is taken out of the environment in which it was located.

Use of spatial-extension resources relies on adding a person, object, substance or energy to a given space. Spatial-extension resources “have value because of their location”.⁶ Their exploitation takes various forms: tourism for example uses a given space and, in the process, adds people, and potentially waste to that space, causing impacts on the ecosystem. The oceans or the atmosphere can also be spatial-extension resources when substances or energy are discharged, for example through dumping of waste at sea, or introduced, for example through emission of CO₂ in the atmosphere or injection of aerosol particles in the stratosphere, again with impacts on the relevant ecosystems. Such discharges or introduction of people, substances, or energy in areas can be intentional (such as in the case of dumping or solar radiation modification) or might be an (unintended) side-effect of another activity (such as in the case of the introduction of CO₂ in the atmosphere from industrial activities).

2.2 *Typology of Use*

Use can be categorised as extractive, when natural resources are removed from the environment (eg fishing), or additive, when people, objects, substances or energy are added to the spatial-extension resources (eg dumping waste into the ocean). In that sense, extractive use relates to the use of natural resources, while additive use relates to the use of spatial-extension resources.

Use can also be divided into use that has the potential of being sustainable *versus* use that is automatically unsustainable (see Table 2.1). In the former category, one finds renewable resources, such as flora or fauna harvested up to their maximum sustainable yields, and resources that can continue functioning even with a certain level of disturbance due to ecosystem resilience. The concept of maximum sustainable yield refers to the “largest yield one can harvest from the resource over an indefinite period”,⁷ or the “highest average catch that can be continuously taken from an exploited population [...] under average environmental conditions”.⁸ It is used mainly in relation to fisheries science and management to determine which level of catches can be sustained in the long-term. Ecosystems more generally are able, up to a certain point, to “withstand and recover from perturbations” and their level of resilience

6 *ibid.*

7 M. A. Janssen, “Governance of Common-Pool Resources” in J. F. Shogren (ed), *Encyclopaedia of Energy, Natural Resource, and Environmental Economics. Volume 3* (Elsevier 2013) 38.

8 A. C. Tsikliras and R. Froese, “Maximum Sustainable Yield” in B. Fath (ed), *Encyclopaedia of Ecology. Volume 2* (2nd ed, Elsevier 2019) 108.

“reflects the degree to which a system is capable of rebuilding and increasing its ability to adapt from a disturbance”.⁹

In opposition to this use, which has the potential to remain sustainable, some uses are inherently unsustainable. Such cases relate to non-renewable resources, which, once removed from the environment, do not replenish themselves – or would require such a long period to do so that it would fall within the geological time scale. The prime example of such resources are minerals: once removed from the environment in which they were located, they do not ‘grow back’. It is acknowledged that some activities in this category might relate to resources that will enter a perfectly circular system (with a perpetual cycle of production-recycling-production) or aim at creating sustainable energy, for example when mining resources are needed for the production of renewable energy. Nonetheless, the focus remains here on whether the resource itself can be replenished within short time-frames, which is not the case with mineral resources.

TABLE 2.1 Typology of use

Sustainability of use → Types of resources and use ↓	Potentially sustainable (renewable resources used within carrying capacity)	Not potentially sustainable (non- renewable resources)
Natural Resources – Extraction	Fishing Whaling	Mining
Spatial-Extension	Tourism	
Resources – Addition	Emissions of greenhouse gases (GHGs) Marine/Solar geoengineering Dumping Transport/shipping	

Every use has an impact on the targeted resource(s), and often also on other resources. This reality tends to be hidden by some word choices. The consequent lack of terminological clarity and the risk attached thereto are described here below.

9 S. Peña-Alzate and J. E. Cañón Barriga, “Approaching the concepts of ecosystems resilience and stability through spatiotemporal system dynamics and agent-based modelling” (2017) 84 *Revista Facultad de Ingeniería Universidad de Antioquia* 84–96, 85, and references therein.

The differentiation between 'consumptive' and 'non-consumptive' use is widespread,¹⁰ but is arguably problematic, and has been criticised.¹¹ The word 'consumptive' commonly refers to activities that extract a resource from its environment, while the term 'non-consumptive' relates to activities where no resource is extracted. These terms carry with them a danger, in that they give the impression that non-consumptive use is free of impacts vis-à-vis the resource – and consequently might not need to be regulated. The consumptive/non-consumptive use terminology is common when activities which originally focused on extraction, such as whaling or hunting, have then been (partially) replaced by non-extractive activities such as whale watching or wildlife spotting.¹² While the direct impact on the original target resource is decreased, the new activity might remain a use of the original resource (with impacts that are not necessarily benign)¹³ and also of other resources such as the spatial-extension resource of the oceans or the wildlife habitat.¹⁴ It has even been shown that recreational uses, which epitomise so-called 'non-consumptive' uses, might prevent marine protected areas (MPAs) from reaching their conservation goals if such activities are left inappropriately managed.¹⁵ Consequently, it must be acknowledged that every use is consumptive in a certain manner.

The use of one resource will generally have impacts on other, non-targeted resources. For example, if deep-seabed exploitation starts, minerals will be its

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- 10 See eg D. A. Duffus and P. Dearden, "Non-Consumptive Wildlife-Oriented Recreation: A Conceptual Framework" (1990) 53 *Biological Conservation* 213–231; M. H. Koch, *A Comparison of the Perceived environmental impacts of consumptive and non-consumptive wildlife tourism*, Master's dissertation (North-West University 2021); C. Wilson and C. Tisdell, "Conservation and Economic Benefits of Wildlife-Based Marine Tourism: Sea Turtles and Whales as Case Studies" (2003) 8 *Human Dimensions of Wildlife* 49–58.
- 11 See eg J. E. S. Higham et al, "Managing Whale-Watching as a Non-Lethal Consumptive Activity" (2016) 24 *Journal of Sustainable Tourism* 73–90; Z. A. Meletis and L. M. Campbell, "Call It Consumption! Re-Conceptualizing Ecotourism as Consumption and Consumptive" (2007) 1(4) *Geography Compass* 850–870; B. Wilkes, "The Myth of the Non-Consumptive User" (1978) 36(2) *Blue Jay* 67–70.
- 12 See W. C. Burns, "The International Whaling Commission and the Regulation of the Consumptive and Non-Consumptive Uses of Small Cetaceans: The Critical Agenda for the 1990s" (1994–1995) 13(1) *Wisconsin International Law Journal* 105–144, who highlights at page 123 that "the term 'non-consumptive' utilisation in this context is often a clear misnomer".
- 13 S. Burgin and N. Hardiman, "Effects of Non-Consumptive Wildlife-Oriented Tourism on Marine Species and Prospects for Their Sustainable Management" (2015) 151 *Journal of Environmental Management* 210–220.
- 14 R. Blanc et al, "Effects of Non-Consumptive Leisure Disturbance to Wildlife" (2006) 61 *Revue d'Ecologie – La Terre et la Vie* 117–133; see also Wilkes (n 11) 68.
- 15 R. H. Thurstan et al, "Are Marine Reserves and Non-Consumptive Activities Compatible? A Global Analysis of Marine Reserve Regulations" (2012) 36 *Marine Policy* 1096–1104.

target resource, but it will also impact the surrounding marine ecosystem. Hence, it will probably create an additional stress factor for the fish stocks in the water column above the mined area.¹⁶ Indeed, due to ecological connectivity, changes to any biotic or abiotic element of an ecosystem can impact all others.¹⁷ Moreover, when more than one activity takes place in or has effects in a given space, the various uses will often interact, usually negatively for the environment. This is where the concept of cumulative impacts might come into play.¹⁸ For example, global warming and ocean acidification, both consequences of increasing levels of CO₂ in the atmosphere and hence largely of fossil fuel consumption, contribute additional stressors to some fish stocks which might already be under pressure from fishing.¹⁹ In such case, the maximum sustainable yield of the stock ought to take into account this variety of activities and impacts, in what is called the ecosystem approach.²⁰ Fully understanding cumulative impacts is, however, extremely complex.

2.3 *Resources Domains and Goods*

A resource domain is understood as a defined geographical area within which resources can be found in the form of natural resources or which is the spatial-extension resource itself.²¹ The focus of the present research is on resource

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- 16 B. C. O'Leary and C. M. Roberts, "Ecological Connectivity Across Ocean Depths: Implications for Protected Area Design" (2018) 15 *Global Ecology and Conservation* e00431; C. R. Smith et al, "Editorial: Biodiversity, Connectivity and Ecosystem Function Across the Clarion-Clipperton Zone: A Regional Synthesis for an Area Targeted for Nodule Mining" (2021) 8 *Frontiers in Marine Science* 797516; V. I. Stenvers et al, "Experimental Mining Plumes and Ocean Warming Trigger Stress in a Deep Pelagic Jellyfish" (2023) 14(1) *Nature Communications* 7352.
 - 17 Deep Ocean Stewardship Initiative (DOSI), "Ecological Connectivity: Implications for Ocean Governance" (2020) *Policy Brief*, available at <<https://www.dosi-project.org/wp-content/uploads/DOSI-Ecological-Connectivity-ISA-Submission.pdf>> accessed 8 October 2024. Arguably, all systems on Earth (and potentially beyond) are in fact part of a single ecosystem.
 - 18 See eg B. S. Halpern et al, "Spatial and Temporal Changes in Cumulative Human Impacts on the World's Ocean" (2015) 6 *Nature Communications* 7615.
 - 19 W. W. L. Cheung et al, "Large-Scale Redistribution of Maximum Fisheries Catch Potential in the Global Ocean Under Climate Change" (2010) 16(1) *Global Change Biology* 24–35; I. Nagelkerke et al, "Ocean Acidification Alters Fish Populations Indirectly Through Habitat Modification" (2016) 6 *Nature Climate Change* 89–93; A. L. Perry et al, "Climate Change and Distribution Shifts in Marine Fishes" (2005) 308 *Science* 1912–1915.
 - 20 S. A. Murawski, "Ten Myths Concerning Ecosystem Approaches to Marine Resource Management" (2007) 31 *Marine Policy* 681–690. Note that the ecosystem approach goes beyond what is called the ecosystem approach to fisheries, which remains sector-specific (on this, see eg J. Morishita, "What is the Ecosystem Approach for Fisheries Management?" (2008) 32 *Marine Policy* 19–26).
 - 21 Buck (n 5) 5–6.

domains which do not belong to any State, also known as global/international commons. The five generally accepted such resource domains are the outer space, the atmosphere, the high seas, the Area, and Antarctica.²² Whereas the former four are generally considered global commons since they are undoubtedly accessible by all, Antarctica is viewed as an international resource domain, mainly because it is, in fact, governed by a limited number of States.²³ This differentiation is now, with the Antarctic Treaty System's relative openness to new members,²⁴ mostly a theoretical one. The other important factor when it comes to characterising Antarctica as an international common is the existence of territorial claims. While the Antarctic Treaty has frozen the claims made before its adoption, prevented further claims, and created a framework for States to cooperate as if Antarctica was a global common, the existence of these territorial claims nonetheless informs many aspects of governance.²⁵

Commons and global commons have been the subject of extensive academic literature, in the legal and social science fields.²⁶ The present research

²² *ibid.* The atmosphere is in part under national jurisdiction in that the airspace above States falls under their sovereignty. Nonetheless, in light of the constantly moving nature of air and the inability to impound it (as one could migratory fish when located in areas under national jurisdiction), it is generally considered a global common (see eg M. S. Soroos, *The Endangered Atmosphere – Preserving a Global Commons* (University of South Carolina Press 1997).

²³ Buck (n 5) 5–6.

²⁴ However, while virtually any State can accede to the Antarctic Treaty (and hence to the Environmental Protocol), only Consultative Parties have decision-making powers. In addition to the original Signatories, a Consultative Party is State that “demonstrates its interest in Antarctica by conducting substantial scientific research activity there”, with the final decision as to whether a State has met that threshold left to the existing group of Consultative Parties. See Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71, arts IX, XIII. On this, see eg E. J. Molenaar, “Participation in the Antarctic Treaty” (2021) 11(2) *The Polar Journal* 360–380.

²⁵ On this see eg P. J. Beck, “Who Owns Antarctica?: Governing and Managing the Last Continent”, *Boundary and Territory Briefing* 1 (1994); K. J. Dobbs, “Sovereignty watch: claimant states, resources, and territory in contemporary Antarctica” (2011) 47 *Polar Record* 231–243; K. N. Scott, “Managing Sovereignty and Jurisdictional Disputes in the Antarctic: The Next Fifty Years” (2009) 20 *Yearbook of International Environmental Law* 3–40.

²⁶ On the commons and global commons, see eg K. Bosselmann, *Earth Governance – Trusteeship of the Global Commons* (Edward Elgar 2015) chapters 3–4; Buck (n 5); S. Cogolati and J. Wouters (eds) *The Commons and a New Global Governance* (Edward Elgar 2018); G. Hardin, “The Tragedy of the Commons” (1968) 162 *Science* 1243–1248; B. Hudson et al (eds), *Routledge Handbook of the Study of the Commons* (Taylor & Francis 2019); E. Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (CUP 1990); S. Ranganathan, “Global Commons” (2016) 27 *European Journal of International Law* 693–718; C. Rendueles, *The Commons – A Force in the Socio-Ecological Transition to Postcapitalism* (Routledge 2023); N. Schrijver, “Managing the Global Commons: Common Good or

focuses on global commons because they constitute a special subset of internationally shared resources which cannot be appropriated by any State and in whose governance all States can be involved. In that sense, theoretical considerations of commons' characteristics beyond their shared *res communis* nature are outside the scope of this chapter and edited volume. It is worth noting however that the respective legal regimes put in place to govern global commons are underpinned by different principles and concepts. These include the freedoms of the high seas,²⁷ the common heritage of (hu)mankind,²⁸ the common concern of humankind,²⁹ the benefit of all peoples,³⁰ and the interest of all (hu)mankind (as a whole).³¹ In light of this variety of principles and concepts, one might wonder, whether and to what extent these principles influence the direction of a regime towards use or non-use. In theory, indeed, one could potentially expect a regime based on the freedoms of the high seas to be more focused on use than a regime characterised by the common heritage of humankind principle.³²

Both natural resources and spatial-extension resources can be referred to as 'goods'. Goods can be characterised along several lines (see Table 2.2). First, some goods are legally accessible by all (or most) users (non-excludable goods), while others can be reserved by a portion of the stakeholders (excludable goods). Second, some goods, when used, continue being equally available to others (non-rival or non-subtractable), while others decrease in quantity or quality as they become used (rival or subtractable goods).³³

In light of this book's focus on global commons, only the non-excludable goods will be examined. These common goods can be divided into two

Common Sink?" (2016) 37 *Third World Quarterly* 1252–1267; J. Vogler, *The Global Commons: A Regime Analysis* (Wiley & Sons 1995).

27 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3, art 87.

28 *ibid* art 136.

29 United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107, preamble; Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) 3156 UNTS 79, preamble.

30 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205, preamble.

31 Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71, preamble; Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol) (adopted 4 October 1991, entered into force 14 January 1998) 2941 UNTS 5778, preamble.

32 This reflection is revisited in the conclusion, on the basis of the contributions.

33 M. Chin, "Global Public Goods" (*IMF Publications*, December 2021), available at <<https://www.imf.org/en/Publications/fandd/issues/2021/12/Global-Public-Goods-Chin-basics>> accessed 8 October 2024.

TABLE 2.2 Characterisation of goods

Availability → Goods ↓	Rival	Non-rival
Excludable	Private goods	Club goods
Non-excludable	Common pool goods	(Global) public goods

TABLE INSPIRED BY CHIN (N 33)

categories: common pool goods and public goods.³⁴ Common pool goods are legally accessible by all (or most) users (non-excludable nature) and their use by someone impacts their availability for other users (rivalrous or subtractable nature).³⁵ At the global level, they include for example high seas fish stocks or Antarctic minerals. Common pool goods differ from public goods in that those latter ones are non-rivalrous. At the global level, an example of pure public good might be international security.³⁶ While global environmental components such as fresh air are often described as public goods, they are nonetheless used at the cost of their availability, in terms of quantity or quality, to others. Indeed, fresh air, for example, includes in fact an element of subtractability in the face of air pollution.³⁷ The present research focuses on global common pool goods, leaving the more intangible (and often aspirational) global public goods aside.

2.4 Examples of Uses

Various activities, also referred to here as ‘uses’, can take place within the examined resource domains and in relation to these common pool goods

34 Buck (n 5) 4–5. It is worth noting that conceptual and definitional ambiguity remains. For example, the term ‘common goods’ has been used to refer to common pool goods (Chin (n 33)) and the term ‘global common goods’ has been used to refer to non-excludable and non-rivalrous goods, including in that category goods as varied as human rights, Antarctica, or the ozone layer ((E. Harden-Wolfson and J. A. Quinteiro, “Public Goods, Common Goods and Global Common Goods: A Brief Explanation” (*UNESCO IESALC*, 2024), available at <<https://www.iesalc.unesco.org/en/articles/public-goods-common-goods-and-global-common-goods-brief-explanation>> accessed 27 April 2025).

35 Buck (n 5) 4–5.

36 J. E. Stiglitz, “The Theory of International Public Goods and the Architecture of International Organizations” (1995) *Department for Economic and Social Information and Policy Analysis, United Nations*.

37 D. Bodansky, “What’s in a Concept? Global Public Goods, International Law, and Legitimacy” (2012) 23 *The European Journal of International Law* 651–668, 653.

(see Table 2.3). Some activities fall under two global or international commons, such as fishing in Antarctic waters (under ‘high seas’ and ‘Antarctica’). Many of the following uses are examined in this book.

TABLE 2.3 Examples of uses in global/international commons

Resource domains: global/international commons	Resources: common pool goods	Uses of resources
High seas	Fish	Fishing
	Marine mammals	Whaling
	Ocean space and environment	Dumping, including for marine geoengineering; shipping
Antarctica	Fish	Fishing
	Minerals	Mining
	Antarctic space	Tourism
Area	Minerals	Mining
Outer space	Minerals	Mining
	Outer space space and properties	Satellite placing/geo-stationary slots; tourism; geoengineering
Atmosphere	Atmosphere space and properties	Emitting ozone, GHGs, or other substances, including for geoengineering; air travel

Worth noting, research is also a use in that it is an activity with a potential impact on the resources of a resource domain. It might target the natural resources themselves, when taking samples, or the spatial-extension resource, when entering a space to take measurements. Research is undertaken in all global commons and is usually the object of rights and obligations that differentiate this use from others. It often is mentioned as a use that might be acceptable even when other uses ought to be/are prohibited. This is for example the case in the regime of the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter and its 1996 Protocol (London Convention/Protocol), which prohibits ocean fertilisation activities, except for legitimate scientific research.³⁸ Similarly, the moratorium on commercial

38 IMO, “Resolution LC-LP.1 (2008) on the Regulation of Ocean Fertilization” (2008), paras 1, 8. The amendment to the London Protocol to provide a more comprehensive framework to marine geoengineering is not yet into force (IMO, “Resolution LP.4(8) (2013) on the

whaling does not apply to takes for scientific purposes: under the International Convention for the Regulation of Whaling (ICRW), scientific whaling indeed remains possible under a system of nationally granted permits.³⁹

3 The Concept of Non-use: Origins and Development

The term ‘non-use’, in opposition to that of use, is understood as the absence of ‘use’ of natural resources or spatial-extension resources. It covers a wide-range of concepts, depending on the discipline, as is outlined here below, starting with social sciences (3.1), before moving to the legal field (3.2), and the study of non-use measures in particular (3.3).

3.1 *Non-use in Social Sciences*

In academic research, the concept of ‘non-use’ is originally found in social sciences such as ecological economics or environmental management. First identified in 1967 by Krutilla,⁴⁰ non-use value became part of the measurement of a resource’s total economic value.⁴¹ The concept relates to assessing the potential value of not using a resource, in opposition to the expected benefits of using it in the present.

Non-use values mainly include the existence value, that is the value given to a resource for its mere existence. According to some views, it also covers the bequest value, which is “the value attached to preserving a good or service for use by future generations”.⁴² However, there is no consensus on the question of future use: some definitions of non-use values indeed preclude potential use by future generations,⁴³ which would consequently limit the concept of bequest value. Other non-use values mentioned are cultural⁴⁴ or

Amendment to the London Protocol to Regulate the Placement of Matter for Ocean Fertilization and other Marine Geoengineering Activities” (2013)).

39 International Convention for the Regulation of Whaling (ICRW) (adopted 2 December 1946, entered into force 10 November 1948) 161 UNTS 72, art VIII(1).

40 J. V. Krutilla, “Conservation Reconsidered” (1967) 57(4) *The American Economic Review* 777–786.

41 T. O’Garra, “Bequest Values for Marine Resources: How Important for Indigenous Communities in Less-Developed Economies?” (2009) 44 *Environmental Resource Economics* 179–202, 179–180.

42 *ibid* 179.

43 J.-B. Marre et al, “Non-Market Use and Non-Use Values for Preserving Ecosystem Services Over Time: A Choice Experiment Application to Coral Reef Ecosystems in New Caledonia” (2015) 105 *Ocean & Coastal Management* 1–14.

44 K. M. A. Chan et al, “Cultural Services and Non-Use Values” in P. Kareiva et al (eds), *Natural Capital: Theory and Practice of Mapping Ecosystem Services* (OUP 2011) 206–228.

transcendental⁴⁵ values. Research often examines non-use value in relation to protected areas, such as (marine) national parks⁴⁶ or coral reefs.⁴⁷

3.2 *Non-use in Legal Studies*

The concept of 'non-use' in the legal field has developed in at least two distinct directions, one considering non-use rights as the rights of States not to use, generally for environmental reasons, and the other focusing on non-use rights as the rights of nature to be on equal footing with human interests, and hence potentially not to be used.

When it comes to the first understanding of non-use rights, Molenaar develops and analyses the concept in relation to marine biodiversity. He notes that the international framework for the sustainable use of marine biodiversity ought to, but does not to date, include an explicit "right of States to [...] biodiversity".⁴⁸ Such a right would not only recognise the variety of values associated with marine biodiversity, such as conservation that aims at long-term sustainable use, but it would also acknowledge non-use for other reasons.⁴⁹ This right would ensure that marine biodiversity for present and future generations is given equal consideration as socio-economic interests.⁵⁰ He points out that, at present, such a right is not explicitly recognised. However, it is implicit in the obligation of States to protect the marine environment and the right of non-user States to participate in the work of some international bodies managing marine living resources, such as the International Whaling Commission (IWC) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).⁵¹ Moreover, the relatively accepted practice by States to under-utilise their fishing quotas indicates that the use-it-or-lose-it rule has not been strictly pursued in international fisheries law.⁵² While it seems that

45 C. M. Raymond and J. O. Kenter, "Transcendental Values and the Valuation and Management of Ecosystem Services" (2016) 21 *Ecosystem Services* 241–257.

46 A. McVittie and D. Moran, "Valuing the Non-Use Benefits of Marine Conservation Zones: An Application to the UK Marine Bill" (2010) 70 *Ecological Economics* 413e424; D. H. L. Thomas, F. Ayache and G. Edwards Hollis, "Use and Non-use Values in the Conservation of Ichkeul National Park, Tunisia" (1991) 18(2) *Environmental Conservation* 119–130.

47 Y. Laurans et al, "Economic Valuation of Ecosystem Services from Coral Reefs in the South Pacific: Taking Stock of Recent Experience" (2013) 116 *Journal of Environmental Management* 135e144; Marre et al (n 43).

48 E. J. Molenaar, "Managing Biodiversity in Areas Beyond National Jurisdiction" (2007) 21 *International Journal of Marine and Coastal Law* 89–124, 108.

49 *ibid.*

50 *ibid.* 109.

51 *ibid.* 108–115.

52 *ibid.*

States forgoing the use of their whole quotas or allocations do so because of issues of capacity or economic viability, rather than as attempts to contribute to environmental conservation,⁵³ this is nonetheless a noteworthy precedent.

Except for this analysis by Molenaar, most relevant academic research focuses on domestic developments and seems to associate non-use rights with rights of nature.⁵⁴ Such rights do not actually require the absence of use but rather consider that “nature has inherent rights to exist, evolve and fulfil ecological functions [...] and that human activities must be managed so as to prevent destruction of nature”.⁵⁵ The right of non-use has been studied and advocated for by Laitos.⁵⁶ Looking at the historical development of legal regimes focused on resources, he shows the inadequacy of laws to protect the environment, whether they are rules promoting use, rules conserving resources but with a view to future use, rules promoting non-use to ensure continued recreational and existence value of the environment for humans, or even human rights to a clean environment. He views a right of non-use as an ecocentric right, making it in fact a right of nature. Such right of nature is not an absolute right which would preclude any use, but rather a right “to be *considered* as part of the use calculus, along with the consequences for nature and natural systems if the right were ignored”.⁵⁷ Laitos’ research, as most research on the rights of nature, refers to the domestic legal systems in which the rights of elements of the natural world have been recognised, sometimes with them being granted legal personality and innovative forms of representation being established.⁵⁸ The international legal regime is generally not discussed, as rights of nature are, on the international scene, *lex ferenda* at the most.⁵⁹

Other articles referring to non-use rights, such as those by Leonard and Regan,⁶⁰ also question the bias of many legal systems towards regulating the

53 *ibid* 115.

54 Guggisberg (n 4).

55 H. Harden-Davies et al, “Rights of Nature: Perspectives for Global Ocean Stewardship” (2020) 122 *Marine Policy*, 104059, 3.

56 J. G. Laitos, *The Right of Non-Use* (OUP 2012); J. Laitos, “Rules of Law for Use and Non-Use of Nature” in C. Voigt (ed), *Rule of Law for Nature: New Dimensions and Ideas in Environmental Law* (CUP 2013) 209–221.

57 Laitos (2013) (n 56) 218.

58 Harden-Davies et al (n 55) 2.

59 As presented in Harden-Davies et al (n 55); see eg United Nations General Assembly (UNGA) Res 73/235 (2018) GAOR 73rd Session Supp 49, 2; Universal Declaration of Rights of Mother Earth, World People’s Conference on the Climate Change and the Rights of Mother Earth (Cochabamba, Bolivia, 2010).

60 B. Leonard et al, “Allow ‘Non-use Rights’ to Conserve Natural Resources” (2021) 373 *Insights* 958–961. For a longer analysis, see B. Leonard and S. Regan “Legal and Institu-

use of resources in an extractive manner. However, their focus remains firmly on the domestic scene. These authors specifically examine the USA's use-it-or-lose-it rules that preclude environmental groups from acquiring "public natural resources for the purpose of withholding them from development".⁶¹ They suggest an expansion of the concept of use to also include non-extractive uses, such as conservation uses.⁶² They do not discuss whether these latter uses would also impact the resources in question, and, if so, what regulatory frameworks would be required. An example of the limits of the US framework was highlighted when an environmentalist bought two leases in Utah but, instead of developing the energy resources located underneath the parcels, his plan was to use the land to promote the "keep it in the ground" movement, which argues against further oil and gas production. His lease was eventually cancelled.⁶³

Squarely placing his reflection within the Earth System Law movement,⁶⁴ van Asselt argues in favour of an international law of "leaving it in the ground" as a necessary step to mitigate climate change.⁶⁵ He identifies multiple limitations to the existing legal framework, especially the lack of clear legal guidance directing States to move away from fossil fuel production.⁶⁶ This fits in with one of the main criticisms voiced by the Earth System Law proponents, that is the absence of a systemic approach across fields of international law. Van Hasselt suggests that, by using existing international legal principles such as prevention of harm, intra-generational equity and common but differentiated responsibilities and applying some rules of human rights law, in particular the rights to life, health, food, and development, a coalition of willing States could "establish non-binding commitments to wind down fossil fuel production in line with climate goals while providing for a just transition".⁶⁷ This would be followed by an alignment of hard law with the need to move away from oil and

tional Barriers to Establishing Non-use Rights to Natural Resources" (2019) 59 *Natural Resources Journal* 135–179.

61 Leonard et al (n 60) 958.

62 *ibid* 959, 961.

63 Leonard and Regan (n 60) 162–163.

64 On the goals of Earth System Law, see eg R. E. Kim and L. Kotzé, "Planetary Boundaries at the Intersection of Earth System Law, Science and Governance: a State-of-the-Art Review" (2021) 30(1) *Review of European, Comparative and International Environmental Law* 3–15, 13–14.

65 H. van Asselt "Governing Fossil Fuel Production in the Age of Climate Disruption: Towards an International Law of 'Leaving It In the Ground'" (2021) 9 *Earth System Governance* 100118 1–9.

66 *ibid* 5.

67 *ibid* 6.

gas, and potentially then by a treaty exclusively focused on such just transition.⁶⁸ His reflection is still in the realm of *lex ferenda* however and does not address the specific issue of regulating global goods and commons.

It is worth remarking that non-use in legal academia refers to different concepts and rights holders. While the right of non-use developed by Molenaar is a substantive right held by State not to use a resource and preserve it instead, the right of non-use conceptualised by Laitos and, more generally, the rights of nature movement is a right held by nature to be considered equally as the rights of humans to use, which places corresponding obligations on States. Neither of these is equivalent to non-use measures, which are – as will be further developed below – obligations, undertaken and held by States, not to use a specific resource.

3.3 *Non-use Measures in Legal Academia*

Non-use measures themselves have also been examined, to some extent, in academic literature. In addition to one article by Yin focused on the concept of moratorium but only marginally addressing moratoria related to natural resources,⁶⁹ publications are usually limited to one specific field, and academic interest is often linked to current developments.

For example, in the lead up to the adoption of the Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement), MPAs have been the subject of numerous publications.⁷⁰ By focusing on such area-based management tools which might prohibit some uses at sea, this body of research has examined the legality, enforceability, and potential successes of non-use measures. Other non-use measures are discussed amongst a variety of management issues within a specific regime, such as the moratorium on commercial whaling within broader

68 *ibid* 6–7.

69 W. Yin, “Moratorium in International Law” (2012) 11 *Chinese Journal of International Law* 321–340.

70 See eg L. Cordonnery, A. D. Hemmings and L. Kriwoken, “Nexus and Imbroglia: CCAMLR, the Madrid Protocol and Designating Antarctic Marine Protected Areas in the Southern Ocean” (2015) 30 *The International Journal of Marine and Coastal Law* 727–764; W. Duan *The International Legal Regime Relating to Marine Protected Areas in Areas Beyond National Jurisdiction* (Brill Nijhoff 2022); S. M. Grant “The Applicability of International Conservation Instruments to the Establishment of Marine Protected Areas in Antarctica” (2005) 48 *Ocean & Coastal Management* 782–812; K. N. Scott, “Conservation on the High Seas: Developing the Concept of the High Seas Marine Protected Areas” in D. Freestone (ed), *The 1982 Law of the Sea Convention at 30: Successes, Challenges and New Agendas* (Brill Nijhoff 2013) 175–183; D. Smith and J. Jabour “MPAs in ABNJ: Lessons from Two High Seas Regimes” (2018) 75 *ICES Journal of Marine Science* 417–425.

monographs on the protection and conservation of marine mammals.⁷¹ The moratorium for mining in Antarctica, in addition to being included in general studies about Antarctic governance,⁷² has been the subject of recent publications on the future of hydrocarbon extraction in Antarctica,⁷³ arguing that the future of the moratorium might be in question. Finally, articles have also examined potential non-use measures, such as closing the high seas to fishing⁷⁴ or adopting a deep-seabed mining moratorium,⁷⁵ whether or not they are likely to be adopted in a near future.

4 Typology of Non-use Measures

As mentioned above, ‘non-use’ is the absence of use of natural resources or spatial-extension resources. Non-use measures are measures adopted on the international scene that ban or suspend the use of a resource. Such measures are referred to under a variety of appellations, such as ban, moratorium, abstention, closure, no-take zone, closed area, closed season, sanctuary. The term itself does not necessarily provide information as to the specificities of the non-use measure in place. Important characteristics for the study of non-use measures include the legal nature of the instrument giving them effect (4.1), the participation by States in such instruments (4.2), as well as their spatial applicability and duration (4.3). Non-use measures are different from measures that simply restrict use, but they can also co-exist (4.4).

71 M. Fitzmaurice, *Whaling and International Law* (CUP 2015); C. S. G. Jeffries, *Marine mammal conservation and the law of the sea* (OUP 2016).

72 C. Redgwell, “Environmental Protection in Antarctica: The 1991 Protocol” (1994) 43 *The International and Comparative Law Quarterly* 599–634; D. R. Rothwell, “Polar Environmental Protection and International Law: The 1991 Antarctic Protocol” (2000) 11 *European Journal of International Law* 591–614.

73 P. Flamm and A. D. Hemmings, “Now and Never: Banning Hydrocarbon Extraction in Antarctica Forever” (2022) *German Institute for Global and Area Studies (GIGA) – Leibniz-Institut für Globale und Regionale Studien*.

74 J. F. Green and B. Rudyk, “Closing the High Seas to Fishing: A Club Approach” (2020) 115 *Marine Policy* 103855.

75 A. Jaeckel et al, “Deep seabed mining lacks social legitimacy” (2023) 2(1) *npj Ocean Sustainability* 1; K. A. Miller et al, “Challenging the Need for Deep Seabed Mining From the Perspective of Metal Demand, Biodiversity, Ecosystems Services, and Benefit Sharing” (2021) 8 *Frontiers in Marine Science* 706161; P. A. Singh, “The Invocation of the ‘Two-Year Rule’ at the International Seabed Authority: Legal Consequences and Implications” (2022) 37 *The International Journal of Marine and Coastal Law* 375–412.

4.1 *Legal Nature of Measures and Procedural Considerations*

Non-use measures can be found in a variety of instruments, ranging from multilateral treaties to unilateral policies. The qualified and temporary abstention from fishing in the high seas portion of the central Arctic Ocean, for example, is one of the main substantive elements in a treaty.⁷⁶ The moratorium on Antarctic mining is equally sourced in a binding instrument, being the object of an article in the Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol).⁷⁷ Other non-use measures are found in annexes or appendices to treaties, such as the moratorium on commercial whaling which was established through the adoption of zero quotas under the Schedule to the ICRW.⁷⁸ Many non-use measures are created by instruments adopted by international organisations or meetings of parties to a treaty; for example, no-take zones in MPAs are adopted by CCAMLR⁷⁹ and Antarctic Specially Protected Areas (ASPAs) by the Antarctic Treaty Consultative Meeting.⁸⁰ Non-use (or restricted-use) measures can furthermore be created in instruments developed outside of established intergovernmental settings, by a coalition of like-minded States; this is for instance the case with the Artemis Accords and safety zones on the Moon.⁸¹ Finally, a State can make a unilateral declaration or adopt a domestic policy, whereby it decides to refrain from using a certain resource. The Netherlands, for example, has an official policy of forbidding helicopter flights, heliskiing and drones for tourism in coastal areas of Antarctica,⁸² a non-use measure (albeit not one adopted at the international level, as per the definition developed in this chapter) which is not required under the Antarctic Treaty System rules.⁸³

76 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA) (signed 3 October 2018, entered into force 25 June 2021) OJ 2019 L 73/3.

77 Environmental Protocol, art 7.

78 ICRW, Schedule adopted in 1982 with moratorium to start in 1985/86 season. The decision of the ICRW adopting the moratorium can be found at "Chairman's report of the Thirty-Fourth Annual Meeting" (1983) 33 *Report of the International Whaling Commission*, 21 (agenda item 6).

79 Two MPAs have been, as of September 2024, adopted under CCAMLR: "Conservation Measure 91-03 (2009) Protection of the South Orkney Islands Southern Shelf" CM 91-03 (adopted at CCMLR-XXVIII, in force since 2009, Subarea 48); "Conservation Measure 91-05 (2016) Ross Sea region Marine Protected Area" CM 91-05 (adopted at CCAMLR-XXXV, in force since 2016, Subarea 88.1).

80 As of September 2024, there are 78 ASPAs, the full list of which can be found on the Antarctic Treaty Secretariat website.

81 US Department of State, "Artemis Accords", available at <<https://www.state.gov/artemis-accords/>> accessed 8 October 2024.

82 See, Ministry of Foreign Affairs, "The Netherlands' Polar Strategy 2021-2025" (2021) 44, available at <<https://www.government.nl/documents/publications/2021/03/01/polar-strategy>> accessed 8 October 2024.

83 See E.-L. Alvarez Ortega and S. Guggisberg, "Governance of Antarctic Tourism: From Private Actors to the Antarctic Treaty System, and Back", in D. Ioannides, A. Varnajot and

These different instruments, in turn, have distinct legal effects. Some of these instruments, in particular international treaties, generally create obligations with legally binding obligations for their parties – except if a State has made a relevant reservation. The legal nature of acts of international organisations depends on their constitutive instrument but they often are legally binding on the members, except when these opt out of a measure. Opting out, when it is permitted, allows members to an international organisation to express their absence of consent to be bound by a specific measure. When decision-making is by majority, rather than by consensus, it is common that States negotiating a treaty agree to an opt-out mechanism to preserve their right not to be bound by decisions they consider to go against their vital interests. Some acts adopted by international organisations or by meetings of the parties, for example Resolutions adopted by the Antarctic Treaty Consultative Parties, are explicitly not binding.⁸⁴ Other instruments in which non-use measures might be found, such as the Artemis Accords, are also explicitly non-legally binding.⁸⁵

Procedural aspects will influence how an instrument containing a non-use measure can be adopted (and become effective) and how an existing instrument can be amended to add – or reversely bring to an end – such a measure. When the non-use measure is found in a treaty, its adoption and entry into force have clear procedural requirements, such as the ratification by all original signatories⁸⁶ or by a certain pre-determined number of States.⁸⁷ Once in force, some treaties, protocols or annexes thereto can be amended. The procedures vary between regimes. For example, amendments to the London Convention and Protocol and their annexes can be adopted by a two-third majority,⁸⁸ while those to the Environmental Protocol require a three-quarter majority and include further substantive and temporal requirements when it

M. Vereda (eds), *Polar Tourism and Communities: Experiences, Knowledge Building, Challenges and Opportunities* (CABI 2025), 43–59.

84 ATCM, “Recommendations divided into Measures, Decisions and Resolutions” (1995) Decision 1.

85 Artemis Accords, para 10 of preamble, and section 13.2; R. Deplano, “The Artemis Accords: Evolution or Revolution in International Space Law” (2021) 70 *International and Comparative Law Quarterly* 799–819.

86 CAOFA, art 11.

87 Montreal Protocol on Substances that Deplete the Ozone Layer (adopted 16 September 1987, entered into force 1 January 1989) 1522 UNTS 3, art 16.

88 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (LDC) (adopted 29 December 1972, entered into force 30 August 1975) 1046 UNTS 120, art xv; Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (LDP) (adopted 7 November 1996, entered into force 24 March 2006) 36 ILM 1, art 22.

comes to the mining moratorium.⁸⁹ Once adopted, an amendment must still enter into force, which usually demands the explicit approval by States. However, in certain cases, and often when it comes to annexes, a tacit approval of an adopted measure is considered sufficient.⁹⁰

Procedural rules are also of great importance for non-use measures found in instruments adopted by international organisations or meetings of parties. Some treaty regimes rely on consensus, and others on (qualified) majority decision-making. Hence, in order for a non-use measure to be adopted, or, in reverse, terminated, a particular threshold must be met. At the IWC, the Schedule can be amended, as it was to establish a moratorium on commercial whaling, through a three-quarter majority.⁹¹ In contrast, under the Antarctic Treaty, Resolutions and Measures can only be adopted by consensus.⁹² This makes the adoption of a non-use measure – but also its reversal – much harder to achieve. Additionally, some instruments adopted by international organisations or meetings of parties, in particular those intended to be legally binding, might be subject, once adopted, to a formal ratification process – as are for example Measures adopted by Antarctic Treaty Consultative Parties.⁹³

4.2 *Participation and Scope of Applicability*

Non-use measures can have a global, regional, or limited reach *ratione personae*. This depends, in part, on the intended scope of applicability of the instrument used to adopt a non-use measure and, in part, on its success at gathering support amongst States.

Some regimes can be joined by all interested States and are hence aiming at universal participation. An example of a treaty which can be acceded to by any State – and which has been ratified by 198 Parties – is the Montreal Protocol.⁹⁴ The phaseouts of ozone depleting substances provided for in that instrument are consequently characterised by a wide scope of applicability *ratione personae*. A non-use measure with similar reach can also be found under the auspices of a global and open international organisation; this would for example

⁸⁹ Environmental Protocol, art 25.

⁹⁰ London Convention, art xv; London Protocol, art 22.

⁹¹ IWC, “IWC Rules of Procedure and Financial Regulations” (2022) ICRW 68th meeting E.3(a).

⁹² Antarctic Treaty, art XII.

⁹³ Antarctic Treaty, art IX(4); ATCM, Decision 1 (1995) (n 84).

⁹⁴ Montreal Protocol, arts 15, 17.

be the case if the moratorium on deep-seabed mining discussed among States was adopted by the International Seabed Authority (ISA).⁹⁵

Other regimes do not have such large participation – and measures they provide thus only apply to a limited number of States. Some regimes are open to all States, but have failed to gather widespread support. The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies,⁹⁶ for example, is in force, but only binds 17 States, none of which are main players in outer space activities. Other measures are adopted within the scope of systems that are fully functioning, but do not aim at bringing together all States because of specific conditions to become a party. For example, many regional fisheries management organisations (RFMOs) are not fully open as, in some cases, applicants to membership must meet certain eligibility criteria and/or their requests to join need approval by the existing members.⁹⁷

Whether a treaty regime is intended to remain a ‘closed club’ – which in turn raises some major issues of legitimacy when it comes to the regulation of global commons – or whether it failed to attract near-universal participation, non-use measures adopted by such regimes will only apply to their parties/members, leaving open the issue of third parties’ behaviour. The main situation where measures would be legally-binding on third parties is in the case of an objective regime,⁹⁸ but the existence of treaties that would create obligations for non-parties remains highly controversial.

95 As an international organisation created by UNCLOS, the ISA’s membership currently extends to 169 Parties.

96 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (adopted 5 December 1979, entered into force 11 July 1984) 1363 UNTS 3.

97 On this, see E. J. Molenaar, “Participation in Regional Fisheries Management Organizations” in R. Caddell and E. J. Molenaar (eds), *Strengthening International Fisheries Law* (Hart 2019) 103–129, 118–123.

98 C. Fernández de Casadevante Romani, “Objective Regime” in *The Max Planck Encyclopedia of Public International Law* (OUP online 2023). On the potential of objective regimes, see R. A. Barnes, “Objective Regimes Revisited” (2000) 9 *Asian Yearbook of International Law* 97–145. Objective regimes, however, are not the only scenario of relevance. In specific situations, indeed, complex *pacta tertiis* issues might arise: for example, non-members of RFMOs that are parties to the UNFSA are nonetheless bound by that treaty’s obligation not to fish in the area where an RFMO exists and they are not member to it (United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA) (adopted 4 December 1995, entered into force 11 November 2001) 2167 UNTS 3, art 8).

4.3 *Geographical Applicability and Duration*

Non-use measures can have a global, regional, or local scope of applicability *ratione loci*. They can apply to the whole range (or most) of an activity or species, or be much more specific and limited. An example of a measure intended to apply globally is the whaling moratorium, since it sets zero quotas for the whole range of ocean spaces.⁹⁹ Other measures apply to a large region, but do not cover the whole area where an activity could take place: the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA) requires the abstention of fishing in the high seas portion of the central Arctic Ocean but is not applicable to areas under national jurisdiction,¹⁰⁰ which are nonetheless part of the fish migratory range. Finally, some measures are more localised: non-fishing zones under RFMOs can be quite restricted spatially,¹⁰¹ and Visitor Site Guidelines only apply to discrete tourist sites in Antarctica.¹⁰²

The participation to the instrument in which a non-use measure is found differs from the geographical reach of the measure itself. An example of this distinction is Areas of Particular Environmental Interest where deep-seabed mining is not allowed.¹⁰³ These measures are very localised in their implementation. However, since they are adopted by the ISA, a near-universal regime in terms of participation, they are to be respected by the large majority of the international community.

When it comes to the time period during which a non-use measure is in effect, non-use measures can take the form of a prohibition of an activity with no envisioned end date: the prohibition of dumping certain substances at sea is for example not time-bound.¹⁰⁴ Other non-use measures, such as no-take zones in the Ross Sea region MPA under CCAMLR, are temporary.¹⁰⁵ These can be open in time until certain conditions are met and the measure might be reversed. An example of that are the zero quotas set under the Convention on the Conservation and Management of Pollock in the Central Bering Sea

99 ICRW, art I(2).

100 CAOFA, art 1(a).

101 See eg South Pacific Regional Fisheries Management Organisation (SPRFMO), "Conservation and Management Measure for Deepwater Species in the SPRFMO Convention Area" (2023) CMM 03a-2023 (Supersedes CMM 03a-2021).

102 ATCM, "Site Guidelines for Visitors" (2022) Resolution 2. The latest versions of the Site Guidelines for Visitors can be found on the Antarctic Treaty Secretariat website.

103 See eg ISA Council, "Decision of the Council of the International Seabed Authority Relating to the Review of the Environmental Management Plan for the Clarion-Clipperton Zone" (2021) ISBA/26/C/58.

104 LDC and LDP.

105 This measure will lapse after 30/35 years, except if consensus is reached to continue with the Ross Sea region MPA (CM 91-05 (n 79) paras 20 and 21).

(CBS Convention) which will stay in place until biomass of Alaskan pollocks reaches certain levels.¹⁰⁶ Time-bound non-use measures can also have an explicit arrangement on duration, which pinpoints the time when the decision is open for renewal or will lapse. The mining moratorium in Antarctica is binding for at least 50 years after entry into force of the Environmental Protocol and can be stopped afterwards if a certain number of conditions are met.¹⁰⁷ Closed seasons to fishing, in contrast, have fixed end dates when they automatically come to an end.¹⁰⁸

Another temporal element of note is whether a non-use measure is adopted before the relevant activity has started, or whether it follows an already established use. Some measures are indeed preventative in nature, in that they address a potential use before it happens, prime examples being the abstention from fishing under CAOFA or the mining ban in Antarctica. Other non-use measures are responsive, either in the face of a need to ensure long-term sustainable use, as with some fishing closures, or to prevent future degradation in – and enable recovery of – an overexploited resource, as with the whaling moratorium. Non-use measure might also be adopted in acknowledgment that the resource is (currently) unavailable for harvesting, as is the case under the CBS Convention where stocks of pollocks had collapsed.

4.4 *(Restricted-)use and Non-use Measures*

The term of ‘use measures’ is not common, but the concept in fact exists in parallel to that of non-use measures. Certain regimes’ default mode is to allow a use, whereas others forbid uses, except in certain specific cases. An example of the former would be the regulation of tourism in Antarctica: as a default, this activity is allowed, with a few restrictions put in place through specific non-use measures. An example of the latter would be dumping at sea under the London Protocol: such activity is overall forbidden, except if a substance is explicitly listed as authorised.

The relation between use and non-use measures is not of opposed concepts, but of a continuum, ranging from unregulated use, to restricted-use or limited-use measures (terms used interchangeably), and finally to non-use measures. Purely unregulated use seems to be vanishing when it comes to global

106 Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (signed 16 June 1994, entered into force 8 December 1995) 34 ILM 67, Annex Part 1, para 3.

107 Environmental Protocol, art 25.

108 See eg as provided for under the Convention on Future Multilateral Cooperation in the Northeast Atlantic Fisheries (adopted 18 November 1980, entered into force 17 March 1982) 1285 UNTS 129, art 7(c).

commons. Even the traditional example of unregulated use, that is high seas fishing in areas where no RFMO exists, is in fact subject to quite extensive rules, as laid down in international fisheries law.¹⁰⁹ Clear illustrations of limited-use measures would be, for example, quotas for fishing or rules for exploration for deep-seabed mining in the Area under the Mining Code.¹¹⁰

In certain cases, non-use measures have evolved from limited use, such as with the moratorium on commercial whaling which was adopted after decades of quota-setting. Another example is that of the regime regulating dumping, which started as a limited-use one, became increasingly restrictive with the amendments to the Annexes to the London Convention and then turned to non-use with the adoption of the London Protocol. The Montreal Protocol initially controlled the production and consumption of ozone depleting substances with limited-use measures, but these were progressively tightened and then became mostly non-use measures.

Finally, non-use measures are also regularly intertwined with restricted-use measures within a single instrument or as part of a larger regime. Visitor Site Guidelines under the Antarctic Treaty System, for example, generally prohibit certain activities or behaviours, and limit others.¹¹¹ Most Protocols under the Convention on Long-Range Transboundary Air Pollution (CLRTAP)¹¹² provide for restricted-use measures, but one of them, the 1998 Aarhus Protocol on persistent organic pollutants, contains both restricted and non-use measures.¹¹³

5 Rationales for and Objectives of Non-use Measures

Non-use measure can be developed and adopted for a variety of reasons, often underpinned by values assigned to nature (5.1) and they pursue objectives that range from preservation-focused to use-oriented (5.2). While some non-use

¹⁰⁹ UNCLOS, arts 116–119; UNFSA. Further rules are then adopted under RFMOs.

¹¹⁰ ISA, Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area (15 November 2010) ISBA/16/A/12/REV.1; ISA, Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area (27 July 2012) ISBA/18/A/11 (Cobalt Regulations); ISA, Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (22 July 2013) ISBA/19/C/17 (Nodules Regulations).

¹¹¹ ATCM, Resolution 2 (2022) (n 102).

¹¹² Convention on Long-Range Transboundary Air Pollution (adopted 13 November 1979, entered into force 16 March 1983) 1302 UNTS 217.

¹¹³ Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants (adopted 24 June 1998, entered into force 23 October 2003) 2230 UNTS 79.

measures' objectives are primarily related to the resource which cannot be used, others in fact prohibit the use of one resource to protect (or use) another (5.3).

5.1 *Rationale for Non-use Measures*

A variety of values have been assigned to nature, which in turn justify non-use in the eyes of its proponents. According to Pearson, one can distinguish first the utilitarian value, which refers to the benefits that humans derive from using nature, such as ecosystem services, climate regulation, fishing, or recreation. Second, he identifies the non-use value, which refers to the value given to nature by humans, even when they are not using it, such as existence value or bequest value. Third, he points to the intrinsic value, which refers to the value of nature irrespective of humans, including existence value.¹¹⁴ Pearson clarifies that

there are similarities between intrinsic and non-use values in that both value nature irrespective of human use (eg existence value), but non-use value is distinguished in that the value is regarded as being to humans rather than regardless of human interests.¹¹⁵

Non-use measures can, in theory, relate to utilitarian, non-use or intrinsic values. Indeed, it depends on the specific objectives such measures are pursuing. However, the adoption of non-use measures is generally driven by anthropocentric rationales, whether a resource is to be conserved for utilitarian or non-use values. Non-use measures seem to mostly fall in the utilitarian category as they aim at conserving resources in light of what they (could) bring to humans. A few non-use measures might also be based on non-use values, especially when it comes to iconic elements of nature such as whales. Measures that are purely justified by intrinsic values, while possible, are yet to be adopted on the international scene.

5.2 *Objectives of Non-use Measures*

While arguably always based on anthropocentric values, some non-use measures pursue more preservation-oriented and others more use-oriented objectives (see Table 2.4). As is further discussed below, the three first aims listed in the table fall within the preservation-oriented category, while the last two are more use-oriented. It is difficult to classify 'gather further information' and 'further develop control/enforcement scheme' as these two aims can be means towards renewed use or strengthened conservation.

¹¹⁴ R. G. Pearson, "Reasons to Conserve Nature" (2016) 31 *Trends in Ecology & Evolution* 366–371, 367. See also G. M. Mace, "Whose Conservation?" (2014) 345 *Science* 1558–1560.

¹¹⁵ Pearson (n 114) 367.

TABLE 2.4 Objectives of non-use measures

Objective of non-use measures	Example(s)
Conserve/preserve a given resource	IWC moratorium conserves/preserves species of whales MPA s provide refugia to species under pressure from various stressors
Contribute to other conservation/ preservation goal	Ban on oil mining would aim at mitigating climate change Deep-seabed mining moratorium would aim at protecting marine living ecosystems
Conserve/preserve environment in the face of uncertainty	Ban on solar/marine geoengineering would avoid/ avoids unforeseen consequences of technology on the environment
Gather further information	Abstention from fishing under CAOFA until more information on stocks is gathered Proposed moratorium or precautionary pause on deep-seabed mining until more information on the ecosystem and impacts of mining is gathered
Further develop control/ enforcement rules/general framework	Abstention from fishing under CAOFA until a range of institutional and management conditions are in place Proposed moratorium or precautionary pause on deep-seabed mining until control scheme is in place IWC moratorium until proper inspection scheme (as originally argued) is in place
Enable another (exclusive) use of said space	Areas closed to tourism in Antarctica to enable scientific research Safety zones on the Moon where other actors cannot undertake activities in order for mining to proceed safely
Enable use of said resource at a later date or elsewhere	Area or season closed to fishing because stocks need recovery or because of specific life-cycle characteristics

Some non-use measures have clear consumptive objectives. For example, establishing a closed area/season in the management of a fishery is usually aimed at ensuring that fish can spawn and/or juveniles can grow before fishing can resume, at the adequate time in the life-cycle of the stock and in the appropriate location. Similarly, the proposed safety zones on the Moon are intended, by restricting activities by third parties in a given area, to allow mining to

proceed in a safe manner. While aiming at reducing risks and impacts of use or at making use of renewable resources sustainable in the long-term, this type of non-use measures ultimately is intended to enable use.

In addition to these obviously consumptive aims, some non-use measures are providing a pause, either to establish a substantive or institutional framework for the adequate management of a resource, or to apply precaution in light of scientific uncertainty while more information is gathered. A clear example is the abstention of fishing under CAOFA, which was agreed upon as a temporary, precautionary pause until adequate scientific information has been gathered and until a regional fisheries management framework has been set up. Although pursuing environmental aims, these non-use measures still view nature under a utilitarian angle: resources are useful for humans, but these resources or related elements of the ecosystem would be at (inacceptable) risk if the activity was allowed to commence or continue under the current circumstances.

Finally, some non-use measures are more clearly conservation-focused, with no stated intention to start/resume use even if circumstances change. In that sense, they appear more akin to conserving a resource for itself. However, even these measures do not seem to extend to protecting a resource for its intrinsic value. Examples of such measures include the moratorium on commercial whaling, intended to ensure the continued existence of species of whales, and the establishment of an MPA within CCAMLR to provide a refugia for species in light of climate change. In both cases, the justifications for these non-use measures relate to ecosystem health, on which humans rely, or preservation of iconic megafauna, which are viewed by humans as valuable.

In some cases, preventative bans are called for or adopted because of uncertainty and because the risk of damage would be too serious if an activity proceeded. Marine and solar geoengineering are such cases. The London Convention/Protocol regime applies to the former,¹¹⁶ while many scientists call for a non-use agreement with regards to the latter.¹¹⁷ Interestingly, both of these activities intend to mitigate climate change, proving that non-use measures and environmental protection have a complicated set of interactions. On the one hand, marine and solar geoengineering could cause enormous damage to

¹¹⁶ On this see (n 38).

¹¹⁷ Solar Geoengineering Non-Use Agreement, "We call for an International Non-Use Agreement on Solar Geoengineering", available at <<https://www.solargeoeng.org/>> accessed 8 October 2024.

the environment, but on the other hand, these activities' objective is to mitigate climate change.

5.3 *Resource Targeted by Non-use Measures and Resource Protected*

Some non-use measures aim at the conservation of the resource targeted by the non-use measure, whereas others restrict the use of one resource in order to contribute to other conservation goals or protect other values.

Examples of the first category abound, in particular for renewable natural resources. Non-use measures related to fishing, for example, can be adopted to ensure the long-term sustainable use of these renewable resources. They might be envisioned as a planned pause to enable the resources to recover from exploitation or to ensure that they are not targeted at key life-cycle stages. These non-use measures can also be temporary abstentions from an activity until certain gaps in a regime can be filled, such as with CAOFA.

In the second category are non-use measures that apply a prohibition of use towards one resource, while also or mainly aiming at protecting another resource or value. These non-use measures appear to be more frequently related to non-renewable natural resources as well as to spatial-extension resources. For example, the ban on mining in Antarctica aims at protecting the environment, not (solely) the mineral resources themselves, which are finite by nature. Safety zones on the Moon are intended to enable safe use, hence to protect the value of safety. The regime against ozone depletion, ultimately, is aimed at safeguarding human life and health from increased UV radiation.

6 Conclusion

Use is any activity that targets or otherwise impacts a resource. Non-use is to be understood as the absence of use of natural resources or spatial-extension resources. Non-use measures, in turn, are measures that ban or suspend the use of a resource. While they can co-exist with restricted-use measures, an actual prohibition of activity is required to be considered a non-use measure. As examined in this chapter, non-use measures are varied in legal nature, scope of participation, geographic applicability, duration, rationales, and objectives. The specificities of each non-use measure depend not only on the objectives pursued and the best way to attain them, but also on the geopolitical realities of what can be achieved and the existing legal frameworks into which non-use measures might be adopted.

The conceptual framework developed in this chapter will enable a systematic analysis of the non-use measures presented in this book, with a view to identifying the characteristics that might lead to successful outcomes in terms of adoption of non-use measures and achievement of their objectives.

Acknowledgments

The author would like to thank Catherine Blanchard, Erik Molenaar, Shani Friedman, Shira Giveon, and Jeroen Oomen for comments on earlier versions of this chapter. My gratitude also to all workshop contributors for inspiring discussions.

PART 2

The High Seas



Interdisciplinary Considerations for Closing the High Seas to Fishing

Guillermo Ortuño Crespo

1 Introduction

After the Earth's atmosphere and outer space, the ocean beyond the jurisdiction of coastal and island States, the high seas, represents humanity's largest commons, extending across 46% of the planet's surface. According to various United Nations (UN) agencies, biodiversity in the high seas, and the ocean more generally, is in crisis.¹ Marine biodiversity loss is widely recognised as a threat to planetary health and has long been on the agenda of the international community. Of the 169 Targets agreed upon during the 2015 *UN Summit for the Adoption of the 2030 Agenda*, Target 4 under Sustainable Development Goal (SDG) 14 was established to explicitly end overfishing and restore fish stocks² to sustainable levels.³ In 2015, when the agenda was adopted, 33.1% of global fish stocks were classified as overfished, tripling the rate reported by the United Nations Food and Agriculture Organization (FAO) in 1974.⁴ However, instead of improving, the situation has since deteriorated. The 2024 State of the World Fisheries and Aquaculture report by the FAO, which published the 2021 fishing rates, reported a global overfishing rate of 37.7%, an increase of 4.6% since 2015, undermining SDG 14.4, which had a time-bound target date

1 H. O. Pörtner et al (eds), *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (CUP 2019); FAO, "The State of World Fisheries and Aquaculture 2024 – Blue Transformation in action" (2024), available at <<https://openknowledge.fao.org/server/api/core/bitstreams/131ab804-f871-4562-bd0d-2457ebad0e47/content/cdo683en.html>> accessed 15 August 2024; UNEP-WCMC, "State of the World's Migratory Species" (2024), available at <https://www.cms.int/sites/default/files/publication/State%20of%20the%20Worlds%20Migratory%20Species%20report_E.pdf> accessed 15 August 2024.

2 A stock is a term primarily used in fisheries and wildlife management, referring to a population or a subpopulation of a species that is managed as a unit.

3 UNGA Res 70/1 (2015) GAOR 70th Session Supp 49, 24.

4 FAO, "The State of World Fisheries and Aquaculture 2018 – Meeting the sustainable development goals" (2018), available at <<https://openknowledge.fao.org/server/api/core/bitstreams/6fb91ab9-6cb2-4d43-8a34-a680f65e82bd/content>> accessed 15 August 2024.

set to 2020.⁵ In their 2018 report, the FAO already stated that “it seems unlikely that the world’s fisheries can rebuild the 33.1 percent of stocks that are currently overfished in the very near future”; however, the FAO did not foresee that overfishing would worsen. In addition to this crisis for targeted fish species, the rest of marine biodiversity does not seem to fare any better. For example, according to the latest International Union for Conservation of Nature (IUCN) Red List, six of the seven species of sea turtle in the world are threatened with extinction, while the seventh is data deficient,⁶ and a 71% decline in the abundance of oceanic sharks has been noted in just five decades due to commercial fishing.⁷ One is warranted to ask if the situation might even be worse for the many other species which are not monitored.

A legal framework exists, that is supposed to enable the long-term sustainable use of global marine fisheries and conservation of the marine environment and its biodiversity, both within and beyond national jurisdiction. The United Nations Convention on the Law of the Sea (UNCLOS)⁸ lays out a set of obligations, rights and freedoms to guide the conservation and sustainable management of the ocean and its resources. Under Part VII, UNCLOS provides for freedom of fishing in the high seas,⁹ but calls for the cooperation of States in the conservation and management of living resources through the establishment of subregional or regional fisheries organisations.¹⁰ The mandate of these organisations – to ensure the sustainable use of straddling and migratory fish stocks, as well as associated species and species belonging to the same ecosystem – was further enshrined in the second implementing agreement of UNCLOS, the 1995 UN Fish Stocks Agreement (UNFSA).¹¹ These organisations have come to be known as regional fisheries management organisations (RFMOs). In 2023, a third implementing agreement that may impact certain fishing activities was adopted to further the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction (ABNJ), what came

5 FAO (n 1).

6 UNEP-WCMC (n 1).

7 N. Pacoureau et al, “Half a century of global decline in oceanic sharks and rays” (2021) 589 *Nature* 567–571.

8 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 396.

9 UNCLOS, art 87(1)(e).

10 UNCLOS, art 118.

11 United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (adopted 4 August 1995, entered into force 11 December 2001) 2167 UNTS 3.

to be known as the biodiversity beyond national jurisdiction Agreement (BBNJ Agreement).¹² While the new BBNJ Agreement has the authority to establish non-use measures in the high seas that could potentially restrict fishing, how it might do so while respecting the competences of existing regional or global management bodies, including RFMOs, is yet to be deciphered.

High seas fisheries are generally managed by restricted-use measures adopted by these RFMOs, such as fisheries catch quotas, fishing gear restrictions and gear modifications and some non-use measures, such as spatial or temporal closures (discussed by Urrutia in chapter 5), including marine protected areas (discussed by Klerk in chapter 4 and by Guggisberg in chapter 13). About a century after the establishment of the first RFMO, commercial fishing remains the largest driver of marine biodiversity loss on the high seas,¹³ the state of marine straddling and migratory biodiversity is more perilous than ever before,¹⁴ illegal, unreported and unregulated (IUU) fishing on the high seas remains a problem¹⁵ and fisheries access and benefits continue to be inequitable.¹⁶ In light of the ongoing ecological crisis in the ocean, it is clear that the current framework is inadequate or at least insufficient to maintain the abundance of target and impacted non-target biodiversity which inhabit or transit the high seas. It is therefore necessary to explore other options beyond the frameworks and instruments that have been agreed upon until now. These measures may include the adoption of what some may consider a radical measure: the closure of the high seas to commercial fishing. One could indeed argue that only an ambitious non-use measure could bend the global overfishing and biodiversity loss curves, which threaten the functionality of the global ocean.

This case study around fisheries in shared international waters addresses an environmental challenge affecting the global commons in which a small subset of States, which are exercising their international freedoms, are responsible for the vast majority of in-situ and transboundary environmental impacts that affect a much broader set of stakeholders. In this context, fisheries are understood as an activity aimed at the extraction of biotic resources for the purposes

12 Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, Document A/CONF.232/2023/4 (30 June 2023).

13 G. O. Crespo and D. C. Dunn, "A review of the impacts of fisheries on open-ocean ecosystems" (2017) 74(9) *ICES Journal of Marine Science* 2283–2297.

14 UNEP-WCMC (n 1).

15 J. Park et al, "Tracking elusive and shifting identities of the global fishing fleet" (2023) 9(3) *Science advances*.

16 U. R. Sumaila et al, "Winners and losers in a world where the high seas is closed to fishing" (2015) 5(1) *Scientific reports* 8481.

of direct or indirect (ie feed production) human consumption or sport, and which may result in the bycatch or impacting of other portions of the marine environment that were not targeted. Targeted non-fish species such as cephalopods, mollusks or marine mammals are encapsulated under this definition. Non-commercial modalities of fishing such as fishing for research purposes are not included. The case study explores the reasons justifying the closure of the high seas to fishing activities. It expands on the potential rationale for closing the high seas by presenting the relevant ecological and environmental (section 2), knowledge, management, and control (section 3), and socio-economic and equity (section 4) arguments underpinning such a non-use measure. It does so by synthesising – and building upon – the published literature which alludes to the closure of the high seas to fishing as a necessary non-use measure in order to ensure the environmental and socioeconomic sustainability of ocean activities and its resources both beyond and within national jurisdiction.

2 Ecological and Environmental Considerations

As is explained here below, the status of marine biodiversity of many targeted high seas fish stocks is poor, and so is that of other taxonomic groups in ABNJ (2.1), which causes impacts not only on species, but also on ecosystems (2.2). Moreover, high seas fisheries contribute towards anthropogenic climate change (2.3).

2.1 *Status of High Seas Biodiversity*

Almost 20 years ago, a FAO report summarised the state of highly migratory, straddling, and other high seas fishery resources and associated species.¹⁷ The report covered various ecological levels, from stock and population levels to taxonomic families, and concluded that about one-third of highly migratory tuna and tuna-like species, over half of highly migratory sharks and rays, and nearly two-thirds of straddling and high seas stocks were overexploited or depleted.¹⁸ Although updating the FAO report is beyond the scope of this chapter, the latest IUCN Red List statuses provide a concerning picture of species

17 J. J. Maguire et al, “The state of world highly migratory, straddling and other high seas fishery resources and associated species” (2006) *FAO Fisheries Technical Paper. No. 495*, available at <<https://www.fao.org/4/a0653e/a0653e00.htm>> accessed 15 August 2024.

18 *ibid.*

health.¹⁹ Of the 224 species assessed, including additional oceanic sharks,²⁰ albatross and petrel species,²¹ as well as sea turtles,²² 34% were classified as vulnerable, endangered, or critically endangered, 26% were data deficient or lacked an IUCN assessment, and 40% were not classified as threatened. In terms of population trends, that is how populations evolve over time, 37% were decreasing, 45% had unknown trends or lacked an IUCN Red List assessment, and only 17% were stable or increasing. Although direct comparison to the 2006 FAO report is challenging, these recent findings derived from the latest IUCN Red List assessments highlight ongoing concerns about the health of migratory, straddling, and high seas species.

Global overfishing has been increasing for decades, with 37.7% of all monitored fish stocks currently overfished.²³ Marine migratory and straddling species experience overfishing rates nearly double those of species managed within national jurisdictions.²⁴ A 2010 assessment of the 48 fish stocks managed by the world's 18 RFMOs concluded that 67% were either overfished or depleted.²⁵

The 2014 report of the United Nations Environment Programme and the Convention on Migratory Species highlighted the vulnerability of highly mobile sharks and rays, noting that over one-third of the 153 migratory or potentially migratory sharks or rays were threatened with extinction, while an additional 27% of these species were classified as data deficient.²⁶ Nearly a decade later, studies confirmed the continued decline of oceanic shark species worldwide.²⁷

19 *ibid.*

20 Pacoureaux et al (n 7).

21 Agreement on the Conservation of Albatrosses and Petrels (adopted 19 June 2001, entered into force 1 February 2004) 2258 UNTS 257.

22 IUCN, "Red List Assessments", available at <<https://www.iucn-mtsg.org/statuses>> accessed 15 August 2024.

23 FAO, "The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation" (2022), available at <<https://openknowledge.fao.org/items/1a4abd8-4e09-4bef-9c12-900fb4605a02>> accessed 15 August 2024.

24 FAO, "The State of World Fisheries and Aquaculture" (2014), available at <<https://www.fao.org/in-action/globefish/publications/details-publication/en/c/338355/>> accessed 15 August 2024.

25 S. Cullis-Suzuki and D. Pauly, "Failing the High Seas: a global evaluation of regional fisheries management organizations" (2010) 34(5) *Marine Policy* 1036–1042.

26 S. Fowler, "The Conservation Status of Migratory Sharks" (2014) *UNEP/CMS Secretariat*, available at <<https://www.cms.int/en/publication/conservation-status-migratory-sharks>> accessed 15 August 2024.

27 Pacoureaux et al (n 7).

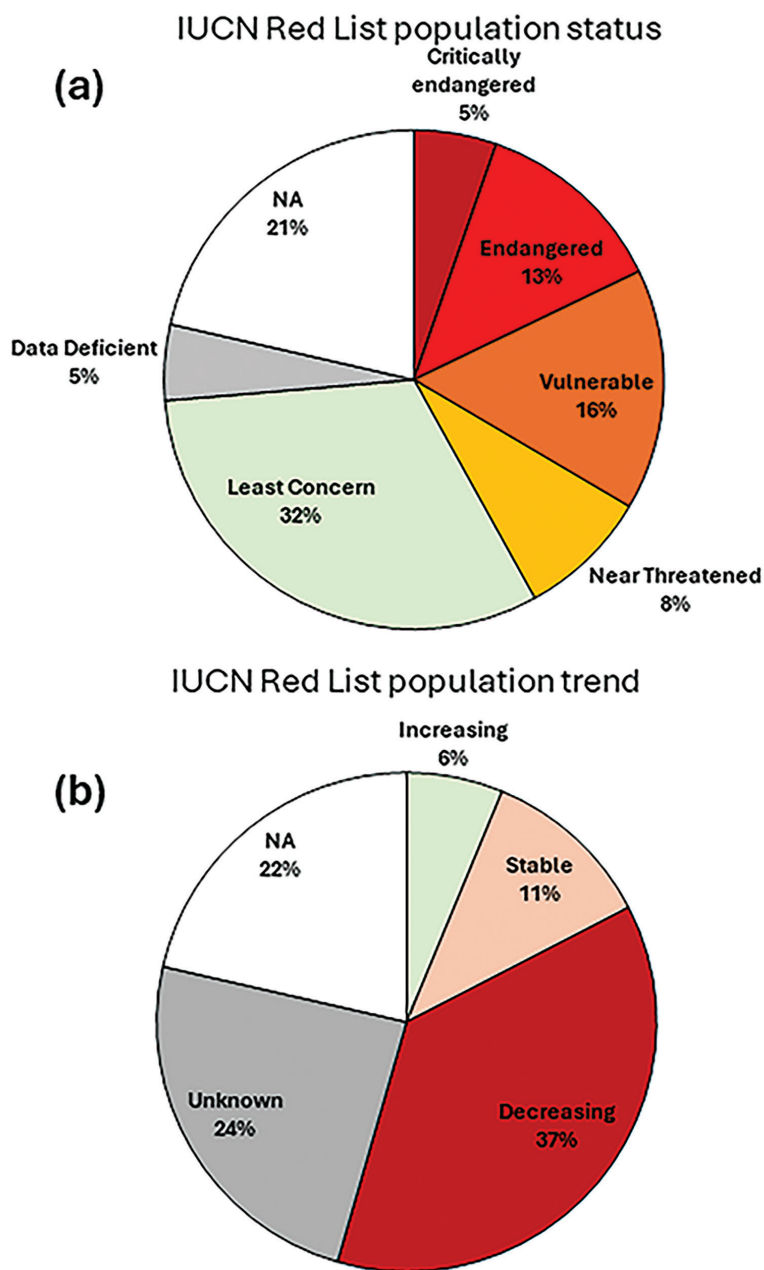


FIGURE 3.1 Ecological status (a) and population trend (b) of 224 marine migratory, straddling or high seas species
PREPARED BY THE AUTHOR

2.2 Impacts on Ecosystems

Excessive fishing has led to reductions in the abundance and range of various pelagic species,²⁸ a decrease in the average body size of individuals,²⁹ truncation in the age structure of populations,³⁰ and reduced genetic diversity, making them less adaptable to environmental change.³¹ These impacts have been observed across many high seas species, many of which are not actively managed by RFMOs.

Research over the past twenty years has shown that predators play a significant role in shaping marine ecosystems.³² Knock-on effects triggered by the declines of these predators, known as trophic cascades, have been observed in coastal areas like coral reefs,³³ rocky shores,³⁴ and kelp forests.³⁵ However, detecting these changes in the open ocean is challenging due to limited data and the existence of few open ocean ecosystem models.³⁶ Despite these challenges, ecosystem models have revealed community-level impacts caused by declines in higher trophic level species, also in the open ocean.³⁷ For example, a 2004 study showed that increased tuna catches in the Eastern Tropical Pacific and Central North Pacific led to reduced top predators and increased

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- 28 B. Worm and D. P. Tittensor, "Range contraction in large pelagic predators" (2011) 108 *Proceedings of the National Academy of Science of the United States of America* 11942–11947.
 - 29 G. Woodward et al, "Body size in ecological networks" (2005) 20 *Trends in Ecology & Evolution* 402–409.
 - 30 C. H. Hsieh et al, "Fishing elevates variability in the abundance of exploited species" (2006) 443 *Nature* 859–862.
 - 31 Crespo and Dunn (n 13).
 - 32 B. Worm and R. A. Myers, "Meta-analysis of cod-shrimp interactions reveals top-down control in oceanic food webs" (2003) 84 *Ecology* 162–173; D. Ainley et al, "Paradigm lost, or is top-down forcing no longer significant in the Antarctic marine ecosystem?" (2007) 19 *Antarctic Science* 283–290; S. Nicol et al, "Paradigm misplaced? Antarctic marine ecosystems are affected by climate change as well as biological processes and harvesting" (2007) 19 *Antarctic Science* 291–295; J. J. Polovina and P. A. Woodworth-Jefcoats, "Fishery-induced changes in the subtropical Pacific pelagic ecosystem size structure: observations and theory" (2013) 8 *PLOS ONE*.
 - 33 D. R. Bellwood, T. P. Hughes, C. Folke and M. Nyström, "Confronting the coral reef crisis" (2004) 429 *Nature* 827–833.
 - 34 B. A. Menge, "Top-down and bottom-up community regulation in marine rocky intertidal habitats" (2000) 250 *Journal of Experimental Marine Biology and Ecology* 257–289.
 - 35 J. A. Estes and J. F. Palmisano, "Sea otters: their role in structuring nearshore communities" (1974) 185 *Science* 1058–1060.
 - 36 M. Colléter et al, "Global overview of the applications of the Ecopath with Ecosim modeling approach using the EcoBase models repository" (2015) 302 *Ecological Modelling* 42–53; T. J. Webb, E. Vanden Berghe and R. O'Dor, "Biodiversity's big wet secret: the global distribution of marine biological records reveals chronic under-exploration of the deep pelagic ocean" (2010) 5(8) *PLOS ONE*.
 - 37 J. F. Kitchell et al, "Billfishes in an ecosystem context" (2006) 79 *Bulletin of Marine Science* 669–682; Polovina and Woodworth-Jefcoats (n 32).

biomass of lower trophic levels.³⁸ Evidence of the number of smaller predators (eg small tuna) increasing due to declines in apex predators (eg oceanic sharks) is also growing,³⁹ although some studies report limited or no evidence of trophic cascades.⁴⁰ The decline in marine top predators is therefore a potential driver in ecosystem-wide changes.

2.3 *Climate Change Considerations*

As the global population grows and its appetite for seafood increases,⁴¹ we must adjust our food production systems to increase their productivity, while not increasing their environmental footprint.⁴² The contribution of high seas fisheries towards anthropogenic climate change can be explored through two primary lenses: the greenhouse gas footprint of the vessel during transit and fishing operations, and the profile of species harvested in ABNJ.

First, the vast majority of species targeted by the high seas fishing fleet can also be found in areas within national jurisdiction, making their catch in the high seas inefficient from a fuel consumption standpoint.⁴³ Satellite tracking of distant water fishing nations (DWFN) operating across RFMOs shows that some vessels traverse thousands of miles between ocean basins just to reach their target fishing ground.⁴⁴ One could ask whether it would not be more efficient for domestic fleets to target those species within exclusive economic zones (EEZs) using the same fishing gear, thereby avoiding the fuel consumption associated with traveling thousands of nautical miles. Such a change could have a non-negligible impact in terms of climate change, since it is estimated that fuel consumption in marine capture fisheries results in the emission of about 130 million tonnes of CO₂ equivalent per year, which represents about 4% of the total emissions from the global food production sector.⁴⁵

38 J. T. Hinke et al, "Visualizing the food-web effects of fishing for tunas in the Pacific Ocean" (2004) 9 *Ecology and Society* 10.

39 P. Ward and R. A. Myers, "Shifts in open-ocean fish communities coinciding with the commencement of commercial fishing" (2005) 86 *Ecology* 835–847.

40 M. L. Pace, J. G. Cole, S. R. Carpenter and J. F. Kitchell, "Trophic cascades revealed in diverse ecosystems" (1999) 14 *Trends in Ecology & Evolution* 483–488.

41 FAO (n 1).

42 M. Crippa et al, "Food systems are responsible for a third of global anthropogenic GHG emissions" (2021) 2(3) *Nature food* 198–209.

43 L. Schiller, M. Bailey, J. Jacquet and E. Sala, "High seas fisheries play a negligible role in addressing global food security" (2018) 4(8) *Science Advances*.

44 D. C. Dunn et al, "Empowering high seas governance with satellite vessel tracking data" (2018) 19(4) *Fish and Fisheries* 729–739.

45 R. W. Parker et al, "Fuel use and greenhouse gas emissions of world fisheries" (2018) 8(4) *Nature Climate Change* 333–337.

Second the climate services provided by the ocean include both the physical carbon pump, as well as the biological carbon pump, which is in part driven by the vertical movements of biodiversity, including those of commercial interest.⁴⁶ When they die, fish sink and hence contribute to carbon sequestration in the ocean.⁴⁷ This process is prevented by fishing, since fish are removed from the seas and hence the carbon that is not sequestered in the ocean is ultimately released into the atmosphere. The amounts of carbon at play are not marginal: from 1950–2014, fisheries extracted an amount of blue carbon⁴⁸ globally equivalent to 318.4 million metric tons of large fish.⁴⁹ This extraction resulted in the release of 37.5 ($\pm$ 7.4) million metric tons of carbon into the atmosphere, consequently preventing the sequestration of 21.6 ($\pm$ 4.4) million metric tons of carbon that would have occurred through the sinking of fish carcasses into the deep ocean.⁵⁰ High seas fishing's contribution to this problem is important due to the type of fish caught in ABNJ. Indeed, large pelagic fish (>90 cm total length), when they die, sink a larger amount of carbon into the ocean depths per individual than smaller fish, and up to 68.6% of the catch volume by the high seas fishing fleet between 2010–2019 consisted of such larger type of fish.⁵¹

In conclusion, the status of many highly migratory, straddling, and other high seas fishery resources and associated species is dire and generally worse than those in EEZs. Population trends show that only few species' status is improving, confirming that the fisheries management system currently in place is insufficient. The effects of excessive fishing are serious, ranging from impacts on the targeted species' health to the trophic chains and even ecosystems. These ecological considerations give credence to the argument that closing the high seas might be necessary to ensure the sustainable management of marine biodiversity, particularly straddling and migratory biodiversity. Furthermore, fishing on the high seas is not only less efficient in terms of fuel consumption – and hence carbon emissions – than fishing in EEZs, but it also mostly leads to the harvesting of larger individuals, which are hence

46 S. Honjo et al, "Understanding the role of the biological pump in the global carbon cycle: an imperative for ocean science" (2014) 27(3) *Oceanography* 10–16.

47 G. Mariani et al, "Let more big fish sink: Fisheries prevent blue carbon sequestration – half in unprofitable areas" (2020) 6(44) *Science advances*.

48 Carbon captured and stored by coastal and marine species and ecosystems, such as fish populations, mangroves, seagrasses, and salt marshes.

49 Mariani et al (n 47).

50 *ibid*.

51 D. Pauly, D. Zeller and M. L. D. Palomares (eds), "Concepts, Design and Data" (2020) *Sea Around Us*, available at <www.seaaroundus.org> accessed 15 August 2024.

removed from vertical carbon sequestration. Closing the high seas to fishing would consequently have a doubly positive impact on the environment in terms of anthropogenic climate change, by both reducing emissions and increasing sequestration of carbon.

3 Knowledge, Management and Control Considerations

Closing the high seas to fishing can also be advocated for because of insufficient and/or inadequate management, as well as on the basis of the precautionary principle. Indeed, gaps in the data available about many components of marine biodiversity mean that many exploitative activities are taking place in the absence of sufficient information to assess their impacts and take the appropriate management actions (3.1). Moreover, due to some practical management challenges and gaps, little is, or can be, done to ensure the long-term conservation of many species (3.2). Finally, some specificities of the high seas – vast areas far away from any coastal State – means that monitoring challenges abound (3.3).

3.1 *Data and Knowledge Gaps*

Vast data and knowledge gaps remain on the composition of high seas biodiversity, the extinction risk status of these species, as well as their functional relationships within the ecosystem.⁵² The implementation of ecosystem-based management⁵³ or ecosystem-based fisheries management⁵⁴ hinges on having a sufficient understanding of the species composition of a given system, what their ecological status is, and how these species relate to one another and their environment. Yet, our understanding of the composition of ocean biodiversity declines notoriously the further and deeper we venture from the coastline.⁵⁵

52 Webb, Vanden Berghe and O'Dor (n 36); G. O. Crespo et al, "Policy brief on High Seas biodiversity knowledge" (2022) *IUCN*, available at <https://iucn.org/sites/default/files/2022-11/policy_brief_on_high_seas_biodiversity_knowledge_o.pdf> accessed 15 August 2024.

53 Ecosystem-based management is an integrated approach that considers the entire marine ecosystem, including human activities, to maintain healthy, productive, and resilient ocean environments. It aims to balance ecological, social, and economic objectives by managing human activities in a way that protects ecosystem health and biodiversity, supports sustainable use of marine resources, and ensures the well-being of communities that depend on the ocean.

54 Ecosystem-based fisheries management is a holistic approach that takes into account the complex interrelationships within an ecosystem, including the impacts of fishing on non-target species, habitats, and the broader marine environment.

55 Webb, Vanden Berghe and O'Dor (n 36).

In fact, the biodiversity of vast areas of the high seas remain poorly studied (Figure 3.2(a) and (b)). The Ocean Biodiversity Information System (OBIS) is the most comprehensive repository of spatial information on biodiversity in ABNJ. A 2018 summary of our knowledge regarding the composition and distribution of biodiversity information in ABNJ highlighted that most of the over 20,000 species documented in international waters have fewer than 10 historical

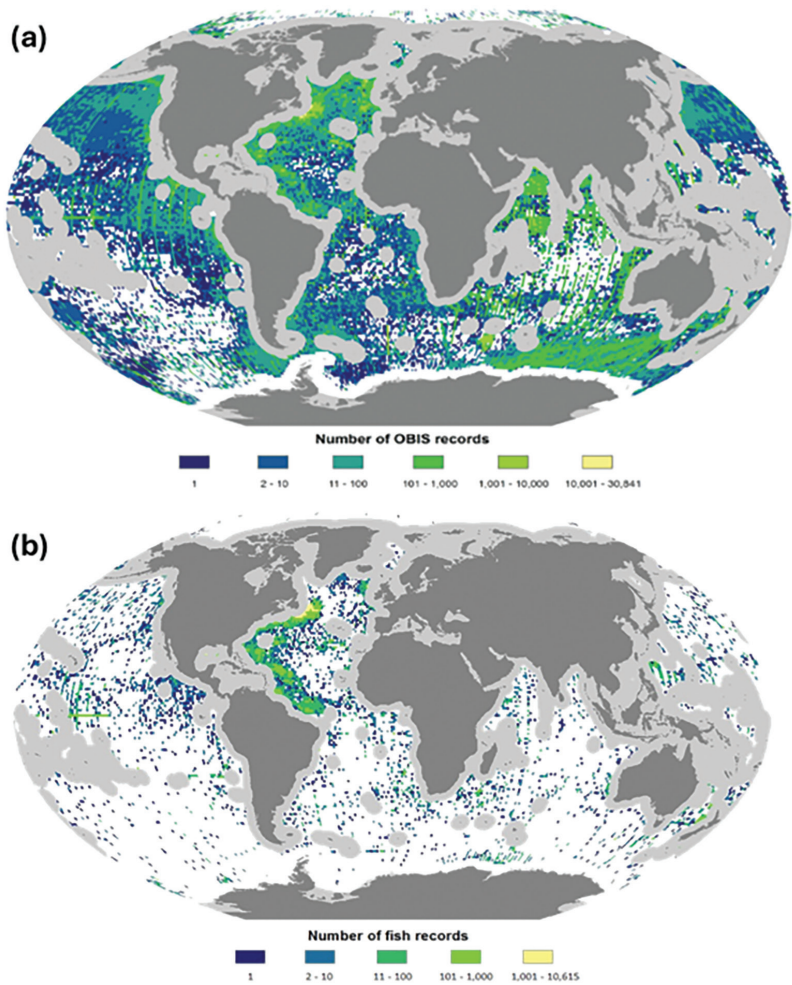


FIGURE 3.2 Distribution of biodiversity records in ABNJ (a) and global information of fish biodiversity in ABNJ (b)
FIGURE PREPARED BY THE AUTHOR ON THE BASIS OF RECORDS AND DATA FOUND IN THE OCEAN BIODIVERSITY INFORMATION SYSTEM (OBIS), AVAILABLE AT <[HTTPS://OBIS.ORG](https://obis.org)> ACCESSED 25 AUGUST 2024

records, and about half have only a single documented record in the OBIS.⁵⁶ Vast areas of ABNJ have little to no biodiversity information (eg the central Indian Ocean, southeast Pacific Ocean or central south Atlantic Ocean; Figure 3.2(a)). The gaps in biodiversity information are perhaps best reflected when mapping what is known about specific taxonomic groups. Figure 3.2(b) shows the known distribution of fish biodiversity in ABNJ. The fish taxonomic group (ie *pices*) has the most documented species in ABNJ under OBIS (>4,000). Yet, even for this group and except for the concentration of information in the North and Western Atlantic Ocean, the majority of ABNJ are data deficient (Figure 3.2(b)).⁵⁷

In addition to the need of understanding the composition and distribution of biodiversity in ABNJ in order to inform management, it is important to also have knowledge about the ecological status of said species. There are significant knowledge gaps regarding the ecological status of most recorded species in ABNJ. Of the approximately 18,000 marine species assessed by the IUCN Red List (a small proportion of the estimated number of species in the ocean), the majority are found within national jurisdictions, leaving substantial gaps in our understanding of the status of high seas species.⁵⁸ As illustrated in Figure 3.1, the population trends for half of the marine migratory and straddling species listed by the FAO that also use the high seas remain unknown.

There is growing evidence that the impacts of industrial fishing in the open ocean extend across multiple ecological scales, from the population to the biological community levels.⁵⁹ However, the improvement of our understanding of high seas ecosystems and our impacts on them are limited by our notable knowledge gaps in the diversity⁶⁰ and abundance of thousands of species in the ocean beyond national jurisdiction.⁶¹ This information is important, among other reasons, to create models that can inform managers about the state of the marine environment. Ecosystem models (also known as mass-balance models) attempt to recreate the composition and predator-prey

56 G. O. Crespo, D. C. Dunn, W. Appeltans and P. N. Halpin, "What do we know about taxonomic diversity beyond national jurisdiction?" (2018) *Nereus Programme*, available at <https://nereusprogram.org/wp-content/uploads/2018/09/BBNJ-Policy-Brief-TaxonomicDiversity_v5_FINAL.pdf> accessed 15 August 2024.

57 *ibid.*

58 It is noteworthy that the total number of IUCN Red List assessments is inferior to the total number of species documented in ABNJ alone, which according to the most recent estimates is of 28,365 species, see OBIS, "ABNJ", available at <<https://obis.org/area/1>> accessed 25 August 2024.

59 Crespo and Dunn (n 13).

60 Webb, Vanden Berghe and O'Dor (n 36).

61 G. O. Crespo et al, "High-seas fish biodiversity is slipping through the governance net" (2019) 3(8) *Nature Ecology & Evolution* 1273–1276.

relationships of species within an ecosystem and are necessary to implement an ecosystem-based approach to marine capture fisheries management.⁶² For decades, scientists have understood that the depletion of species in an ecosystem can have knock-on effects in other parts of the food web and hence risks destabilising the composition and function of the ecosystem.⁶³ While mass-balance models represent some of the most practical research tools for understanding these knock-on effects, only a limited number of such models exist for open ocean ecosystems.⁶⁴ As it stands, we have built enough open ocean ecosystem models to understand that commercial fishing can alter the functioning and structure of an ecosystem, but have not managed to mainstream their use across the high seas to inform management efforts across regions.⁶⁵

3.2 *Management Challenges and Gaps*

In addition to the important data and knowledge gaps presented here above, there are issues related to the actual management of species. First, in international fisheries management, while the populations of highest commercial interest are generally monitored and managed, most of the other species are ignored.⁶⁶ A telling example is that of non-target species under the International Commission for the Conservation of Atlantic Tunas (ICCAT). On top of the target species of tuna, ICCAT fisheries is known to interact with 289 species. This includes up to 109 shark and ray species⁶⁷ known to be caught within the convention area, as well as another 180 additional non-shark and ray species,⁶⁸ including a broad range of pelagic fish species, seabirds, marine mammals and sea turtles. Of the 109 shark and ray species, less than 20 were

62 J. S. Collie et al, "Ecosystem models for fisheries management: finding the sweet spot" (2016) 17(1) *Fish and Fisheries* 101–125.

63 J. K. Pinnegar et al, "Trophic cascades in benthic marine ecosystems: lessons for fisheries and protected-area management" (2000) 27(2) *Environmental conservation* 179–200.

64 A. Valls, M. Coll and V. Christensen, "Keystone species: toward an operational concept for marine biodiversity conservation" (2015) 85 *Ecological Monographs* 29–47; A. Audzijonyte et al, "Atlantis: A spatially explicit end-to-end marine ecosystem model with dynamically integrated physics, ecology and socio-economic modules" (2019) 10(1) *Methods in Ecology and Evolution* 1814–1819.

65 M. Colléter et al, "EcoBase: a repository solution to gather and communicate information from EwE models" (2013) Fisheries Center Research Report, University of British Columbia, Canada.

66 Crespo et al (n 61).

67 P. de Bruyn and C. Palma, "Updated Species List for Sharks Caught in ICCAT Fisheries (SCRS/2014/027)" (2015) 71(6) *ICCAT Collective Volume of Scientific Papers* 2557–2561.

68 P. de Bruyn and C. Palma, "Updated Species List for By-Catch Caught in ICCAT Fisheries (SCRS/2014/099)" (2015) 71(6) *ICCAT Collective Volume of Scientific Papers* 2887–2899.

included in ICCAT's ecological risk assessment.⁶⁹ Similarly, the 2018 report on the intersessional meeting of the shark species group listed up to 75 species of shark and ray within ICCAT's convention area, of which approximately 30 are broadly considered as "ICCAT sharks" that are within their taxonomic mandate.⁷⁰ Only three of those are "major ICCAT sharks" with multiannual stock assessments: shortfin mako (*Isurus oxyrinchus*), porbeagle shark (*Lamna nasus*), and blue shark (*Prionace glauca*).⁷¹ When one turns to non-shark and ray species, the situation is not better: overall, the populations of only a small portion of pelagic fish are being monitored and even fewer have total allowable catch limits, while no population-level assessments of the status of impacted seabirds, sea turtles or marine mammals are carried out by RFMOs.⁷² Similarly, while there are data reporting obligations for 18 shark and ray species caught by the Indian Ocean Tuna Commission (IOTC) species,⁷³ only one (ie the blue shark – *Prionace glauca*) has a stock assessment. Hence, while the UNFSA calls for assessing the impacts of fishing on "species belonging to the same ecosystem or associated with or dependent upon the target stocks",⁷⁴ RFMOs have generally failed to monitor the population status and trajectories of the vast majority of species their fisheries interact with.

Second, due to the division of the ocean into areas under and beyond national jurisdiction that does not reflect ecosystems' boundaries, the consequences of anthropogenic actions on biodiversity in the high seas affects ecosystems in coastal nations' own waters and vice-versa. This ecological connectivity⁷⁵ complicates – and in some cases renders impossible – the sustainable management

69 E. Cortés et al, "Ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries" (2010) 23(1) *Aquatic Living Resources* 25–34.

70 ICCAT, Report of the 2018 ICCAT intersessional meeting of the Sharks Species Group (Madrid, Spain, 2–6 July 2018), available at <https://www.iccat.int/Documents/Meetings/Docs/2018/REPORTS/SHK_2018_ENG.pdf> accessed 31 August 2024.

71 *ibid.*

72 H. Murua et al, "Updated Ecological Risk Assessment (ERA) for shark species caught in fisheries managed by the Indian Ocean Tuna Commission (IOTC)" (2018) Indian Ocean Tuna Commission IOTC-2018-SC21-14.

73 IOTC Secretariat, "Guidelines for the reporting of fisheries statistics to the IOTC", available at <<https://data.iotc.org/reference/latest/guidelines/>> accessed 25 August 2024.

74 UNFSA, art 5(d).

75 D. C. Dunn et al, "Adjacency: how legal precedent, ecological connectivity, and traditional knowledge inform our understanding of proximity" (2017) *Nereus Scientific and Technical Briefs on ABNJ Series*, available at <<https://nereusprogram.org/reports/policy-brief-adjacency-how-legal-precedent-ecological-connectivity-and-traditional-knowledge-inform-our-understanding-of-proximity/>> accessed 25 August 2024; E. Popova et al, "Ecological connectivity between the areas beyond national jurisdiction and coastal waters: Safeguarding interests of coastal communities in developing countries" (2019) 104 *Marine Policy* 90–102.

of transboundary species. And this issue is not a marginal one since, of the 39 species of primary commercial interest caught in the high seas, all except for one are also caught in areas within national jurisdiction.⁷⁶

Should a coastal State attempt to protect the biodiversity in its own maritime zones but other States cannot agree on proper conservation and management measures for the relevant species when they are located in the high seas, individual efforts are unlikely to succeed. This is the case for Costa Rica, a nation which has seen a hundred-fold decrease in the abundance of the iconic leatherback sea turtle (*Dermochelys coriacea*) population over the past 35 years (Figure 3.3) primarily due to bycatch in the open ocean, and which can no longer guarantee the survival of this species through domestic conservation actions. As reflected in Article 7 of the UNFSA, understanding the biological unity of a species throughout its range (which may include multiple jurisdictions) is imperative for its sustainable management, and many coastal States experience a high degree of powerlessness when attempting to manage transboundary species, many of which are threatened migratory predators that spend most of their life histories on the high seas.⁷⁷

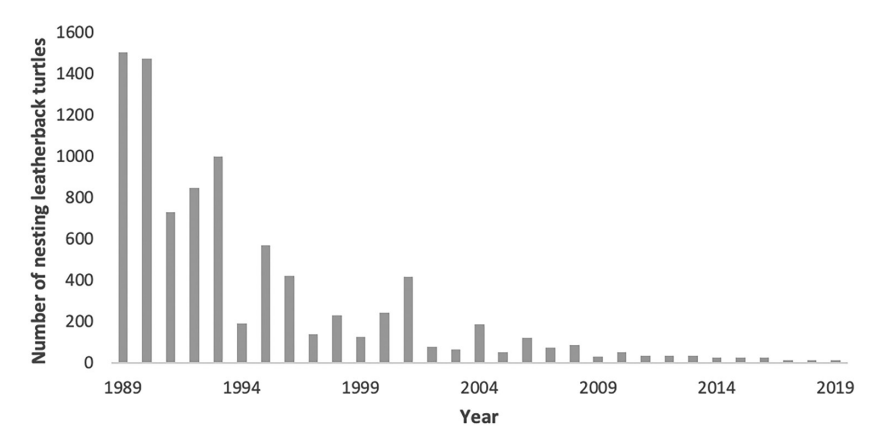


FIGURE 3.3 Decline in nesting leatherback sea turtles (*Dermochelys coriacea*) at one of Costa Rica's principal nesting beaches
FIGURE PREPARED BY THE AUTHOR BASED ON DATA OF THE EARTH WATCH INSTITUTE, AVAILABLE AT <[HTTPS://EARTHWATCH.ORG/SITES/DEFAULT/FILES/2020-03/EARTHWATCH-FIELD-REPORT-COSTA-RICAN-SEA-TURTLES-2017-19.PDF](https://earthwatch.org/sites/default/files/2020-03/earthwatch-field-report-costa-rican-sea-turtles-2017-19.pdf)> ACCESSED 31 AUGUST 2024

⁷⁶ Schiller, Bailey, Jacquet and Sala (n 43).
⁷⁷ A. L. Harrison et al, "The political biogeography of migratory marine predators" (2018) 2(10) *Nature Ecology & Evolution* 1571–1578.

Management gaps are further exacerbated by the lack of non-tuna RFMOs in vast areas of the high seas, including the southwest Atlantic Ocean, the eastern tropical Pacific or the northwest Indian Ocean, to name a few.

3.3 *Vessel Monitoring, Control and Surveillance*

Tracking the activities of the global high seas fishing fleet is crucial for the sustainable management of high seas fisheries, as it provides necessary information on when, where, and how high seas fishing impacts the environment. However, such tracking is also a challenging endeavour.⁷⁸ Historically, it has depended heavily on the cooperation of the flag States of vessels operating in these international waters, as they are expected to comply with existing regulations and best practices for collecting and sharing essential fisheries operational data. In reality, the information that was shared by fishing States with international bodies like RFMOs or the FAO about where, when and what species were caught has generally been vague and sparse. While monitoring, control and surveillance tools exist and progress has been made, as is presented here below, they have not been able to provide all the information necessary for the sustainable management of high seas fisheries.

First, until recently, the distribution of industrial fishing on the high seas could only be mapped through the data that each fishing State decided to disclose at coarse spatial and temporal resolutions.⁷⁹ Over the past decade however, there has been a conscious effort to leverage the information from, among other sources, automatic identification systems (AIS), a technology used in the maritime industry to prevent vessel-to-vessel collisions, in order not only to map the distribution of fishing vessels equipped with this technology, but also to calculate their relative fishing activity.⁸⁰ States and RFMOs are beginning to establish AIS requirements for fishing vessels operating within their jurisdiction or flying their flag; for example, all European fishing vessels larger than 15 meters are now required to be equipped with AIS. While fishing vessel tracking through AIS has revolutionised our understanding of the spatiotemporal footprint of fishing on the high seas,⁸¹ AIS can nevertheless be turned off or its signal tampered with, thus interfering with efforts to map fisheries impacts.⁸²

78 D. C. Dunn et al (n 44).

79 D. A. Kroodsma et al, "Tracking the global footprint of fisheries" (2018) 359(6378) *Science* 904–908.

80 International Convention for the Safety of Life at Sea, 1974 (adopter 1 November 1974, entered into force 25 May 1980) 1184, 1185 UNTS 2; Automatic Identification System, 33 CRF 164.46 (2003), available at <<https://www.ecfr.gov/current/title-33/chapter-1/subchapter-P/part-164/section-164.46>> accessed 7 September 2024.

81 Kroodsma et al (n 79).

82 Park et al (n 15).

Second, observer and electronic monitoring programs are critical for accurately recording the composition of fisheries catch and bycatch on the high seas.⁸³ However, the degree of on-board observation of high seas fishing vessels, both in terms of human observers and electronic monitoring, varies significantly across the main fishing gears operating on the high seas.⁸⁴ These gaps are particularly worrisome in the most geographically widespread form of fishing on the high seas, drifting pelagic longlines. This fishing method, which primarily targets large pelagic fishes, is known for having extremely low observer coverage rates, oftentimes inferior to 5% of the vessels or deployed longline sets across multiple RFMOs being observed.⁸⁵ Some of the earliest recommendations to increase observer coverage rates onboard longlines date back almost three decades.⁸⁶ While RFMO scientists have consistently requested their respective commissions for the observer coverage rates to be at least of 20% of all sets,⁸⁷ few States meet this threshold. By contrast, industrial purse seiners can have up to 100% coverage, oftentimes as a mix of human observers and electronic monitoring systems.⁸⁸ Nonetheless, perhaps with the exception of this form of fishing and certain longline fleets (eg the US Atlantic and Pacific pelagic longline fleets), most other high seas fisheries generate unreliable observational information.⁸⁹

Third, a fishing-related at-sea activity for which observer coverage is important is transshipment. Transshipment is the process of transferring catches from a fishing vessel to another vessel, typically at sea, to facilitate the transport of fish to processing facilities or markets without the fishing vessel having to return to port.⁹⁰ This practice can improve efficiency and reduce costs but

83 Dunn et al (n 44).

84 C. Ewell et al, "An evaluation of Regional Fisheries Management Organization at-sea compliance monitoring and observer programs" (2020) 115 *Marine Policy* 103842.

85 *ibid.*

86 R. A. Skillman, J. A. Wetherall and G. T. DiNardo, "Recommendations for scoping the sea turtle observer program for the Hawaii-based longline fishery" (1996) Honolulu Laboratory, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA.

87 S. Griffiths, C. Lennert-Cody, B. Wiley and L. Fuller, "Update on operational longline observer data required under resolution C-19-08 and a preliminary assessment of data reliability for estimating total catch for bycatch species in the eastern Pacific Ocean (BYC-10 INF-D)" (2021) IATTC Scientific Advisory Committee, 12th Meeting, available at <https://www.iattc.org/getattachment/476948e6-a594-4bc7-a470-69303b6e14c2/BYC-10-INF-D_Update-on-operational-longline-observer-data.pdf> accessed 7 September 2024.

88 Ewell et al (n 84).

89 E. Gilman, M. Weijerman and P. Suuronen, "Ecological data from observer programmes underpin ecosystem-based fisheries management" (2017) 74(6) *ICES Journal of Marine Science* 1481–1495.

90 N. A. Miller et al, "Identifying global patterns of transshipment behavior" (2018) 5 *Frontiers in Marine Science* 240.

requires careful monitoring to prevent IUU fishing activities and discourage unsustainable fishing.⁹¹ Some well-established unregulated fisheries, such as the squid fishing in parts of the high seas that are not covered by any RFMO (such as the Southwest Atlantic Ocean or the Northwest Indian Ocean), show persistent reliance on transshipment to extend their fishing operations for prolonged periods of time.⁹² Over two decades after the 2001 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing called for a standardisation of transshipment reporting documentation,⁹³ oceanic fisheries transshipments remain opaque and heterogeneous in their reporting. For example, while the tuna fishery in the Western and Central Pacific stands as one of the best managed fisheries in the world, a recent study, which used different data streams to assess the nature of at-sea encounters between fishing vessels in this region and refrigerated cargo vessels (ie reefers), could only verify that no fish were transshipped illegally in 32% of the encounters.⁹⁴ While there is certainly precedent for well-monitored transshipment,⁹⁵ its current oversight on the high seas remains limited, making it a prominent vector for IUU fishing and overfishing in some regions.⁹⁶

In conclusion, insufficient information on the composition of high seas biodiversity, the extinction risk status of these species, as well as their functional relationships within the ecosystem is available to enable sustainable management. Under such circumstances, and taking into account the precautionary principle, the option of closing such fisheries must seriously be considered. Additionally, while conservation and management measures for straddling and migratory biodiversity on the high seas should be designed to work in tandem with measures adopted within national jurisdiction, the existence of separate ocean zones leaves many coastal States powerless to protect species under their jurisdiction. By closing the high seas to fishing, the responsibility of sustainably managing migratory and straddling biodiversity would largely fall on the coastal and island States which share the species. While they would

91 C. Ewell et al, "Potential ecological and social benefits of a moratorium on transshipment on the high seas" (2017) 81 *Marine Policy* 293–300.

92 K. L. Seto et al, "Fishing through the cracks: The unregulated nature of global squid fisheries" (2023) 9(10) *Science advances*.

93 FAO, "International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing" (2 March 2001).

94 K. Seto, N. Miller, M. Young and Q. Hanich, "Toward transparent governance of transboundary fisheries: The case of Pacific tuna transshipment" (2022) 136 *Marine Policy* 104200.

95 K. Boerder, N. A. Miller and B. Worm, "Global hot spots of transshipment of fish catch at sea" (2018) 4(7) *Science advances*.

96 Ewell et al (n 91).

still have to understand transboundary connectivity and impacts and to cooperate, these efforts may be more manageable. Finally, decades after numerous monitoring, control, and surveillance challenges related to high seas fisheries have been identified, the situation has not sufficiently improved. The vastness of the high seas and practical difficulties to monitor vessels engaged in distant-water fishing argue in favour of closing the high seas to this extractive activity.

4 Socio-Economic and Equity Considerations

Other factors strongly call for a high seas fisheries closure. In particular, many fishing activities in ABNJ are not economically viable without subsidies – and such governmental support can contribute to unprofitable environmental degradation (4.1). Moreover, high seas fisheries appear to benefit only a few, while costing many; equity would therefore benefit from their closure (4.2). Finally, this sector seems rife with human rights abuse, which are in part enabled by the remoteness of the high seas and the lengthy isolation of crews (4.3).

4.1 *Questionable Profitability of High Seas Fishing and the Role of Subsidies*

As it currently stands, large sections of the high seas fishing fleets' activities are unprofitable. Indeed, they rely heavily on governmental subsidies. A 2018 study assessed the relative profitability of the high seas fishing fleet across fishing gears and regions with and without government subsidies.⁹⁷ Three quarters of the fishing effort could be attributed to six fishing nations (China, Taiwan, Japan, Indonesia, Spain and South Korea), whose vessels spent an average of 141 days annually fishing on the high seas. The authors found that without government subsidies, up to 54% of high seas commercial fishing grounds would be unprofitable. China, Taiwan and the Russian Federation, which currently account for 51% of high seas catch, were identified as the most unprofitable fleets without government subsidies. Deep-sea bottom trawling and squid jigging were unequivocally found to be the least profitable fishing methods with net losses in profit of US\$230 million and US\$345 million without government subsidies.⁹⁸

While some subsidies can support fisheries and fishing communities in adapting to change or become more sustainable or capacity-enhancing, harmful fisheries subsidies – primarily in the form of fuel subsidies or investments

97 E. Sala et al, "The economics of fishing the high seas" (2018) 4(6) *Science advances*.

98 *ibid*.

in new vessels – artificially distort the economic sustainability and viability of a fishery, which ends up impacting its environmental sustainability.⁹⁹ One can wonder about the length at which governments might be willing to go to keep a largely unprofitable industry on artificial life support, with the environmental degradation that such support might contribute to.

In light of this important issue, in 2022, after two decades of negotiations, members of the World Trade Organization adopted an agreement to end harmful fisheries subsidies, the Agreement on Fisheries Subsidies.¹⁰⁰ It remains to be seen what the Agreement will be able to achieve once it enters into force, but this commitment by the international community reiterates the seriousness of the problem created by subsidies and the necessity to limit their negative impact. Its entry into force would drastically shape the fishing seascape on the high seas, removing most of the unprofitable fisheries.

The potential of the Agreement on Fisheries Subsidies notwithstanding, the overall profitability of marine fisheries would benefit from stopping fishing on the high seas. A model on the potential bioeconomic effects of closing the high seas indeed predicted that such a non-use measure would not only increase stock abundance significantly – fourfold in the high seas and by 30% within EEZs – but also double the profits. In contrast, open high seas would reduce the abundance of target species to a third of their economically optimal size.¹⁰¹

4.2 *Unequitable Benefits*

High seas fisheries benefit a very limited number of States and closing them would have the potential for more equitable redistribution. While the global ocean beyond national jurisdiction is open to all States with fishing interests, only States with historically prominent fishing traditions or widespread government subsidies programs have been able to reap the benefits of the high seas freedoms enshrined in Article 87 of UNCLOS. Out in the high seas, 10 flag States account for 68% of the catch of migratory species: Indonesia, Ecuador, Spain, Japan, Taiwan, Mexico, Seychelles, South Korea, France, USA. Among these 10 flag States, six of them (Spain, Japan, USA, France, Taiwan, and South Korea) are also within the top 10 States responsible for 46.2% of the total catches in across all high seas species.¹⁰²

99 U. R. Sumaila et al, “WTO must ban harmful fisheries subsidies” (2021) 374(6567) *Science* 544–544.

100 Agreement on Fisheries Subsidies, WTO Document WT/MIN(22)/33 (22 June 2022), available at <https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm> accessed 7 September 2024.

101 C. White and C. Costello, “Close the high seas to fishing?” (2014) 12(3) *PLOS Biology*.

102 Pauly, Zeller and Palomares (n 51); Sumaila et al (n 16).

The vast majority of fisheries landed catch and value across high seas regions has been accumulated not by adjacent coastal and island nations, but instead by DWFN. An assessment of the distribution of fisheries catch value across 14 non-polar FAO fishing areas demonstrates that, on average, 70.7% of the total value of high seas fisheries catch was fished by fishing States foreign to each FAO area. In regions such as the eastern (FAO 57) and western (FAO 51) Indian Ocean, those percentages climb to a shocking 95.3 and 98.5% respectively (Table 3.1).

TABLE 3.1 Global FAO fishing areas except for Arctic (FAO 18) and Antarctic (FAO 48, 58 and 88)

FAO fishing high seas areas	Percent of catch value in FAO area by adjacent coastal nations	Percent of catch value in FAO area by DWFN
21 – Atlantic, Northwest	13.3%	86.7%
27 – Atlantic, Northeast	99.1%	0.9%
31 – Atlantic, Western Central	22.0%	78.0%
34 – Atlantic, Eastern Central	4.8%	95.2%
41 – Atlantic, Southwest	25.4%	74.6%
47 – Atlantic, Southeast	4.8%	95.2%
51 – Indian Ocean, Western	1.5%	98.5%
57 – Indian Ocean, Eastern	4.7%	95.3%
61 – Pacific, Northwest	78.0%	22.0%
67 – Pacific, Northeast	50.0%	50.0%
71 – Pacific, Western Central	41.4%	58.6%
77 – Pacific, Eastern Central	30.0%	70.0%
81 – Pacific, Southwest	5.6%	94.4%
87 – Pacific, Southeast	29.0%	71.0%
Average	29.3%	70.7%

TABLE PREPARED BY THE AUTHOR ON THE BASIS OF DATA FOUND IN PAULY, ZELLER AND PALOMARES (N 51)

High seas fisheries do not represent a large proportion of total marine catches. They reached their peak in the late 2010s at 3.5 million annual tons,¹⁰³ and, historically, have only contributed 4.2% of the total global wild catches, which

103 Pauly, Zeller and Palomares (n 51).

translates to approximately 2.4% of the total global seafood production when accounting for aquaculture.¹⁰⁴ High seas fisheries may play an important role in supporting livelihoods of a small subset of commercial fishing fleets, but the majority of their landings are intended for premium food and supplement markets in affluent, food-secure nations.¹⁰⁵ Hence, they represent an almost negligible role in securing global seafood production.¹⁰⁶ While the historic contribution of high seas fisheries to global seafood production is rather minimal, a different pattern appears for the taxonomic group of highly-mobile tuna, billfish, sharks and rays: between 2010–2019, high seas catches of these species accounted for 20.6 million tons, out of a global total of 80.6, which equates to 25.6% of global catch.¹⁰⁷

Coastal States without high seas fleets, which constitute most of the world's coastal States, would benefit economically from closing high seas fisheries. Such a measure could result in no net loss of global fisheries catch while reducing global fisheries catch inequality by 50%.¹⁰⁸ This measure could benefit over 120 States. It would have a particularly noticeable impact on the coastal and island States whose coastal communities and fisheries depend on highly-mobile tuna, billfish, sharks and rays.

4.3 *Human Rights Violations on the High Seas*

'Blue crimes' on the high seas, which include well-documented instances of human trafficking or forced labour onboard fishing vessels, frequently go unpunished.¹⁰⁹ Migrant workers on high seas DWFN have been subjected to various forms of physical and non-physical violence, including: (1) abuse of vulnerability, (2) deception, (3) restriction of movement, (4) isolation, (5) physical and sexual violence, (6) intimidation and threats, (7) retention of identity documents, (8) withholding of wages, (9) debt bondage, (10) abusive working and living conditions or (11) excessive overtime.¹¹⁰ The remoteness of the high seas creates the perfect environment for such human rights

104 Schiller, Bailey, Jacquet and Sala (n 43).

105 *ibid.*

106 *ibid.*

107 Pauly, Zeller and Palomares (n 51).

108 Sumaila et al (n 16).

109 International Labour Organization, "Caught at sea – Forced labour and trafficking in fisheries" (2013), available at <<https://www.ilo.org/publications/caught-sea-forced-labour-and-trafficking-fisheries>> accessed 7 September 2024.

110 Greenpeace, "Seabound: the journey to modern slavery in the High Seas" (2019), available at <<https://www.greenpeace.org/southeastasia/publication/3428/seabound-the-journey-to-modern-slavery-on-the-high-seas/>> accessed 7 September 2024.

violations.¹¹¹ Transshipment at sea is a further risk factor, as crews stay on board fishing vessels for longer periods of time, which increases their vulnerability. A study by the Environmental Justice Foundation on human rights violations of Indonesian fishers found that distant water fishing vessels engaging in at-sea transshipment spent an average of 13.3 months at sea per trip, compared to 3 months for those that did not.¹¹² Up to 79% of these long-range vessels involved in at-sea transshipment reported human rights abuses, compared to 63% for those not transshipping.¹¹³

Closing the high seas to fishing would significantly reduce the risk of human rights violations. Fishing activities would be confined to areas with better regulatory oversight, reducing the opportunities for the prolonged exploitation of crews. Enhanced monitoring and control would ensure better compliance with human rights standards and significantly curb the abuse prevalent in high seas fishing operations.

In conclusion, even if the Agreement on Fisheries Subsidies enters into force and stops harmful fisheries subsidies, it has nonetheless been demonstrated that overall marine fisheries would be more profitable if the high seas were closed to fishing. Such a non-use measure would also combat the concentration of benefits into the hands of a few wealthy States which have had the means to develop high seas fleets. Closing high seas fisheries would mostly benefit coastal States, while having a minimal impact on overall seafood production or food security. Finally, it would mitigate some of the factors that make human rights violations at sea so prevalent, in particular the remoteness of the high seas and the prolonged isolation of fishing crews.

5 Conclusion

The debate over whether or not closing the high seas to commercial fishing is an appropriate non-use measure to combat some of the challenges in ocean conservation and sustainable use is multifaceted and complex. This chapter summarises several, hopefully compelling, arguments supporting this

¹¹¹ *ibid.*

¹¹² Environment Justice Foundation, “The Weakest Link: How at-sea trans-shipment fuels illegal fishing and human rights abuses in global fisheries” (2023), available at <<https://ejfoundation.org/resources/downloads/Weakest-Link-Transshipment-report-Jan-2023.pdf>> accessed 7 September 2024.

¹¹³ *ibid.*

approach, grounded in environmental, biodiversity, climate change, management, economic, equity, and human rights considerations.

First, from an ecological and environmental perspective, it is undeniable that marine biodiversity, in particular on the high seas, is in crisis and that the impacts of overfishing do not stop at the species-level, but also extend to the trophic chain, potentially destabilising the whole ecosystem. Closing the high seas would certainly decrease pressure on targeted species and the related degradation of marine ecosystems. Moreover, such a non-use measure would halt the current fishing practices on the high seas, which play a negative role in carbon sequestration. Second, as demonstrated by the environmental and ecological crisis, the legal regime and management measures in place are not adequate and/or sufficient. Data and knowledge gaps are only one of the major issues facing management of fish stocks and associated and dependent species. Some of these unmanaged, unregulated, or bycaught species are not even monitored, let alone properly managed. If one adds vessel monitoring, control and surveillance difficulties and the current state of transshipment practices, a high seas fishing closure appears strongly warranted. Third, harmful fisheries subsidies artificially make over half of high seas fisheries profitable, which impacts their environmental sustainability. Even if the Agreement on Fisheries Subsidies enters into force and reduces this issue, closing the high seas would lead to a substantial increase not only in fish stock conservation but also in fisheries yields and profits. These benefits would furthermore promote a more equitable distribution of resources, addressing the inequities faced by developing nations and smaller fishing communities that currently compete with large industrial fleets. Finally, human rights violations on the high seas present another critical cause for concern. They are in large part made possible by to the remoteness of the high seas and practices such as transshipment which increase workers' vulnerability. Bringing fishing activity back into areas with better regulatory control would reduce these risk factors.

To those arguing that a high seas closure cannot take place, I submit it actually can. Over the past four decades, there have indeed been a series of instances where the extraction of marine living resources from the high seas through fishing have been temporarily or permanently restricted, which shows that States can agree to massively curtail high seas freedoms vis-à-vis marine living resources. For example, the international moratorium on commercial whaling, addressed by Jeffries and Latos in chapter 7, represented a historical turning point in international efforts to conserve wide ranging migratory species in the face of overexploitation both within and beyond national jurisdiction. In addition, the temporary fishing abstention in the Central Arctic Ocean, discussed by Molenaar in chapter 6, is one of the most recent and impactful examples of

non-use measures in international waters and demonstrates that, in the face of threatened ecosystems and lack of knowledge, the precautionary principle can be effectively implemented through the adoption of non-use measures. Other more circumscribed examples include the UN General Assembly Resolution on high seas drift net ban,¹¹⁴ which shows that it has been legally and diplomatically achievable to reach consensus on restricting the exploitation of living resources beyond national jurisdiction outside of the RFMO framework; provisions under UNCLOS on anadromous and catadromous fish stocks, which grant certain coastal States control over fishing for these species, precluding other States from fishing them;¹¹⁵ and high seas pockets in the South Pacific, where the Parties to the Nauru Agreement agreed to leverage their collective power to prevent access to their national waters to any vessel that fished the high seas bordering their national waters (known as 'high seas pockets').¹¹⁶

While closing the high seas to commercial fishing could result in direct socio-economic and environmental benefits for the majority of the world's coastal and island States, such a non-use measure would not become a 'silver bullet' against overfishing, as the unsustainable exploitation of target and non-target species also takes place within EEZs. Concerns might also exist about the displacement of fishing efforts into EEZs, but empirical evidence indicates that the majority of marine capture fisheries production already occurs within national jurisdictions and the relative increase in fishing effort within these areas would consequently be minimal. In conclusion, closing the high seas to commercial fishing as a non-use measure presents a viable path, if joined by improvements in the management of EEZs' marine living resources, toward sustainable fisheries management, enhanced biodiversity, more equitable benefit sharing, and improved respect for human rights. Addressing the gaps and inefficiencies in the current regulatory framework is crucial for ensuring the long-term health of our oceans and the communities that depend on them, and this might require 'radical' action rather than slow and insufficient reforms.

114 UNGA Res 44/225 (1989) GAOR 44th Session Supp 49; UNGA Res 45/197 (1990) GAOR 45th Session Supp 49; UNGA Res 46/215 (1991) GAOR 46th Session Supp 49.

115 UNCLOS arts 66(3)(a) and 67(2).

116 J. Vince, E. Brierley, S. Stevenson and P. Dunstan, "Ocean governance in the South Pacific region: progress and plans for action" (2017) 79 *Marine Policy* 40–45.

Ocean in Motion: Addressing Gaps in MPA Governance in Areas beyond National Jurisdiction

Bastiaan E. Klerk

1 Introduction

Marine biodiversity is currently facing a plethora of anthropogenic pressures, including overfishing, pollution, and climate change, which have led to a serious decline in marine biodiversity and a significant increase in the number of species facing extinction and habitats being degraded.¹ Consequently, the imperative for effective conservation measures to protect marine biodiversity has never been more pressing. The concept of marine protected areas (MPAs) has gained widespread recognition as a potentially highly effective non-use measure for the conservation and sustainable utilisation of marine biodiversity. Over the last two decades, the utilisation of MPAs has greatly proliferated, with a tenfold increase in MPA coverage since the year 2000.² At present, over 18,000 MPAs are in place, covering roughly 8.2% of all ocean space; a remarkable increase compared to just 0.7% in 2000. Notably, the vast majority of these MPAs are located in areas within national jurisdiction, whereas only 1.5% of the high seas are covered by MPAs.³ The high seas cover nearly half the surface of the Earth and two-thirds of the ocean. They provide habitat and migratory routes for whales, sharks, sea turtles, and seabirds; play a key role in regulating the Earth's climate and storing CO₂; and harbour rich ecosystems, such as deep-water corals and hydrothermal vents.⁴

1 R. E. A. Almond, M. Grooten, D. Juffe Bignoli and T. Petersen (eds), "Living Planet Report 2022 – Building a nature-positive society" (2022) *WWF*, available at <https://wwfint.awsassets.panda.org/downloads/embargo_13_10_2022_lpr_2022_full_report_single_page_1.pdf> accessed 14 July 2024.

2 UNEP-WCMC, IUCN and NGAS, "Protected Planet Report 2020" (December 2023) *Protected Planet*, available at <<https://liverreport.protectedplanet.net/>> accessed 19 December 2023.

3 *ibid.*

4 L. Karan and N. Clark, "A Path to Creating the First Generation of High Seas Protected Areas" (2020) *The Pew Charitable Trusts*, available at <https://www.pewtrusts.org/-/media/assets/2021/03/highseas_mpa.pdf> accessed 30 January 2024.

This comparatively low level of MPA coverage on the high seas owes primarily to the existence of a laissez-faire legal framework that governs this vast area of ocean space. The existing legal scheme largely centres around the high seas freedoms as outlined in Article 87 of the United Nations Convention on the Law of the Sea (UNCLOS). The overall result is “a complex, loosely coordinated, and generally permissive regime” for governing areas beyond national jurisdiction (ABNJ),⁵ in which establishing MPAs is a complex endeavour.⁶ In response to various concerns throughout the international community with regard to the inadequacy of the existing framework to sufficiently protect biodiversity in ABNJ, international actors negotiated a new Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement). The highly anticipated Agreement was adopted in June 2023, marking the culmination of nearly two decades of work.

The BBNJ Agreement assigns a prominent role to MPAs, reaffirming their status as a core element in the global strategy to halt biodiversity loss. According to the definition found therein, MPAs include, by default, some non-use measures. Indeed, article 1(9) of the BBNJ Agreement states that a

‘Marine protected area’ means a geographically defined marine area that is designated and managed to achieve specific long-term biological diversity conservation objectives and may allow, where appropriate, sustainable use provided it is consistent with the conservation objectives.

Since sustainable use “may be allowed, where appropriate, provided it is consistent with the conservation objectives”, the definition implies that, in all other cases, and by default, use is not allowed. Defined as such, MPAs are consequently important tools to study in a book on non-use measures. Depending on their material scope of application, they might, however, also include elements of (un)restricted use.

The present chapter undertakes a critical assessment of MPAs in the context of the BBNJ Agreement, examining the potential of this new instrument to strengthen these area-based tools and their role in conserving the high seas’ biodiversity. To this end, the BBNJ Agreement is measured against two

5 E. Mendenhall et al, “A Soft Treaty, Hard to Reach: The Second Inter-governmental Conference for Biodiversity Beyond National Jurisdiction” (2019) 108 *Marine Policy* 103664.

6 Besides the permissive nature of the legal regime, other limiting factors for designating MPAs in areas beyond national jurisdiction are the institutional density of the areas and the lack of coordination and cooperation among them, as well as the lack of scientific data and understanding of the ecosystems found therein.

benchmarks: its potential to address gaps in the existing legal framework for MPA governance in ABNJ, and its ability to accommodate the implementation of novel tools and concepts for conserving biodiversity in ABNJ. The analysis focuses in particular on one concept that has been gaining traction over recent years: ‘dynamic’ MPAs, ie protected areas with mobile boundaries, allowing them to respond to ecological, oceanographic and atmospheric variability.⁷ This concept is rooted in the recognition that the marine environment is inherently dynamic, with continuous changes occurring in its physical and biological conditions. Climate change is exacerbating this dynamism, with species rapidly shifting their geographical range due to warming water temperatures and changes in ocean chemistry.⁸ This poses a significant challenge to the management of MPAs, as they must be able to adapt to these changes to be effective. Dynamic MPAs serve as a potential solution to this challenge, as they allow for regular review and adaptive management in response to changes in the marine environment. Therefore, for the BBNJ Agreement to be future-proof, it is argued here that it must embody a sufficient degree of legal dynamism to accommodate their implementation.

The analysis conducted in this chapter sheds light on various questions in relation to non-use measures, as identified by Guggisberg in chapter 2. In particular, the thorough examination conducted of the network of MPAs established under the Convention for the Protection of the Marine Environment of the North-East Atlantic (the ‘OSPAR’ Convention)⁹ clarifies key elements that are necessary not only for the adoption but also for the success of these conservation tools. Further, the chapter examines the prospects of adopting dynamic MPAs, as well as the challenges to their successful implementation under the BBNJ Agreement. To this end, the remainder of this Chapter is structured as follows. In section 2, the existing legal regime for the establishment of MPAs on the high seas is introduced, together with an assessment of its weaknesses. Such critical examination will be based on an analysis of the OSPAR MPAs.¹⁰ Indeed, OSPAR stands forth as the most suitable subject for such analysis, considering that nearly a third of all MPAs in ABNJ have been adopted under the auspices of this body, and noting that those adopted under the Convention on the Conservation of Antarctic Marine Living Resources (CAMLRL Convention) are

7 G. O. Crespo et al, “Beyond Static Spatial Management: Scientific and Legal Considerations for Dynamic Management in the High Seas” (2020) 122 *Marine Policy* 104102.

8 L. Cheng et al, “Another Year of Record Heat for the Oceans” (2023) 40 *Advances in Atmospheric Science* 963–974.

9 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) (adopted 22 September 1992, entered into force 25 March 1998) 2354 UNTS 67.

10 *ibid.*

discussed by Guggisberg in chapter 13. Section 3 of this chapter assesses not only whether the BBNJ Agreement adequately strengthens the legal framework for MPAs by addressing existing gaps, but also whether it embodies a sufficient degree of legal flexibility to accommodate the implementation of novel tools and concepts for conserving biodiversity in ABNJ, focusing in particular on dynamic MPAs.

2 MPAS in ABNJ under Contemporary International Law

2.1 *Marine Protected Areas and Non-use: Evolution, Definitions and Concepts*

Before turning to the contemporary legal scheme in place in ABNJ, it is useful to briefly clarify the relevant nomenclature. Prior to the adoption of the BBNJ Agreement, two definitions of MPAs were normally relied upon by legal and policy ocean experts. The first one, widely recognised and endorsed, is that formulated by the International Union for Conservation of Nature (IUCN), which defines an MPA as

any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.¹¹

The second one, suggested by OSPAR, defines an MPA as

an area [...] for which protective, conservation, restorative or precautionary measures, consistent with international law have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment.¹²

It is noteworthy that while these definitions vary to some extent, they generally encompass three key components: a geographically defined space; some form of regulation or management of the resource(s) in question; and the existence of conservation objectives. The definition included in the BBNJ Agreement, as presented in the introduction, brings forward one new element: that sustainable use is allowed provided that it is consistent with conservation objectives.

11 G. Kelleher (ed), *Guidelines for Marine Protected Areas* (IUCN 1999) XVIII.

12 OSPAR, "Network of Marine Protected Areas" (2010) Recommendation 2010/2 on amending Recommendation 2003/3, art 2.1.

This renders sustainable use subordinate to conservation. While the focus on conservation was obviously present under previous definitions, the BBNJ Agreement can be seen as making non-use the default mechanism, unless it can be justified otherwise.

Generally, MPAs are considered to be a sub-category of area-based management tools (ABMTs). The difference between ABMTs and MPAs is essentially a matter of emphasis; the primary objective of MPAs is conservation, whereas, for ABMTs, conservation objectives may be of an auxiliary character. ABMTs simply denote the management of human activities in a given area, whether for conservation purposes or other objectives.

2.2 *The Limitations of the Existing Legal Framework*

The principle of high seas freedoms, which are rooted in the concept of *mare liberum* established by Grotius and currently codified in Article 87 of UNCLOS, has long been the cornerstone of the legal regime governing ABNJ. This provision grants States significant latitude in their ability to engage in activities such as fishing, navigation, and scientific research within the high seas, without imposing any detailed obligations to protect the rich biodiversity that these waters harbour. While Part VII of UNCLOS does provide some general rules for the conservation and management of living resources within the high seas, these obligations primarily centre around the need for cooperation among States.¹³ In addition, Part XII of UNCLOS outlines a more elaborate regime for the protection and preservation of the marine environment which is also applicable to ABNJ.¹⁴ Although the importance of Part XII as a framework for marine biodiversity protection should not be underestimated, its value is limited on the high seas, where environmental considerations are balanced against States' far-reaching freedoms.

This permissive legal framework poses significant challenges for the establishment of MPAs within ABNJ, as UNCLOS and other global instruments do not explicitly provide for their designation. This does not exclude the possibility of designating MPAs therein. However, as all States enjoy the high seas freedoms, pursuant to the principle of *pacta tertiis nec nocent nec prosunt*, any restriction of these freedoms is only possible with States' explicit consent. Thus, the MPAs in ABNJ that are currently in existence only bind the parties to

¹³ UNCLOS, arts 117 and 118.

¹⁴ Key provisions include UNCLOS art 192, prescribing a general duty to protect and preserve the marine environment, and UNCLOS art 194, obliging States to prevent, reduce and control pollution of the marine environment, including rare and fragile ecosystems (UNCLOS, art 194(5)).

the instrument under which they were designated. An additional complicating factor lies herein that various international bodies established through or recognised by UNCLOS have been endowed with a mandate to regulate certain activities in ABNJ, ie deep-seabed mining, shipping and fishing.¹⁵ Therefore, establishing cross-sectoral MPAs requires close cooperation among several international bodies, which further complicates MPA governance on the high seas. Although MPAs offer a huge promise in terms of conservation on the high seas, the legal framework in ABNJ brings forward its load of complexities. A look at the example of OSPAR MPAs gives an opportunity to assess and illustrate promising options, but also challenging realities.

2.3 *OSPAR's MPAs in ABNJ*

Despite these challenges, due to which establishing comprehensive cross-sectoral MPAs is a complex endeavour, several international organisations have undertaken efforts to designate MPAs within the high seas areas under their mandate. Most prominently (in addition to the Commission for the Conservation of Antarctic Marine Living Resources, as discussed in chapter 13), a vast network of MPAs has been put in place in the North-East Atlantic region under the OSPAR Convention. OSPAR's mandate extends to ABNJ portions of the wider Atlantic and the Arctic, which encompasses 40% of its total maritime area (see Figure 4.1 below).¹⁶ Therein, a total of 8 MPAs are designated, and they cover a total area of over a million km².¹⁷ Despite such a promising framework for conservation, what these MPAs actually do is limited, and conservation aspirations are thwarted by important weaknesses.

Indeed, there are little to no substantive obligations within OSPAR MPAs, nor can explicit non-use measures associated with them be found. The MPAs are established by means of a legally binding decision of the OSPAR Commission, which merely sets out the coordinates, general purpose, and scope of the

15 Deep-seabed mining is overseen by the International Seabed Authority (ISA), as discussed further in Part II of this volume; the International Maritime Organization (IMO) is the global organisation responsible for regulation of international shipping activities; and fisheries are, pursuant to UNCLOS art 118; read in conjunction with United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA) (adopted 4 August 1995, entered into force 11 December 2001) 2167 UNTS 88, art 8(3).

16 OSPAR Convention, art 1(a).

17 OSPAR Commission, "Report and assessment of the status of the OSPAR network of Marine Protected Areas in 2021", available at <<https://oap.ospar.org/en/ospar-assessments/committee-assessments/biodiversity-committee/status-ospar-network-marine-protected-areas/assessment-reports-mpa/mpa-2021/>> accessed 5 September 2023.

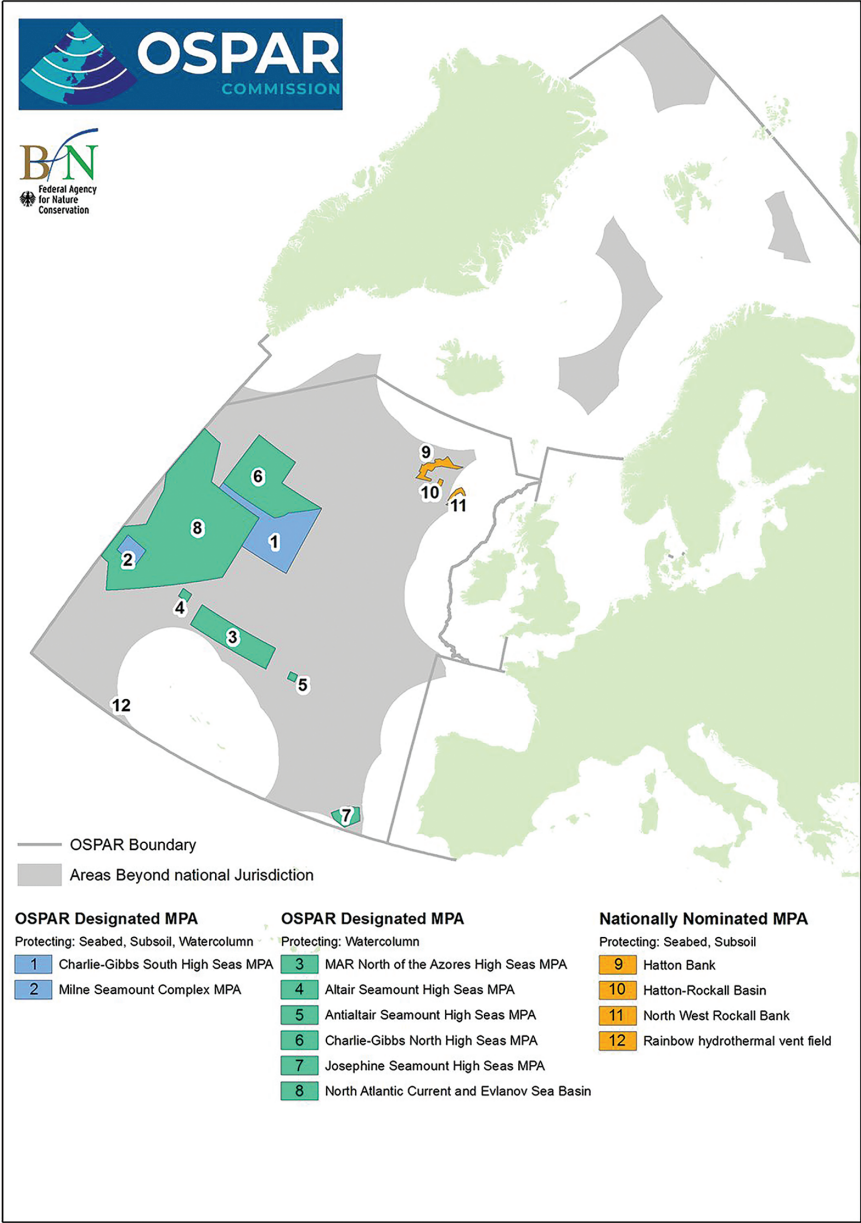


FIGURE 4.1 OSPAR MPAs in ABNJ

OSPAR COMMISSION, “REPORT AND ASSESSMENT OF THE STATUS OF THE OSPAR NETWORK OF MARINE PROTECTED AREAS IN 2021”

MPA.¹⁸ In addition, a (non-legally binding) recommendation provides that contracting Parties should implement the ‘management framework’ (ie the decision and the recommendation) for the MPA. The recommendation outlines a comprehensive set of conservation objectives in its Annex, for example “to prevent deterioration of the environmental quality of the bathypelagic and epipelagic water column”, and to “protect, maintain and [...] restore where appropriate, historically harvested fish populations”.¹⁹ However, these objectives are not joined by practical measures. The practical value of these objectives is further limited by the fact that their implementation is not mandatory, and, hence, it is primarily dependent on the willingness and discretion of the Contracting Parties.

Questions have further been raised regarding the implementation and effectiveness of these MPAs.²⁰ Besides their non-applicability to third States – which is a problem inherent to the legal context in which high seas MPAs are established – the implementation process appears flawed. While the OSPAR Convention stipulates that decisions regarding implementation should contain provisions regarding the timeline of implementation,²¹ this is not the case for the decisions establishing MPAs in ABNJ. The only incentive for Contracting Parties to implement MPAs is their obligation to report on their implementation.²² However, reporting obligations are not a panacea, as transparency and monitoring issues are also acute within OSPAR. Not only is the number of reports received generally very low, with only four out of fifteen Contracting Parties reporting on the implementation of OSPAR’s MPAs in ABNJ in 2022,²³ but the format of reporting has also been met with criticism for being

18 See eg OSPAR, “Decision 2010/2 on the Establishment of the Charlie-Gibbs South Marine Protected Area” (2010) OSPAR 10/23/1-E, Annex 36, available at <<https://www.ospar.org/documents?v=32822>> accessed 13 July 2024.

19 See eg OSPAR, “Recommendation 2010/13 on the Management of the Charlie-Gibbs South Marine Protected Area” (2010).

20 See eg N. Matz-Lück and J. Fuchs, “The impact of OSPAR on protected area management beyond national jurisdiction: Effective regional cooperation or a network of paper parks?” (2014) 49 *Marine Policy* 155–166; B. E. Klerk, “From Undermining to Strengthening: Implications of the Forthcoming Agreement on Biodiversity beyond National Jurisdiction for MPA Governance in the North-East Atlantic” (2023) 38 *The International Journal of Marine and Coastal Law* 1–33.

21 OSPAR Convention, art 13(4).

22 OSPAR Recommendation 2010/13 (n 19) under 5.1.

23 OSPAR Commission, “Report of the meeting of Intersession Correspondence Group on Marine Protected Areas” (18–20 October 2020) ICG-MPA 22/10/1.

‘unfocussed’,²⁴ and the results are not made publicly available and can therefore not be evaluated.

The lack of information published by OSPAR therefore raises questions about the effectiveness of the measures implemented. For example, the 2016 MPA status report briefly addresses the implementation of MPAs in ABNJ, merely stating that progress has been made regarding the OSPAR-North-East Atlantic Fisheries Commission (NEAFC) Collective Arrangement (which is addressed below), and that further work is required to develop and strengthen collaborations with other sectors, particularly regarding seabed mining, cable laying, and military activities.²⁵ The 2018 and 2021 MPA status reports, for their part, state that there has been no new information provided on the management status of MPAs in ABNJ since 2016.²⁶ Information regarding the implementation of OSPAR’s MPAs in ABNJ is thus scarcely available. This is problematic, as it thwarts outside experts’ ability to assess the full potential of these MPAs as conservation measures. Issues of accountability also arise, as the general public is deprived of the means to assess whether these MPAs are being implemented and properly managed and whether States are complying with their (albeit limited) obligations and commitments.

One way to indirectly assess whether these MPAs are being implemented would be to review the progress of these MPAs towards achieving their conservation objectives, as described in detail in the recommendations underpinning the establishment of the MPAs. While Parties are encouraged to “identify suitable mechanisms for monitoring the achievement of the conservation objectives for the area”,²⁷ no site-specific monitoring programmes are in place for MPAs in ABNJ. This conclusion follows from OSPAR’s 2016 MPA Status report itself, which provides that, given the lack of dedicated site condition monitoring programmes in place, it is unknown if the MPAs in ABNJ are moving

24 The United Kingdom, at the 2020 ICG-MPA meeting, described the reporting format as ‘unfocussed’ see *ibid* para 5.2.

25 OSPAR Commission, “2016 Status Report on the OSPAR Network of Marine Protected Areas”, available at <https://oap-cloudfront.ospar.org/media/filer_public/be/10/be103ad3-d98b-4b0a-892f-1c8d55e7f286/p00693_2016_mpa_report.pdf> accessed 5 September 2023.

26 OSPAR Commission, “2018 Status Report on the OSPAR Network of Marine Protected Areas”, available at <https://oap-cloudfront.ospar.org/media/filer_public/50/bb/50bba6bf-4d16-4066-ad51-169d1784979d/p00730_ospar_mpa_status-report_2018.pdf> accessed 5 September 2023; OSPAR 2021 Status Report (n 17).

27 OSPAR Recommendation 2010/13 (n 19) para 3(3) (3)(d).

towards their conservation objectives.²⁸ No progress in this regard is shown by the 2018 and 2021 reports.²⁹

Another gap in OSPAR's MPA governance in ABNJ is the absence of enforcement mechanisms.³⁰ Such mechanisms do exist in relation to its MPAs within national jurisdiction,³¹ which may seem reasonable as coastal States do have enforcement powers in those areas. However, on the high seas, due to the aforementioned *pacta tertiis* issue, measures cannot be imposed and enforced on third States. This would not, however, preclude the possibility of introducing an *inter partes* inspection and enforcement scheme,³² but no such scheme exists at present.

A final issue that merits attention is the material limitations to the mandate of OSPAR. Indeed, OSPAR's competencies in ABNJ are very limited, with three key uses of ABNJ falling outside of its normative scope, ie fisheries, shipping and seabed mining.³³ Hence, even if its MPAs had more substance, OSPAR would be unable to adopt cross-sectoral measures in relation to these activities. In that respect, it is worth noting that OSPAR is cooperating with other 'sectoral' organisations with competencies in ABNJ. The collaboration between OSPAR and the NEAFC has been relatively successful, facilitated by the Collective Arrangement, a multilateral platform that enables OSPAR to collaborate with all relevant entities responsible for managing human activities in the North-East Atlantic.³⁴

However, NEAFC is currently the only organisation formally participating in the Collective Arrangement. Despite the improved coordination between NEAFC's area closures and OSPAR's MPAs in ABNJ,³⁵ significant limitations

28 OSPAR 2016 MPA Status Report (n 25) 43.

29 No progress in this regard is shown by the 2018 and 2021 reports, see OSPAR 2018 MPA Status Report (n 26) and OSPAR 2021 MPA Status Report (n 17).

30 Although Parties are encouraged to adopt enforcement tools such as warnings, penalties and fines in relation to MPAs within the limits of national jurisdiction, these management objectives are explicitly declared inapplicable to MPAs in ABNJ, see OSPAR Commission, "Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area" (OSPAR 2003-18), Appendix 1 at 6.

31 *ibid* 15.

32 As is, for example, applicable to high seas fisheries under the UNFSA, art 21 *et seq*. Other alternatives are intensified port State inspections, such as the one under by the likes of the Paris Memorandum of Understanding on Port State Control (adopted 1 July 1982) in relation to marine pollution.

33 OSPAR Convention, art 4, and UNCLOS, art 137 *et seq*.

34 OSPAR Commission, "Collective Arrangement", available at <<https://www.ospar.org/about/international-cooperation/collective-arrangement>> accessed 31 January 2023.

35 OSPAR Agreement 2014-09 (Update 2018): Collective Arrangement between Competent International Organizations on Cooperation and Coordination Regarding Selected Areas in Areas beyond National Jurisdiction in the North-East Atlantic.

remain as these MPAs do not regulate shipping and mining activities. Notwithstanding repeated invitations from both NEAFC and OSPAR,³⁶ the International Maritime Organization (IMO) and the International Seabed Authority (ISA) had not, until recently, participated in any Collective Arrangement meetings. That is, until June 2023, when the ISA participated in the sixth meeting under the Collective Arrangement, during which it was noted that “it would be useful to find ways to formalize the relationship between ISA and regional organizations in the North-East Atlantic”.³⁷ One obvious way to achieve such formalisation would be for the ISA to formally join the Collective Arrangement. However, given their previous reluctance to engage therein, it remains to be seen whether this scenario will materialise. The reasons behind the abstention of the ISA and the IMO from engagement or official accession to the Arrangement remain a subject of conjecture. This may simply be due to a lack of resources to actively participate in such regional initiatives. Alternatively, adopting a somewhat pessimistic perspective, this choice might arise from the fact that joining the Collective Arrangement would entail restricting their respective activities in the North-East Atlantic, which is not balanced by any equivalent positive gain. Given the significant economic underpinnings of both organisations, the absence of a metaphorical ‘carrot’, that is, economic or other incentives, may explain their reluctance.

In summary, the analysis presented above identifies substantial shortcomings in OSPAR’s high seas MPAs. Not only are OSPAR MPAs clearly not non-use measures as understood in this book, but they also do not seem to include any substantive restrictions to activities. As such, they appear to be only MPAs on paper. Some of the other limitations, such as inadequate monitoring and enforcement, cannot be solely attributed to the constraints of the general legal framework. Other limitations, however, embody the challenges that arise with the creation of MPAs in ABNJ under the current legal framework. For instance, OSPAR’s dependence on the willingness of other institutions to cooperate, due

36 At the 2017 OSPAR Commission meeting, it was agreed that “NEAFC and OSPAR Secretariat would contact IMO, ISA [...] for participation at the Fourth Collective Arrangement meeting, highlighting the importance of their participation” (“Summary record 2017 OSPAR Commission meeting” (26–29 June 2017) OSPAR 17/19/1-E, para 10.2 a), however, these organisations did not attend (OSPAR, “4th Meeting under the Collective Arrangement” (2018), available at <<https://www.ospar.org/meetings/archive/4th-meeting-under-the-collective-arrangement>> accessed 31 January 2023).

37 OSPAR Commission, “Aide Memoire Sixth meeting under the Collective Arrangement” (7–8 June 2023), available at <<https://www.ospar.org/meetings/archive/collective-arrangement-1>> accessed 5 September 2023.

to the sectoral nature of the contemporary legal and institutional framework governing ABNJ, makes it difficult to establish cross-sectoral MPAs.

3 MPAS in ABNJ under the BBNJ Agreement

For decades, if not centuries, the high seas were treated by the international community as out of reach and out of sight, with the *mare liberum* doctrine serving as the basis for all activities deployed therein. Regrettably, the high seas have become a paradigmatic example of the tragedy of the commons, as its resources, once believed to be infinite, are rapidly dwindling. With the long-anticipated adoption of the BBNJ Agreement, the international community reaffirmed the status of MPAs as a pivotal tool in marine biodiversity conservation. Indeed, the BBNJ Agreement envisions the “establishment of a comprehensive system of [ABMTs], with ecologically representative and well-connected networks of [MPAs].”³⁸

The present section aims to determine whether the new BBNJ regime equips States and international organisations with the legal tools required for the realisation of this objective and whether it can overcome some of the challenges in MPA governance in ABNJ identified in the previous section, ie the issue of sectoralism, the difficulty of *pacta tertiis*, the weakness of substantive obligations within MPAs, and the insufficient levels of transparency. To that end, the following subsection considers how the BBNJ Agreement will restructure the institutional context for the establishment of MPAs in ABNJ. Subsequently, the substantive provisions concerning MPAs are evaluated. Finally, the last subsection assesses whether the BBNJ Agreement could embrace the novel and emerging notion of dynamic MPAs.

3.1 *The BBNJ Institutional Arrangements and Its Impact on Existing MPAs in ABNJ*

ABNJs are, in institutional terms, densely populated. As of 2016, there were over 190 global or regional agreements applicable therein, many of which are equipped with some degree of institutional machinery.³⁹ The BBNJ Agreement not only adds more bodies to this already crowded institutional landscape, as it establishes, among others, a Conference of the Parties (COP), a secretariat,

38 *ibid* art 17(a).

39 E. Bigagli, “The International Legal Framework for the Management of the Global Oceans Social-Ecological System” (2016) 68 *Marine Policy* 157.

and a scientific and technical body (STB),⁴⁰ it moreover bears the potential to significantly modify the dynamics of the cooperation among the existing institutions.

Three ways can be identified in which the BBNJ Agreement will impact existing institutions operating in ABNJ, such as OSPAR. Firstly, the COP is bestowed with a mandate to directly establish MPAs and conservation measures by virtue of Article 22. Under this provision, it may choose whether to directly establish MPAs, following a proposal to this end, or whether to

make recommendations to Parties to this Agreement and [...] to promote the adoption of relevant measures through [...] instruments, frameworks and bodies [IFBs], in accordance with their respective mandates.⁴¹

Thus, even in the more institutionally mature regions, such as the North-East Atlantic, MPAs can be established through the BBNJ Agreement, despite the presence of IFBs the likes of OSPAR. In addition, the COP is mandated to adopt “measures compatible with those adopted by [IFBs]”.⁴² This notion arose following the third intergovernmental conference (IGC-3), initially phrased as ‘measures complementary to those adopted under [IFBs]’. However, during IGC-5 the nomenclature ‘compatible’ was opted for, leaving unclear the relationship between these measures and those established under IFBs. The exact substance of this provision remains fraught with uncertainty, as no elaboration on its meaning and content is provided. However, it appears that this allows the COP to scrutinise existing MPAs, perhaps through the STB, and fill regulatory gaps through the adoption of additional measures. Such measures must be adopted in cooperation and coordination with relevant IFBs, consistent with the requirement to not ‘undermine’ them.⁴³

There are two important caveats to this seemingly expansive mandate of the COP. Firstly, and most importantly, no hierarchy is created between the COP and existing IFBs, and the COP’s capacity to establish MPAs is thus largely contingent upon the willingness of these bodies to cooperate with the COP in establishing MPAs. To address this, various normative and institutional cooperative mechanisms are anchored in the substantive provisions, the text of

⁴⁰ Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, Document A/CONF.232/2023/4 (30 June 2023), arts 47, 49 and 50.

⁴¹ *ibid* art 22(1)(c).

⁴² *ibid* art 22(1)(b).

⁴³ *ibid* art 22(2).

which is examined below. Secondly, an opt-out clause was introduced into the text during the final phases of the negotiations, presumably to accommodate States that continued to resist the COP's extensive mandate.⁴⁴

The second way in which the BBNJ Agreement can impact existing institutions operating in ABNJ is found under article 22(4), which states that the COP can establish a mechanism for the 'recognition' of MPAs established by IFBS, such as OSPAR. This article provides, rather cryptically, that the COP "may decide, as appropriate, to develop a mechanism regarding existing [ABMTs, including MPAs] adopted by [IFBS]".⁴⁵ The negotiating history of this provision reveals that, in its original form, such a mechanism entailed "a separate procedure for the recognition of MPAs agreed by regional organisations that meet the agreed general criteria set out in the implementing agreement".⁴⁶ It was described in some detail in the final version of the draft text:

The [COP] may recognize, in accordance with the objectives, criteria and decision-making process laid down in this Part, area-based management tools, including marine protected areas, established under relevant global, regional, subregional and sectoral bodies, at the request of that body or of a Party authorized to act on its behalf, or Parties authorized to act on its behalf.⁴⁷

Such a mechanism is of utmost significance as it has the potential to partially address one of the fundamental issues in MPA governance in ABNJ, ie their non-applicability to third States. As previously noted, pursuant to the *pacta tertiis* principle, third States are not bound by these MPAs, and can thus freely exercise their high seas freedoms in these areas. However, if these MPAs are recognised through the BBNJ Agreement, and if this Agreement attracts a large

44 *ibid* art 23(4). By virtue of this provision, States can object to the establishment of an MPA or related measure, which will then not be binding upon it. During resumed IGC-5, some delegations proposed that the COP may only establish MPAs when "the measures are not within the competence of IFBS"; T. Kantai et al, "Summary of the Resumed [IGC-5] 20 February – 4 March 2023" (2023) 25(250) *Earth Negotiations Bulletin* 8.

45 *ibid* art 22(4).

46 United Nations, "Chair's non-paper on elements of a draft text of an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction" (28 February 2017) 42.

47 UNGA, "Further Revised Draft Text of an Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction" (12 December 2022) UN Doc A/CONF.232/2023/2, art 19(2).

participation, their range of application could be expanded significantly. For instance, this would mean that the MPAs in ABNJ designated by OSPAR, which currently only binds its fifteen Member States, could become binding on all members of the BBNJ Agreement. However, it appears that no consensus could be reached on how to design such a recognition process, as evinced by the bare-bone provision in which it is now anchored, leaving its further elaboration to the COP.

The third key aspect of the BBNJ Agreement's impact on existing MPAs is the creation of a formal mechanism for consultation among existing regional and sectoral bodies competent to establish ABMTs or MPAs. As outlined previously, UNCLOS' sectoral approach is among the main obstacles in the establishment of cross-sectoral MPAs on the high seas, as it necessitates collaboration among IFBS, which are not always eager to cooperate. The BBNJ Agreement seeks to address this by giving further substance to the general obligation to cooperate in the protection and preservation of the marine environment found in Article 197 of UNCLOS, operationalising it in the context of the high seas. References to coordination and cooperation are found throughout the text, and States are, by virtue of Article 8, obligated to

cooperate under this Agreement for the conservation and sustainable use of marine biological diversity of [ABNJ], including through strengthening and enhancing cooperation with and promoting cooperation among [IFBS] in the achievement of the objective of this Agreement.⁴⁸

Similarly, Article 22(3) provides that, in the context of Part III on ABMTs and MPAs, the COP "shall make arrangements for regular consultations to enhance cooperation and coordination with and among [IFBS] with regard to [ABMTs, including MPAs], as well as coordination with regard to related measures adopted under [IFBS]".

The provision is somewhat vague, as it does not specify what such 'arrangements' may entail. The choice of nomenclature is reminiscent of the Collective Arrangement organised in the North-East Atlantic, and perhaps it is such arrangements that delegations envisioned. In any case, these consultations would presumably take place on a regional level, as it would make little sense to convene them globally, considering that many IFBS have mandates that are spatially restricted.⁴⁹ This process will, again, have to be worked out in further

⁴⁸ BBNJ Agreement, art 8(1).

⁴⁹ RFMOs and many multilateral environmental agreements such as OSPAR and CAMLR Convention, for example, operate on strict regional basis.

detail by the COP. Notably, and in contrast with the aforementioned provision relating to recognition, the word ‘shall’ indicates that it is not left to the discretion of the COP whether or not to make such arrangements.

3.2 *Normative Changes Impacting MPA Governance in ABNJ*

Having outlined the institutional nuances of the BBNJ Agreement, the present section assesses the substantive changes it can make to MPA governance, focusing again on the North-East Atlantic region. It should be noted that the substantive modifications brought about by the BBNJ Agreement align, to some degree, with the institutional changes discussed above. For instance, the increased collaboration among IFBs could produce far-reaching normative implications for MPAs. In addition, as a modern environmental treaty, the BBNJ Agreement further develops the legal framework for biodiversity conservation on the high seas, with notable repercussions for MPA governance in ABNJ. Three key implications of this are highlighted for further consideration.

Firstly, the BBNJ Agreement crystallises the inclusion of modern environmental principles into the law of the sea regime. UNCLOS was negotiated between 1973 and 1982 when understanding of the potential severity of human impacts on the ocean was only just emerging, and therefore it does not embody a lot of modern environmental principles. In newer instruments, especially those of an environmental nature, it is becoming increasingly common to incorporate legal principles into the operative part of the treaty. Consistent with this trend, the BBNJ Agreement reflects several contemporary environmental legal principles, many of which potentially foster the implementation of non-use measures.

Article 7 stipulates the fundamental principles that underpin the application of the BBNJ Agreement. These include, *inter alia*, the polluter-pays principle, an approach that builds on ecosystem resilience; and an integrated approach to ocean management.⁵⁰ Additionally, the ecosystem approach and precautionary principle, also found in Article 7, are mentioned repeatedly in Part III on ABMTs, including MPAs. For example, Article 19 outlines the process for identifying areas requiring protection and submitting proposals, and provides in its ‘chapeau’ that such areas are identified based on “the best available science [...] taking into account the precautionary approach and an ecosystem approach”.⁵¹

Although principles, unlike rules, do not prescribe any particular action, they are important, as they must be “take[n] into account, if it is relevant, as a

⁵⁰ BBNJ Agreement, art 7.

⁵¹ *ibid* art 19(3).

consideration inclining one way or another”.⁵² In other words, principles colour the interpretation of other treaty provisions and thus permeate the application of the BBNJ Agreement as a whole. For OSPAR, specifically, the inclusion of these principles will not have far-reaching consequences, as it has already incorporated such modern principles into its convention text,⁵³ as well as into the management framework for its MPAs in ABNJ.⁵⁴ This is, however, where the crux lies. While incorporating environmental principles in treaties or the normative framework of an MPA can be valuable, OSPAR’s MPAs in ABNJ exemplify that translating them into action is not necessarily a matter of course. It has been shown that these MPAs are essentially paper parks, despite incorporating modern environmental principles into their management frameworks. As a consequence of the decentralised nature of the BBNJ Agreement, MPAs like those implemented by OSPAR will, in many cases, remain under the authority of regional and sectoral bodies. Hence, while the recognition and cooperative mechanisms may expand the normative reach of these MPAs, the BBNJ Agreement does little to actually strengthen the (often weak) normative frameworks of existing MPAs.

Secondly, when examining the process for identifying, designating, and implementing MPAs in more detail,⁵⁵ one notices that it is intended to be very inclusive, systematic and detailed, which could address issues of transparency. This is first apparent when parties must “collaborate and consult, as appropriate, with relevant stakeholders”,⁵⁶ such as IFBs, Indigenous Peoples and Local Communities, civil society, and the scientific community, at the stage of developing proposals. In the next phase, ie consultation and assessment of proposals, the Secretariat facilitates consultations and gathers input from all relevant

52 R. Dworkin, *Taking Rights Seriously* (Duckworth 1977) 24, 26, cited in P. Sands and J. Peel, *Principles of International Environmental Law* (CUP 2018) 200.

53 OSPAR Convention, art 2, stipulates the ‘general obligations’ of the Contracting Parties, which include applying the precautionary principle and the polluter-pays principle. Moreover, OSPAR Convention, art 3 of Annex v, obliges the Commission to “to aim for the application of an integrated ecosystem approach”.

54 See eg OSPAR Decision 2010/2 (n 18) mentions the ecosystem approach and precautionary principle in the preamble, and considers ‘precautionary measures’ to be an intrinsic part of an MPA. The corresponding Recommendation 2010/13 (n 19) similarly relies heavily on these principles.

55 Part III of the BBNJ Agreement comprehensively outlines how the adoption of MPAs can occur through a systematic process that includes submitting a proposal by one or multiple parties (art 19), consultation and assessment of proposals (art 21), establishment of ABMTs and MPAs by the COP (arts 22 and 23), and implementation (art 25).

56 BBNJ Agreement, art 19(2)

stakeholders. The proponent of the proposal must consider these inputs and revise the proposal accordingly, as appropriate.⁵⁷

Upon comparing the procedures of the BBNJ Agreement and OSPAR, what stands out in particular is the level of detail in which the process under the global instrument is described. In contrast, OSPAR's (non-binding) Guidelines⁵⁸ for the identification and selection of MPAs do not provide for any engagement of stakeholders, and, importantly, have not been expressly relied upon for the identification of sites in ABNJ,⁵⁹ which instead has been conducted in an *ad hoc* fashion. Notably, however, all proposals for OSPAR MPAs in ABNJ have thus far been put forward by non-governmental organisations (NGOs).⁶⁰ While the active role of NGOs is to be applauded, the lack of clear procedures being followed does not benefit transparency and inclusiveness, as there are no clear obligations to engage with stakeholders or make certain information publicly available.

The third and last key normative change brought forward by the BBNJ Agreement is that it has the potential to foster a stronger integration of science into MPA governance in ABNJ. The infusion of scientific data into the normative fabric of conservation and management measures is key to their effectiveness, in particular for MPAs, that commonly encompass a set of conservation goals. Therefore, it is essential not only to measure the progress towards these goals but also to consistently monitor the marine environment to determine if any adjustments to the goals themselves are necessary. The drafters of the BBNJ Agreement seemed cognisant of this, as the Agreement accords a prominent role to science. The use of the best available science is listed among the guiding principles and approaches of the BBNJ Agreement,⁶¹ as well as specifically in relation to MPAs, where it is provided that "proposals shall be formulated on the basis of the best available science and scientific information".⁶² This principle is further operationalised by the creation of the STB, which plays a central

57 *ibid* art 18(5).

58 Guidelines for the Identification and Selection of Marine Protected Areas in the OSPAR Maritime Area (OSPAR Agreement: 2003-17), as amended by Recommendation 2010/2.

59 Klerk (n 20) 8.

60 The Charlie-Gibbs Fracture Zone was proposed by WWF (Summary record 2007 OSPAR Commission meeting (OSPAR 07/24/1-E) 25-29 June 2007, para 6.17); the Arctic Ice MPA was proposed by Greenpeace and is currently under consideration in collaboration with the Arctic Council (Summary record 2016 OSPAR Commission Meeting (OSPAR 16/20/1-E) 20-24 June 2016, para 6.27); and the NACES MPA was proposed by BirdLife (Draft nomination proforma for a 'North Atlantic Current and Evlanov Seamount' MPA in the OSPAR Maritime Area ICG-MPA 19/4/3 Addendum.

61 BBNJ Agreement, art 7(h).

62 *ibid* art 19(3).

role in the review of proposals,⁶³ the adoption of emergency measures,⁶⁴ and in the monitoring and review process.⁶⁵ Incorporating scientific scrutiny throughout all stages of MPA governance may enhance not only their effectiveness but also transparency. As we have seen, no information is published about the implementation and effectiveness of OSPAR's MPAS. In contrast, the BBNJ Agreement requires monitoring and review reports made publicly available, thereby enabling stakeholders and the general public to see whether MPAS are being implemented.

To conclude, the BBNJ Agreement bears the potential to bring about significant changes to MPA governance in ABNJ. However, due to its decentralised nature,⁶⁶ many MPAS will continue to be governed by sectoral and regional bodies and are hence outside of the BBNJ's normative reach. Paper parks may thus persist. However, this will largely depend on the success of the other mechanisms through which the Agreement seeks to strengthen MPA governance, that is, incorporating contemporary environmental legal principles; prescribing a detailed and highly inclusive process for the selection and implementation of MPAS in ABNJ; and according a prominent role to science. However, for the BBNJ Agreement to be fully future-proof, it should also be capable of accommodating the implementation of emerging concepts and approaches. The ensuing subsection assesses whether it is sufficiently dynamic to do so.

3.3 *Can the BBNJ Agreement Embrace Dynamic MPAS?*

UNCLOS is often referred to as a 'living instrument', as it was 'designed to be flexible'⁶⁷ and therefore capable of evolving to adapt to changing circumstances and emerging challenges. The BBNJ Agreement should similarly seek to embody some degree of flexibility, so as to make it future-proof and facilitate the implementation of novel tools and concepts. This ability is put to the test

63 The STB carries out a preliminary review of proposals, prior to the general consultation procedure (art 18). During the consultation process, the STB conducts a more elaborate assessment which the proponent 'shall consider' (art 21(5)). It moreover provides the COP with scientific advice and recommendations in relation to MPA proposals, which the COP must take into account (arts 21(7) and 22).

64 BBNJ Agreement, art 24 provides that such measures can be recommended by the STB.

65 *ibid* art 26.

66 While, as outlined above, the COP can designate MPAS directly, in institutionally mature regions such as the North-East Atlantic the BBNJ Agreement is decentralised inasmuch as regional and sectoral bodies will carry the majority of the burden of designating and implementing ABMTs.

67 M. Wood, "Reflections on the UN Convention on the Law of the Sea" in J. Barrett and R. Barnes (eds), *Law of the Sea: UNCLOS as a Living Treaty* (British Institute of International and Comparative Law 2016) LXXVII, LXXVIII.

by assessing its capacity to sustain the implementation of dynamic MPAs, a tool that itself emanates from a recognition of the ocean's inherently changing nature.

Indeed, the main premise underlying dynamic MPAs is that the very notion of drawing static boundaries to delineate an MPA sits uncomfortably with the dynamic nature of the ocean. Whereas, on land, animals can no longer freely roam the Earth due to human habitation, the ocean's fluidity and three-dimensionality allow marine animals to migrate across them, and oceanic circulation and currents transport nutrients, eggs, and larvae over vast distances.⁶⁸ Even in ecosystems that are spatially more static, such as coral reefs, its inhabitants may be mere passers-by while engaged in transoceanic journeys.⁶⁹ There is thus a clear tension between the dynamic nature of the ocean and the static nature of MPAs. This tension becomes even more pronounced when considering human interferences, as these add another layer of dynamism. Climate change, in particular, poses a significant challenge to MPAs. Species are rapidly changing their spatial distribution,⁷⁰ and ecosystems are transforming in the face of increasing human pressures.⁷¹ This further underscores the inadequacy of static legal paradigms, as ecosystems and species are moving beyond the confines of maritime zones and MPAs, and conservation measures once designed to protect certain key species may no longer be effective as the ecosystem in question may now bear little resemblance to its past state.

By better aligning the design of the MPA with the dynamic nature of the ocean, dynamic MPAs seek to address these concerns. It has been pointed out elsewhere that ABMTs in ABNJ should "fully reflect the spectrum of variability seen in the open ocean and deep sea and may include a combination of static and dynamic measures".⁷² Dynamic MPAs are such a tool, which is generally understood as an MPA "whose boundaries shift across space and time, that

68 M. Dubois et al, "Linking basin-scale connectivity, oceanography and population dynamics for the conservation and management of marine ecosystems" (2016) 25 *Global Ecology and Biogeography* 503–515.

69 See eg M. C. Boyle et al, "Evidence for transoceanic migrations by loggerhead sea turtles in the southern Pacific Ocean" (2009) 276 *Proceedings of the Royal Society B* 1993–1999.

70 Between 25 and 85% of species have already shifted their geographical range in response to warming water temperatures, see M. L. Pinsky et al, "Climate-Driven Shifts in Marine Species Ranges: Scaling from Organisms to Communities" (2020) 12 *Annual Review of Marine Science* 153–179.

71 See eg S. Kortsch et al, "Climate change alters the structure of arctic marine food webs due to poleward shifts of boreal generalists" (2015) 282 *Proceedings of the Royal Society B* 1814.

72 Crespo et al (n 7) 2.

could help to safeguard marine life and build ecosystem resilience by protecting dynamic habitats as well as migratory marine species in a changing ocean.”⁷³ One benefit of dynamic MPAs is that they better align the spatial and temporal scope of measures to the variability in the environment, thereby potentially greatly increasing the efficacy of management responses over traditional non-use or restricted-use measures.⁷⁴ However, dynamism in a mere spatial and temporal sense is limited, as it does not allow for an appropriate response to the changes occurring in ecosystem composition and functioning. Thus, in addition to dynamism in a geographical sense, it is argued here that dynamic MPAs should also embody dynamism in a ‘normative’ sense. As shown above, marine ecosystems are constantly changing, especially in the face of climate change and biodiversity loss, and they may thus require a more dynamic set of measures that can respond to these changes. This is, of course, only possible in tandem with a comprehensive monitoring program and a flexible and adaptive governance structure.

Perhaps unsurprisingly, given the novelty of the concept, dynamic MPAs are not mentioned explicitly in the BBNJ Agreement. However, the Agreement mentions climate change in its preamble, in its guiding principles, and in the objectives of Part III.⁷⁵ Considering that, as indicated above, marine species are shifting their geographical range in response to climate change and thereby inevitably, at least to some degree, moving beyond MPA borders, adequately acknowledging the effects of climate change arguably requires the incorporation of flexible management approaches that respond to these changes. Moreover, it was reiterated at several instances throughout the negotiations that the BBNJ Agreement should be ‘future-proof’,⁷⁶ which arguably would require a more dynamic approach to marine conservation. The absence of explicit reference to dynamic MPAs does not necessarily preclude their implementation. After all, MPAs are not mentioned anywhere in UNCLOS, and this has proven to be no obstacle to their widespread (albeit fully satisfactory) implementation. Thus, the following analysis will navigate the BBNJ Agreement in search of obstacles to the implementation of dynamic MPAs, rather than components which specifically enable their implementation.

A logical starting point for this assessment is the definition of MPAs, outlined in Article 1 of the Agreement as “a geographically defined marine area that is

73 S. M. Maxwell et al, “Mobile protected areas for biodiversity on the high seas” (2020) 367(6475) *Science* 252–254.

74 Crespo et al (n 7).

75 BBNJ Agreement, art 7(g) and 17(c).

76 See eg IGC President Rena Lee opened IGC-5.2 “encouraging delegates to bring their commitment to this resumed session in order to garner consensus on a universal, effective, and future-proof agreement”, see Resumed IGC-5 Summary (n 44).

designated and managed to achieve specific long-term biodiversity conservation objectives and may allow, where appropriate, sustainable use provided it is consistent with the conservation objective”.⁷⁷ Crespo et al. have questioned the phrase ‘geographically defined area’, suggesting that the definition could benefit from a more dynamic and flexible approach.⁷⁸ While this is a valid point, it is important to note that the current definition might implicitly allow for dynamic MPAs. The definition indeed does not preclude the possibility of an MPA having fluid boundaries, as long as its boundaries are geographically defined at any given point in time. Furthermore, ‘normative dynamism’, ie conservation measures subject to constant adjustment, also falls within the ambit of this definition, as it merely requires the area to be ‘managed’. Thus, although this definition would ideally incorporate a dynamic element explicitly, its current wording is not an obstacle to the implementation of dynamic MPAs.

Similarly, Article 19, outlining the process for submitting proposals for the establishment of MPAs, requires such proposals to include “a geographic or spatial description of the area that is the subject of the proposal”.⁷⁹ The ‘area that is the subject to the proposal’ could be a larger area within which one or several dynamic MPAs are designated, the exact location of which would be subject to periodic review. For instance, a larger area in which whale species are known to aggregate seasonally for breeding or feeding could be proposed as the relevant ‘area’. Then, to respond to interannual variability in their distribution,⁸⁰ the exact geographical delineation of the MPA could be outlined based on sightings and other scientific data.

Article 19 moreover requires the proposal to include “a draft management plan encompassing proposed measures, and outlining proposed monitoring, research and review activities to achieve the specified objectives”,⁸¹ as well as “the duration of the proposed area and measures, if any”.⁸² Although these provisions were not drafted with dynamic MPAs in mind, they include various dynamic elements, and could potentially foster the implementation of dynamic MPAs. The requirement to include monitoring and review procedures allows for periodic revision of the MPA’s boundaries and protective

77 BBNJ Agreement, art 1(12).

78 Crespo et al (n 7) 7.

79 BBNJ Agreement, art 19(4)(a).

80 A. de Vos, C. B. Pattiaratchi, and R. G. Harcourt, “Inter-Annual Variability in Blue Whale Distribution off Southern Sri Lanka between 2011 and 2012” (2014) 2(3) *Journal of Marine Science and Engineering* 534–550.

81 BBNJ Agreement, art 19(4)(f).

82 *ibid* art 19(4)(g).

measures.⁸³ The inclusion of a temporal element ('duration') potentially yields the same results, as this does not necessarily refer to the duration of the MPA in its entirety, but may also entail, say, seasonal adjustment of measures and MPA boundaries.

In a similar vein, Article 26 provides for monitoring and review of ABMTs, including MPAS, by the STB. Taking into account reports from the Parties and IFBS,⁸⁴ the MPAS "shall be monitored and periodically reviewed by the Scientific and Technical Body", with a view to assessing their effectiveness.⁸⁵ Since periodic review coupled with environmental monitoring is a prerequisite for the implementation of dynamic MPAS, the BBNJ Agreement's explicit incorporation of periodic review creates the practical basis for their implementation. However, the process is explicitly tied to decision-making by the COP, which will presumably be convened only once a year.⁸⁶ This may be problematic since the implementation of dynamic MPAS requires adaptive management and swift decision-making processes. The STB may gather more regularly, but its competencies are limited to providing advice and recommendations to the COP. It would not, in any case, be prudent to endow a scientific body with the competence to make substantive adjustments to MPAS.

A possible solution, then, lies in the possibility for the COP to establish subsidiary bodies.⁸⁷ It could establish a subsidiary body that oversees the dynamic MPAS established through the BBNJ Agreement, based on inputs from the STB. This body could meet at regular intervals, and be granted a mandate to adjust MPA boundaries and measures where necessary, within the parameters set by the original decision establishing the MPA. The COP could then scrutinise these adjustments during its annual or bi-annual meetings, safeguarding the legitimacy of measures.

A final element that merits mention, as it has potential dynamic applications, is Article 24 on 'emergency measures'. This provision allows for the adoption of MPAS "on an emergency basis, if necessary, when a natural phenomenon or human-caused disaster has caused, or is likely to cause, serious or irreversible harm to marine biological diversity of [ABNJ] to ensure that the

83 In this regard, see also BBNJ Agreement art 26(3), which provides that ABMTs, including MPAS, "shall be monitored and periodically reviewed by the Scientific and Technical Body".

84 *ibid* art 26(1), reporting is mandatory.

85 *ibid* art 26(3).

86 *ibid* art 47, which merely provides that "ordinary meetings of the Conference shall be held at regular intervals to be determined by the Conference at its first meeting".

87 *ibid* art 47(6)(d).

serious or irreversible harm is not exacerbated”.⁸⁸ Such measures can be proposed by Parties or the STB, and are adopted by the COP ‘intersessionally’.⁸⁹ What exactly this entails is unclear, as the exact procedures are to be worked out in further detail by the STB. MPAs established under this provision embody a higher degree of dynamism, at least in a temporal sense, as they are established through a simplified and adaptive mechanism. However, given the high threshold of harm required for their establishment,⁹⁰ it is questionable whether this provision could be relied upon for the adoption or adjustment of dynamic MPAs.

In conclusion, the framework for the conservation and sustainable use of marine biodiversity in ABNJ potentially allows for the establishment of dynamic MPAs. This would, however, require more explicit facilitation through the rules of procedures of the COP, the STB and subsidiary bodies. Ideally, a subsidiary body would be established with a mandate specifically focused on dynamic MPAs.

4 Concluding Remarks

Despite the adoption of a myriad of ocean-related instruments, UNCLOS firmly remains at the centre of the law of the sea and ocean governance.⁹¹ It has proven to be flexible enough to encompass new principles and concepts and take account of new realities. It does not, however, address all pertinent issues of ocean governance,⁹² and the BBNJ Agreement seeks to fill its most important caveat: the lack of a comprehensive regime for the protection of biodiversity in ABNJ. Examining the potential contribution of the BBNJ Agreement towards the conservation of high seas’ biodiversity, this chapter first analysed the new treaty’s capacity to address existing gaps in MPA governance in

88 *ibid* art 24.

89 *ibid* art 24(b).

90 *ibid* art 24(a) states that emergency measures can only be adopted “if the threat or adverse impact of an activity cannot be managed in a timely manner through the application of the other provisions of this Agreement or by a relevant legal instrument or framework or global, regional, subregional or sectoral body”.

91 T. T. B. Koh, “A Constitution for the Oceans’, Remarks by Tommy T. B. Koh, President of the Third United Nations Conference on the Law of the Sea” (10 December 1982), available at <https://www.un.org/depts/los/convention_agreements/texts/koh_remarks.pdf> accessed 13 July 2024.

92 M. Wambua, “A critical review of the global legal framework on piracy: 40 years after UNCLOS” (2022) 18(1) *Maritime Affairs: Journal of the National Maritime Foundation of India* 40.

ABNJ, with reference to the North-East Atlantic in particular. Then, the chapter questioned whether the BBNJ Agreement would be able to maintain the often-praised capacity of UNCLOS to grow and evolve; to do so, it examined the treaty's ability to encompass a more dynamic mode of ocean governance, ie the implementation of dynamic MPAS.

In conducting this analysis, this chapter moreover shed light on various questions of relevance for the study of non-use. Firstly, the analysis of the OSPAR network in ABNJ unveiled that even a well-developed institutional structure can adopt MPAS that are unlikely to be successful. Rather than focusing on the name of a specific ABMT or even its stated objectives, an MPA with the potential to meet conservation goals must include at the very least specific non-use or restricted-use measures and a monitoring framework. More generally, this examination laid bare how the conditions in ABNJ for adopting non-use measures – in particular the contemporary normative context within which they were designated, here characterised by sectorialism and the reign of the *pacta tertiis* principle – have negatively impacted their success. OSPAR's MPAS embody severe limitations, some of which can indeed be attributed, at least in part, to the legal and institutional frameworks governing the high seas. The findings indicate that the BBNJ Agreement has the potential to significantly enhance MPA governance in ABNJ by addressing identified gaps, promoting collaboration among relevant actors, incorporating contemporary environmental legal principles, and prioritising science in the selection and implementation of MPAS. However, even the BBNJ Agreement is unlikely to single-handedly solve the problem of paper MPAS.

Secondly, the prospects of adopting the non-use measures under discussion, ie dynamic MPAS, under the BBNJ Agreement seem favourable, as nothing in the text explicitly excludes their implementation and it embodies various dynamic elements. However, following the highly anticipated adoption of the final text, much remains to be done. Delegations decided to leave to the COP to elaborate more detailed rules for how the BBNJ Agreement will work in practice. This process of elaboration will reveal the degree to which it can encompass new modes of ocean governance, such as dynamic MPAS.

High seas MPAS face many challenges to truly become effective conservation tools. In their newest iteration under the BBNJ Agreement, MPAS seem to imply the existence of non-use measures and might propose solutions to alleviate some of the multiple challenges stemming from sectorialism, transparency, and implementation, just to name a few. Therefore, for now, the adoption of the BBNJ Agreement justifies cautious optimism about the future of MPA governance in ABNJ.

RFMOs and Non-use Measures

Typology, Practice and Considerations for Future Developments

Osvaldo Urrutia

1 Introduction

This chapter examines the existing practice concerning non-use measures in high-seas areas managed by regional fisheries management organisations (RFMOs). Considering non-use on the high seas may seem odd: since Grotius' days, this vast area and its marine living resources have been meant to be extracted and utilised.¹ International law, particularly the 1995 UN Fish Stocks Agreement (UNFSA) still recognises every State's freedom of fishing subject to the duty to cooperate through existing RFMOs to adopt management measures for the stocks concerned.² Predictably, RFMOs are reluctant to cut off their members' fishing rights: States want their fleets to fish and have established these organisations to deliver regulations for the activity. They would only consider actions translating into non-use decisions under specific or exceptional circumstances.

Yet non-use measures are among the many tools at RFMOs' disposal, even if they are used only occasionally. Generally, RFMOs understand use as any activity that targets or otherwise impacts a resource under their competence. In the case of RFMOs, this means extracting resources from the environment or using the resources the environment contains rather than those the environment represents (spatial-extension resources).³ Therefore, non-use measures in this chapter are understood as those requiring the absence of such taking.

Reasons behind non-use measures adoption vary, including attempts to recover a depleted fishery, conservation of specific non-targeted species and – more recently– broader ecosystem considerations, as when RFMOs have

1 H. Grotius, *The Freedom of the Seas* (first published in 1609, OUP 1916) 72–76.

2 United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (opened for signature 4 December 1995, entered into force 11 November 2001) 2167 UNTS 3, arts 8 and 17.

3 These understandings are consistent with the definition of use and non-use offered by Guggisberg in chapter 2 of this volume.

adopted measures to protect vulnerable marine ecosystems. Observing such practice and RFMOs' dynamics may offer instructive lessons for future discussions on designing and establishing marine protected areas (MPAs) or similar management measures that could potentially have a non-use component, including under the recently adopted Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement).⁴

This contribution is organised into five sections. After this introduction, the second section offers a brief legal and institutional context, situating international fisheries and RFMOs' work within the 1982 United Nations Convention on the Law of the Sea (UNCLOS) framework⁵ and clarifying the meaning of RFMOs to follow. Based on this book's conceptualisation, the third section categorises the types of non-use measures RFMOs adopt, including what this contribution excludes from the non-use measure concept. The same section then moves to present and discuss some of the relevant RFMO practice on the subject. The paper highlights that non-use measures are part of the instruments at RFMOs' disposal, even as these organisations resort to them unevenly. There are differences in applying these measures through regions, and the most visible practice concerns RFMOs with competence over deep water and bottom fisheries.

The fourth section outlines some considerations and difficulties for advancing future non-use area-based tools within RFMOs and the future interactions with the Conference of the Parties under the recently adopted BBNJ Agreement. Observing RFMOs' dynamics offers instructive lessons for future discussion on designing and establishing area-based management decisions that may include non-use measures under MPAs.⁶ The chapter closes by providing some conclusions, including a reflection on the challenges to successful non-use measures under RFMOs.

4 Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, Document A/CONF.232/2023/4 (30 June 2023).

5 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3. Technically, the acronym UNCLOS refers to the United Nations Conferences on the Law of the Sea, of which the Third (1973–1982) resulted in the UNCLOS. However, as other chapters in this book use the acronym UNCLOS to refer to the Convention, this chapter will be consistent. See W. R. Edeson, "Law of the Sea Convention: Confusion over the use of 'UNCLOS', and references to other recent agreements" (2000) 15 *International Journal of Marine and Coastal Law* 413.

6 See also the discussion by Klerk in chapter 4.

2 Legal and Institutional Framework

It is difficult to overestimate the importance of RFMOS for the sustainable management of fish, particularly straddling and highly migratory stocks, ie those that occur in waters under national jurisdiction and the high seas. These organisations have become the standard multilateral regulatory framework to adopt specific measures for these stocks, including any potential non-use measures, bringing together relevant coastal and flag States. The following sections first offer a brief context to situate the work of States cooperating through RFMOS against an international legal background historically defined by the freedom to fish. Likewise, the second section clarifies what this chapter will regard as an RFMO because the notion may offer some difficulties.

2.1 *The Law of the Sea and Fisheries*

UNCLOS provides the basic legal framework for the exploitation and management of marine living resources. Yet this fundamental treaty contains weak provisions to offer an adequate framework for the sustainable exploitation of fisheries, including those occurring on the high seas.

In recognising the exclusive economic zone (EEZ), UNCLOS gave coastal States “sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living” up to 200 nautical miles.⁷ Articles 63(2) and 64 establish a similar rule for States to regulate the exploitation of straddling and highly migratory stocks, that is, those that occur in areas subject to coastal State jurisdiction and the high seas. Coastal States and those fishing for these stocks shall cooperate to adopt conservation and management measures. Under UNCLOS, States can do this directly or bilaterally, or by establishing organisations for this purpose.

For fishing activities on the high seas, Articles 87 and 116–119 maintain the freedom of fishing subject to broad rules imposing limited restrictions and responsibilities on fishing States. Under Article 117, “all States have the duty to take, or to cooperate with other States in taking, such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas”. Article 118 provides a slightly more specific duty to enter negotiations “with a view to taking the measures necessary for the conservation of the living resources concerned”. However, UNCLOS does not address how States should cooperate when an existing regional framework – such as an RFMO – has already adopted management measures. Equally,

⁷ UNCLOS, art 56(1)(a).

Article 119 recognises the maximum sustainable yield (MSY) as the management standard but is qualified by several factors. In practice, all these provisions have been unable to restrain States' conduct on the high seas.⁸

International efforts to overcome the gaps left by UNCLOS led to the adoption of the UNFSA in 1995, which entered into force in 2001. The UNFSA introduced two significant changes for managing straddling and highly migratory stocks. The first is the establishment of general principles coastal and flag States must apply to these fisheries: the precautionary principle and an ecosystem approach to fisheries management.⁹ The UNFSA's second change was recognising a robust and specific duty to cooperate in managing straddling and highly migratory species, enhancing the role of RFMOs. Article 8(3)-(4) provides that, when an RFMO has been established with the competence to adopt management measures for fish stocks, only States which are members or agree to apply the management measures adopted by the competent RFMO "shall have access to the fishery resources to which those measures apply".¹⁰

With only a handful of exceptions, States cooperate to implement these provisions through RFMOs and similar arrangements and have accepted the UNFSA's approach. Today, there is broad consensus that fishing by vessels flagged to uncooperative non-members is regarded as illegal, unreported and unregulated fishing, or 'IUU fishing'.¹¹ This is why the work of RFMOs is critical for managing high seas stocks and for observing the extent to which States adopt non-use measures.

2.2 *The Meaning of RFMOs*

There is no single legal definition of RFMOs, but there is general agreement that they share three distinctive features.¹² They are treaty-based international organisations with legal personality and permanent organs, have the competence to manage high seas stocks and the power to adopt legally binding

8 See E. Hey, "The Persistence of a Concept: Maximum Sustainable Yield" in D. Freestone (ed), *The 1982 Law of the Sea Convention at 30: Successes, Challenges and New Agendas* (Brill 2013) 89–97.

9 UNFSA, arts 5, 6 and 7.

10 UNFSA, art 8(4). See also art 17(1) and (2).

11 Food and Agriculture Organization (FAO), "International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing" (2 March 2001) para 3.3.1.

12 Though the UNFSA defines "arrangement" in Article 1(d), in very broad terms.

measures.¹³ Though partial exceptions exist,¹⁴ RFMOS are usually ‘stand-alone’ and decentralised organisations. Organisations with competence over marine mammals but not fish and those with purely conservationist objectives are not RFMOS, and will therefore not be covered in this chapter.

This chapter regards RFMOS as those with the competence to regulate high-seas fishing and, more explicitly, straddling, highly migratory and the so-called discrete stocks or those that only occur on the high seas. This distinction is relevant because RFMOS set up under Article 64 of UNCLOS would have a role in waters subject to coastal States’ jurisdiction and the high seas. However, this chapter does not examine RFMO measures impacting or related to coastal State practice; it only looks at those non-measures adopted by RFMOS and applicable to the high seas.

Equally, this chapter will not examine the practice of regional organisations that manage anadromous resources under Article 66 of UNCLOS. Article 66(3)(a) bans the take of such species while they are on the high seas, and is in itself a non-use measure.¹⁵ Admittedly, this is one of the most innovative and substantive non-use measures adopted at a treaty level in the law of the sea. Since States in whose rivers anadromous species are born are the ones with the most interest in their conservation, they can take measures within their EEZs. On the high seas, Article 66(3) of UNCLOS facilitates this goal by prohibiting the taking of these resources, unless ‘economic dislocation’ may follow to another State – an exception that has yet to be applied. However, Article 66(3) also means that regional treaties establishing regional organisations to regulate salmon fisheries replicate the same approach, and their practice on the high seas rests primarily on enforcing it. The regional organisations with the competence over salmon fundamentally manage this prohibition and have adopted measures focussed on preventing or reacting to illegal or unregulated fishing by adopting robust monitoring and control measures.¹⁶

13 Perhaps, in addition, to a secretariat that oversees the day-to-day operations. J. Harrison “Key Challenges Relating to the Governance of Regional Fisheries” in R. Caddell and E. J. Molenaar (eds), *Strengthening International Fisheries Law in an Era of Changing Oceans* (Hart 2019) 79, 84.

14 For example, those organisations established under the umbrella of the FAO, such as the Indian Ocean Tuna Commission (IOTC), a feature that generally does not affect their management competence.

15 UNCLOS, art 66(3)(a) recognises the exception of “economic dislocation” in favour of a State other than the State of origin, which has not been applied.

16 Convention for the Conservation of Salmon in the North Atlantic Ocean (adopted 2 March 1982, entered into force 1 October 1983) 1338 UNTS 33; Convention for the

An additional clarification concerns the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).¹⁷ CCAMLR is a unique organisation: the objective of its founding Convention is the conservation of Antarctic marine living resources, where the term ‘conservation’ includes rational use.¹⁸ Therefore, CCAMLR is competent to regulate fishing activities in Antarctic waters. Adopting such decisions has been CCAMLR’s primary business for decades, even as its members do not consider the organisation an RFMO.¹⁹ Most CCAMLR measures on fisheries management are similar to those of other RFMOs, perhaps with the exception of the absence of formal allocation schemes. Because of these similarities, relevant decisions adopted by CCAMLR may fall under the understanding of non-use measures, and this contribution assimilates them to those adopted by RFMOs.

3 Non-use Measures and RFMOs

This section discusses non-use measures under RFMOs treaties and the practice of these bodies when adopting conservation and management decisions, consistent with the conceptualisation this book follows. The first section distinguishes between those measures prohibiting the taking of specific species and those aiming at closing areas to fish. The second section presents part of the relevant RFMO practice on the subject following this categorisation.

3.1 *Typology of Non-use Measures*

As the introduction set out, this chapter generally follows the conceptualisation proposed in this book.²⁰ Marine fishing implies taking marine animals for human or other animal consumption. Therefore, non-use is identified with ‘no taking and killing’ of fish. There is no other possible (except theoretical) utilisation of fish caught on the high seas – even catching fish to take genetic samples would certainly involve, imply or accept such an end.

Conservation of Anadromous Stocks in the North Pacific Ocean (adopted 11 February 1992, entered into force 16 February 1993) 1899 UNTS 69.

17 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) (signed 20 May 1980, entered into force 7 April 1982) 1329 UNTS 47.

18 CCAMLR, art II (1), (2) and (3).

19 See CCAMLR, “Report of the Twenty-Seventh Commission Meeting” (October–November 2008) SC-CAMLR-XXVIII, 71; CCAMLR, “Report of the Thirty-First Commission” (October–November 2012) CCAMLR-XXXI, 129.

20 See the discussion by Guggisberg in chapter 2.

In this categorisation, scientific research that takes fish is also a type of use. This is often the case in fisheries science, where individuals are rarely extracted alive, even if in smaller quantities and not for commercial purposes. However, activities not considering killing fish (eg tagging for scientific purposes) are not regarded as use and will not be covered when addressing RFMOs practice.

The following subsections introduce the two main categories of non-use measures that RFMOs may adopt, namely by species and area, and then explain what will *not* be regarded as non-use in RFMOs' work.

3.1.1 Measures Prohibiting the Taking of Targeted or Other Specific Species

These measures aim to directly ban the taking of species or prohibit fishing over specific fish stocks in an RFMO area of competence or part thereof. There could be different grounds for them: a prohibition on taking a targeted species for sustainability purposes or a seasonal ban allowing for the protection of recruitment processes.²¹ Such decisions would allow for species recovery, restore productivity, and ensure future commercial activities. Equally, measures prohibiting taking associated species or those belonging to the same ecosystems as targeted species due to biodiversity conservation concerns would also fall under this category. Several RFMO treaties unambiguously contemplate the possibility of taking such measures for their decision-making bodies, including those establishing the Inter-American Tropical Tuna Commission (IATTC),²² the South East Atlantic Fisheries Organisation (SEAFO)²³ and the Western and Central Pacific Fisheries Commission (WCPFC),²⁴ to name a few. Other RFMO constitutive treaties do not say anything, but – as the following parts will discuss – in practice, some RFMOs have adopted such measures notwithstanding.

21 In simple terms, in a recruitment process young and small fish survive to become slightly older and larger fish, entering the fishery.

22 Convention for the Strengthening of the Inter-American Tropical Tuna Commission established by the 1949 Convention between the United States of America and the Republic of Costa Rica (opened for signature 14 November 2003, entered into force 27 August 2010) (Antigua Convention) art VII(1)(f).

23 Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean (SEAFO Convention) (opened for signature 20 April 2001, entered into force 13 April 2003) 2221 UNTS 189, art 3(d).

24 Convention on the Conservation of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC Convention) (opened for signature 5 September 2000, entered into force 19 June 2004) 2275 UNTS 40532, arts 5(e), 6(4) and 10(1)(c).

3.1.2 Measures Closing Areas to Fishing

These measures aim to ban the taking of fish within an RFMO area of competence or part thereof, with no reference to specific species or resources. The fact that an RFMO adopts a non-use measure targeting particular species in a defined area does not necessarily make it an area-based one – it would still fall under the category discussed in the previous subtitle above. The critical feature here is the closing of a specific region to fish in consideration of the area itself and its components, with or without reference to species or resources.

Non-use measures in this group admit different justifications. For example, precaution may suggest closing an area to fish until more information on the available stocks is available. An area closure aiming to protect a spawning region for multiple species based on productivity reasons also falls under this category, even if it does not necessarily seek broader ecosystem considerations. It is also possible to consider a fishing ban to safeguard the habitat or ecosystem where targeted and associated species occur. Equally, depending on the impacts of specific fishing or gear on unique or fragile ecosystems, these circumstances would call for non-use measures based on broader biodiversity considerations to protect ecosystems where fish occur. The second part will show that RFMOs' decisions to protect vulnerable marine ecosystems (VMEs) have been adopted based on some of these grounds. Likewise, marine protected areas banning fishing would fall under the present category.

Admittedly, not every measure aimed at protecting habitats or ecosystems where fish and fishing occur needs to be a non-use measure. For example, allowing specific, less harmful fishing gear while prohibiting others may suffice to achieve broader conservation-oriented policy considerations.

3.1.3 What is Not Regarded as 'Non-use' Measures

Some RFMO decisions may look like non-use measures but are not. A couple of examples in the context of WCPFC illustrates the point. Prohibiting specific gear or tools for fishing while still allowing catches with other means is not regarded as a non-use measure. Therefore, the well-known prohibitions of deploying fish aggregated devices (FADs) adopted by WCPFC are not within the scope of the non-use measures notion as this contribution understands them, as it still allows for catches without deploying the FADs.²⁵ In the same WCPFC context, the so-called 'closures' of high seas pockets that banned tuna fishing by purse seiners in 2008–2012 cannot be regarded as non-use measures because they still

25 See eg WCPFC, "Conservation and Management Measure 2021-01 for Bigeye, Yellowfin and Skipjack tuna in the Western and Central Pacific Ocean", available at <<https://cmm.wcpfc.int/measure/cmm-2021-01>> accessed 11 August 2024.

allowed fishing through other means.²⁶ Similarly, area closures prohibiting tuna fishing for purse seiners but not for vessels using other gears in IATTC do not fall under the notion of non-use measures proposed here.²⁷

The WCPFC also illustrate what should not be regarded as non-use measures with a third example. The Parties to the Nauru Agreement demand that foreign fleets seeking access to their members' EEZ abstain from fishing on the high seas. This is not a non-use measure as categorised here. Such a condition is not a measure adopted by WCPFC. Instead, it is the exercise of coastal State jurisdiction conditioning access to fishing in domestic waters.²⁸ Distant-water fishing States can still fish legally in the high seas pockets; the only consequence is being unable to access the EEZs of certain coastal States.

3.2 *RFMOS' Practice*

Non-use measures in the context of RFMOS can be adopted directly at the treaty level or afterwards by a decision of the relevant body, often the Commission. This section contains examples of both, even if the former option is rare. A significant development is that RFMOS have come to adopt non-use measures even if their original constitutive treaties did not openly provide for such competence. However, not all RFMOS exhibit the same degree of development in adopting such non-use measures. Several RFMOS regularly opt for other management tools such as effort control rules, total allowable catches and other input or output measures short of fishing prohibitions.

3.2.1 RFMOS' Competence to Adopt Non-use Measures

Indications of the content of management decisions are rather general in RFMO conventions predating UNCLOS or the UNFSA.²⁹ Most do not refer explicitly to the competence to implement non-use measures and do not mention adopting fishing bans or prohibitions as apparent RFMO powers. For

26 WCPFC, "Conservation and Management Measure 2008-01 for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean", available at <<https://cmm.wcpfc.int/measure/cmm-2008-01>> accessed 18 June 2024.

27 Inter-American Tropical Tuna Commission (IATTC) Scientific Advisory Committee, "Resolution C-21-04, Conservation Measures for Tropical Tunas in the Eastern Pacific Ocean (2022-2024)" (adopted 2021) 98th Meeting (resumed) (by videoconference), 18-22 October 2021, paras 2-3. See also para 12 regarding the so-called "corralito" for purse seiners.

28 Parties to the Nauru Agreement, "Third Implementing Agreement of the Nauru Agreement" (2008) art 1(3), available at <<https://www.pnatuna.com/sites/default/files/3rd%20Arrangement%20PNA.pdf>> accessed 20 June 2024.

29 The UNCLOS says nothing about regional organisations with competence over high seas stocks adopting non-use measures.

example, the International Commission for the Conservation of Atlantic Tunas (ICCAT) Convention has a minimal reference to its Commission's functions to adopt management measures and their content concerning the "levels which will permit the maximum sustainable catch".³⁰ The Indian Ocean Tuna Commission (IOTC) Convention, adopted more than a decade after UNCLOS but before the UNFSA, refers only to the management measures the Commission may adopt "to ensure the conservation of the stocks covered by this Agreement and to promote the objective of their optimum utilisation".³¹ However, there are some exceptions: the Convention on Future Multilateral Cooperation in the Northeast Atlantic Fisheries (NEAFC Convention), for example, explicitly recognises that its Commission may consider "the establishment of closed seasons and of closed areas".³²

In contrast, RFMO treaties negotiated after the UNFSA often reference the specific measures the decision-making body is entitled to adopt. The UNFSA does not explicitly mention non-use measures within RFMOs' powers but recognises them when defining a 'serious violation' of management measures.³³ The UNFSA also introduced significant changes in the understanding of managing straddling and highly migratory stocks, and its provisions have influenced regional practice and the drafting of subsequent RFMO convention texts. Some of these treaties are illustrative of this evolution and have been more explicit when establishing a mandate or recognising the competence to apply precaution and broader ecosystem considerations, such as the conservation of associated species, potentially justifying or leading to non-use measures.

For example, the SEAFO Convention indicates that its Commission may adopt measures such as "the quantity of any species which may be caught" (which, if set to zero, is a non-use measure), "the areas and periods in which fishing may occur" (and hence where it may not), and "any other measures

30 International Convention for the Conservation of Atlantic Tunas (ICCAT Convention) (signed on 14 May 1966, entered into force 21 March 1969) 673 UNTS 63, art VII.1(a). ICCAT parties adopted on 20 November 2019 the Protocol to amend the International Convention for the Conservation of Atlantic Tunas, not yet in force. The Protocol does not introduce changes in this regard: no explicit non-use measures are contemplated within the Commission's powers.

31 Agreement for the Establishment of the Indian Ocean Tuna Commission (IOTC Convention) (adopted 25 November 1993, entered into force 17 March 1996) 1927 UNTS 329, art V.2(c).

32 Convention on Future Multilateral Cooperation in the Northeast Atlantic Fisheries (NEAFC Convention) (opened for signature 18 November 1980, entered into force 17 March 1982) 1285 UNTS 129, art 7(c).

33 UNFSA, art 21(1)(c): a serious violation includes "fishing in a closed area, fishing during a closed season or fishing without, or after attainment of, a quota established by the relevant subregional or regional fisheries management organization".

regulating fisheries with the objective of protecting any species”.³⁴ The WCPFC Convention has similar references.³⁵ The South Pacific Regional Fisheries Management Organisation (SPRFMO) Convention is also explicit: the SPRFMO Commission may take measures, including determining “the general or specific locations” and “the periods in which fishing may or may not occur”.³⁶ Yet, not all post-UNFSA RFMO treaties contemplate such provisions. For example, the Antigua Convention, which adopted a new framework for the work of IATTC, refers to precaution and ecosystem considerations but does not say anything about non-use measures such as area closures or explicit bans on taking tuna stocks.³⁷

Whether RFMO treaties counted on explicit provisions for their decision-making bodies to adopt non-use measures, they nevertheless have sometimes adopted and implemented specific decisions on banning fishing for certain stocks and areas. Perhaps the most significant development in this regard is exemplified by the global process leading to restrictions on bottom fishing and the protection of VMES (bottom trawling can be especially harmful to such fragile ecosystems). The continuous calls through United Nations General Assembly (UNGA) resolutions in the 2000s triggered changes across nearly every RFMO, not only in the management measures they adopted but sometimes at the treaty level. Resolution 61/105 requests States to prevent “significant adverse impacts” on VMES and conduct prior environmental impact assessments before fishing is permitted.³⁸ States and RFMOs should establish precautionary area closures to protect deep-sea habitats and biodiversity where VMES are known or likely to occur unless fisheries can be managed to prevent significant adverse impacts. States and RFMOs should adopt and implement these measures or not authorise bottom fisheries to take place. Subsequent resolutions reviewed and further detailed the calls made back in 2006.³⁹

Although non-binding, this ‘soft-law’ quickly hardened into binding treaty provisions and conservation measures at regional levels. For example, the SPRFMO Convention recognises that its Commission can adopt measures to

34 *ibid* art 6(8)(a), (b) and (g).

35 *ibid* art 10(2).

36 Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean (SPRFMO Convention) (opened for signature 1 February 2010, entered into force 24 August 2012) 2899 UNTS 211, art 20(2)(d)-(e).

37 *ibid* art IV.

38 UNGA Res 61/105 (2006) GAOR 61st Session Supp 49, para 38.

39 UNGA Res 64/72 (2009) GAOR 64th Session Supp 49; UNGA Res 66/68 (2011) GAOR 66th Session Supp 49; UNGA Res 71/123 (2016) GAOR 71st Session Supp 49.

“protect the habitats and marine ecosystems in which fishery resources and non-target and associated or dependent species occur from the impacts of fishing”.⁴⁰ Such measures may include those “to prevent significant adverse impacts on vulnerable marine ecosystems” and precautionary measures where “it cannot adequately be determined” that VMES are present or that fishing would cause significant adverse impacts on them.⁴¹ Equally, under the North Pacific Fisheries Commission (NPFC) Convention, the Commission can “adopt and amend from time to time a list of indicator species for vulnerable marine ecosystems for which directed fishing shall be prohibited”.⁴² Other RFMOs implemented the UNGA calls and these types of provisions through specific management measures even when their constitutive treaties did not contemplate explicit provisions to protect VMES or adopt area-based non-use measures.⁴³ Equally, they have moved towards protecting habitats and vulnerable ecosystems by prohibiting bottom fishing in particular areas.

3.2.2 Non-use Measures for Targeted and Other Species

RFMOs may adopt bans on the taking of specific species for several reasons. For example, a moratorium would contribute to recovering an overexploited or depleted stock. States participating in high-seas fishing have established such measures directly in treaty text or through conservation and management measures adopted by the RFMO decision-making body. An example of a treaty-based measure is the moratorium on the Alaskan pollock fishery (*Aleutian Basin pollock*) in the Central Bering Sea, which collapsed in the early 1990s. States interested in this fishery agreed in 1992 on a moratorium in the ‘Doughnut Hole’, the Central Bering Sea’s pocket between and beyond the EEZs of Russia and the United States.⁴⁴ The 1994 Central Bering Sea Convention kept the measure in place because as long as the biomass of this stock did not meet

40 SPRFMO, art 20(1)(d).

41 *ibid* art 20(1)(d).

42 Convention on the Conservation and Management of the High Seas Fisheries Resources in the North Pacific Ocean (adopted 24 February 2012, entered into force 19 July 2015) 2015 CTS 14, art 7(3)(c).

43 One such example is the Southern Indian Ocean Fisheries Agreement (SIOFA) (opened for signature 7 July 2006, entered into force 21 June 2012) 2835 UNTS 409.

44 See eg D. Balton, “The Bering Sea Doughnut Hole Convention: Regional Solution, Global Implications” in O. S. Stokke (ed), *Governing High Seas Fisheries: The Interplay of Global and Regional Regimes* (OUP 2001) 143; E. Meltzer, “Global Overview of Straddling and Highly Migratory Fish Stocks: The Nonsustainable Nature of High Seas Fisheries” (1994) 25 *Ocean Development & International Law* 255, 283–290.

a certain number of metric tons, the allowable catch would be zero.⁴⁵ Fishing was supposed to resume later, but this has not yet happened since the biomass threshold has not been reached.

RFMOS also adopt non-use measures for specific species for conservation purposes. Historically, most RFMOS have traditionally focussed on the targeted species and regulating the bycatch of species of economic value. Over time, several RFMOS have moved to include measures to protect other species within their area of competence, such as species not necessarily targeted by fishing activities but which may face additional challenges. The North-East Atlantic Fisheries Commission (NEAFC) is an illustrative example to observe: it has pioneered an increasing focus on the effects of fishing on the different parts of the marine ecosystem, including biodiversity.⁴⁶ This shift also included amendments to the NEAFC Convention in 2006 to include notions such as marine biodiversity, precaution and ecosystem considerations; today, NEAFC adopts non-use measures for targeted stocks and to protect other marine ecosystem species.

Non-use measures towards targeted species include NEAFC's current ban on catching redfish in the Irminger Sea, whereby "there shall be no directed fisheries neither for the shallow pelagic redfish stock nor the deep pelagic redfish stock in the Irminger Sea and adjacent waters in 2022, 2023 and 2024".⁴⁷ Other RFMOS have also adopted non-use measures for targeted stocks. SPRFMO, for example, has a zero catch for orange roughy in a specific area, the South Tasman Rise, while allowing fishing in other parts of the SPRFMO Convention Area.⁴⁸ Similarly, SEAFO has established zero catch measures for its orange roughy stocks.⁴⁹

45 Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (signed on 16 June 1994, entered into force 8 December 1995) 34 ILM 67, Annex Part 1, para 3.

46 NEAFC, "Contribution on the Ecosystem Approach to Fisheries Management as a Focus of the Fifteenth Round of Informal Consultations of State Parties to the United Nations Fish Stock Agreement" (March 2021, delayed from 2020) ICSP Contribution, 1.

47 NEAFC, "Recommendation 1: 2022 on Management Measures for the Protection of the Shallow Pelagic Redfish Stock and the Deep Pelagic Redfish Stock in the Irminger Sea and Adjacent Waters in 2022, 2023 and 2024", available at <<https://faolex.fao.org/docs/pdf/mul214704.pdf>> accessed 11 August 2024.

48 SPRFMO, "Conservation and Management Measure 03a/2023 (supersedes 03a/2021) for Deepwater Species in the SPRFMO Convention Area", available at <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2023-CMMs/CMM-03a-2023-Deepwater-Species_29Mar23.pdf> accessed 19 June 2024.

49 SEAFO, "Total Allowable Catches and related conditions for Patagonian Toothfish, Deep-Sea Red Crab, Alfonsino, Orange Roughy and Pelagic Armourhead for 2022 and 2023 in the SEAFO Convention Area" (2021) Conservation Measure CM-TAC-01 2021.

As to non-use measures towards species that are not often targeted or are not regarded as a traditional fishery, one can turn again to NEAFC, which has adopted management measures banning the taking of species such as basking sharks, deep-sea sharks, porbeagles, spur dogs, rays and chimaeras.⁵⁰ Regarding porbeagle, for example, NEAFC recognised that the information available was insufficient to inform on the current status of the porbeagle stock, yet the “low productivity and aggregating nature of this species makes it particularly vulnerable to overexploitation”.⁵¹ Accordingly, NEAFC decided that each contracting party “shall, for the period 2020 to 2023, prohibit all directed fishing of porbeagle (*Lamna nasus*) in the Regulatory Area by vessels flying its flag”.⁵²

However, most RFMOs do not adopt such non-measures, even towards targeted species. In the Pacific, for example, NPFC has seen no need for them, not even for targeted stocks. More conspicuously, the five tuna RFMOs (WCPFC, IATTC, ICCAT, CCSBT and IOTC) generally do not adopt non-use measures as part of harvest strategies or management plans, except for seasonal bans to safeguard biological processes primarily associated with restricting FADS – therefore a gear limitation rather than a non-use measure.⁵³ Instead, they usually resort to more traditional management approaches such as effort limitations, total allowable catch decisions and limits to specific gear, including FADS.

Likewise, only a few RFMOs have adopted non-measures to protect non-targeted or other species for biodiversity conservation reasons. SPRFMO and NPFC, for example, have no measures aiming at non-targeted species. Other RFMOs that have adopted decisions to protect biodiversity beyond targeted stocks do not consider non-use measures but aim to lessen the harmful effects

50 NEAFC, “Recommendation 8: 2020 on Conservation and Management Measures for Basking Shark (*Cetorhinus Maximus*) in the NEAFC Regulatory Area from 2020 to 2023”; NEAFC, “Recommendation 9: 2020 on Conservation and Management Measures for Deep Sea Sharks in the NEAFC Regulatory Area from 2020 to 2023”; NEAFC, “Recommendation 10: 2020 on Conservation and Management Measures for Deep Sea Rays (*Rajiformes*) in the NEAFC Regulatory Area from 2020 to 2023”; NEAFC, “Recommendation 11: 2020 on Conservation and Management Measure for Deep Sea Chimaeras in the NEAFC Regulatory Area from 2020 to 2023”.

51 NEAFC, “Recommendation 7: 2020 on Conservation and Management Measures for Porbeagle (*Lamna Nasus*) in the NEAFC Regulatory Area from 2020 to 2023”.

52 *ibid.*

53 See eg ICCAT, “Replacing Recommendation 19–02 Replacing Recommendation 16–01 on a Multi-annual Conservation and Management Programme for Tropical Tunas” (2021) paras 27 and 28. As explained, this contribution does not consider such decisions as non-use measures but as restrictions on using gear and similar devices.

of some fishing practices or gear. IATTC's provisions on the conservation of whale sharks, for example, merely require members to "prohibit their flag vessels from setting a purse-seine net on a school of tunas associated with a live whale shark (*Rhincodon typus*), if the animal is sighted prior to the commencement of the set".⁵⁴

3.2.3 Area-Based Non-use Measures

RFMOS may also adopt management measures for areas where more than one species can occur. It could be a spawning area, or there may be other considerations, such as the desire to prevent fishing activities that would cause unknown impacts – ie applying the precautionary approach in some form. An example of a non-use measure established at the treaty level is the one found in the Agreement that regulates the high seas of the central Arctic Ocean Fisheries (CAOFA).⁵⁵ The CAOFA prevents future commercial fishing unless appropriate conservation and management measures are adopted in the first place. Therefore, the agreement does not entail an indefinite moratorium on commercial high-seas fishing: it can be lifted when certain conditions are met.⁵⁶

As mentioned in the first part, the most significant progression towards area-based non-use measures that RFMOS have adopted concerns those to protect VMES. There are several examples in this regard. Today, most RFMOS regulating bottom fishing contemplate some degree of protection, even if some decisions are not always consistent with UNGA resolutions. Some RFMOS have built a network of closed areas to fish, aiming at protecting VMES. NEAFC has several such regions.⁵⁷ Other RFMOS have also adopted non-use measures

54 IATTC, "Resolution C-19-06 Conservation of Whale Sharks" (adopted 2019) 94th Meeting, 22–26 July 2019.

55 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA) (signed 3 October 2018, entered into force 25 June 2021) OJ 2019 L 73/3. The ten signatories are the five Arctic States, ie Canada, Denmark in respect of Greenland, Norway, Russia and the United States, and China, Iceland, Japan, South Korea and the European Union; see also the discussion by Molenaar in chapter 6.

56 Moreover, the parties would likely consider allowing exploratory fisheries soon, as the treaty entered into force in 2021. CAOFA, art 5(1)(d).

57 See NEAFC, "Recommendation 19: 2024 on Area Management Measures for the Protection of Vulnerable Marine Ecosystems in the NEAFC Regulatory Area as amended (extended again until 2027)", art 5 and Annex 2.

banning fishing affecting VMES or seamounts, such as SPRFMO,⁵⁸ NAFO⁵⁹ and SIOFA.⁶⁰ Conspicuously, the General Fisheries Commission of the Mediterranean (GFCM) pioneered some area-based decisions in the form of Fisheries Restricted Areas, which protect essential fish habitats and VMES.⁶¹ Some contemplate non-use measures such as prohibiting fishing activities within certain zones.⁶²

In the context of spatial measures adopted to protect elements of the marine environment not necessarily linked to targeted stocks or associated species, some organisations have adopted MPAs that include non-use based on broader ecosystem considerations. MPAs are defined as “a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”.⁶³ They can establish a total no-take area, ie where fishing is prohibited or may have subareas where fishing is allowed under certain conditions.

It is unlikely that an MPA would always be a total no-take area, as at least one type of use would likely be allowed, however minimal: fishing for scientific purposes authorising fish taking (killing). An example of this approach is the South Orkney Islands Marine Protected Area, adopted by CCAMLR in

58 Currently SPRFMO, “Conservation and Management Measure 2023 for the Management of Bottom Fishing in the SPRFMO Convention Area”, available at <https://www.sprfmo.int/assets/Fisheries/Conservation-and-Management-Measures/2023-CMMs/CMM-03-2023-Bottom-Fishing_29Mar23.pd> accessed 18 July 2024.

59 NAFO maintains two types of closure for defined: VMES and seamounts. See NAFO Conservation and Enforcement Measures 2023, art 17. See also M. Koen-Alonso et al, “The Northwest Atlantic Fisheries Organization Roadmap for the development and implementation of an Ecosystem Approach to Fisheries: structure, state of development, and challenges” (2019) 100 *Marine Policy* 342.

60 SIOFA Secretariat, “Conservation Management Measure 2020/21” in *Overview of SIOFA Fisheries*, Annex 3, 32.

61 Agreement on the establishment of the General Fisheries Council for the Mediterranean (adopted 1 November 1949, entered into force 20 February 1952) 126 UNTS 237.

62 See eg General Fisheries Commission for the Mediterranean (GFCM), “Recommendation GFCM/44/2021/2 on the establishment of a Fisheries Restricted Area in the Jabuka/Pomo Pit in the Adriatic Sea (geographical subarea 17), amending Recommendation GFCM/41/2017/3”. Fishing is prohibited in the area identified as Zone A within this Fisheries Restricted Area.

63 N. Dudley (ed), *Guidelines for Applying Protected Area Management Categories* (IUCN 2008), 8. The recently adopted BBNJ Agreement defines a marine protected area in similar terms: a geographically defined marine area that is designated and managed to achieve specific long-term biodiversity conservation objectives and may allow, where appropriate, sustainable use provided it is consistent with the conservation objectives (art 1(9)).

2009.⁶⁴ The decision that created this MPA prohibited fishing activities within the defined area, except for scientific fishing research activities agreed upon by the Commission.⁶⁵ That said, the CCAMLR experience the following decade concerning the proposals for establishing an MPA in the Ross Sea and East Antarctica suggests some fishing nations would likely resist non-use measures within MPAs.⁶⁶

The next section introduces some considerations and posits questions for further discussion on this matter, including how to advance the establishment of appropriate area-based non-use measures.

4 Considerations for Future Non-use Area-Based Measures Protecting Marine Ecosystems

There is broad consensus about the challenges of the international legal framework for adopting integrated area-based conservation measures to protect marine biodiversity.⁶⁷ The system for ocean governance is fragmented and demands coordinated efforts at different decision-making bodies and States to address all the possible environmental impacts of human activities at sea.⁶⁸ These concerns were at the forefront of the negotiations that advanced the BBNJ Agreement adopted in June 2023, which heralds a new legal and institutional framework to adopt area-based management tools.⁶⁹ However, there is still a long way to go before the treaty enters into force and the new institutional arrangements begin their work, including the processes for establishing

64 CCAMLR, "Protection of the South Orkney Islands Southern Shelf" (2009) Conservation Measure 91–03.

65 *ibid* para 2.

66 See eg China's likely position: N. Hong, "Why China is hesitant about endorsing marine protected area proposals in the Antarctic" (*China-US Focus*, 7 April 2023), available at <<https://chinaus-icas.org/research/why-china-is-hesitant-about-endorsing-marine-protected-area-proposals-in-the-antarctic/>> accessed 18 June 2024. For more information of CCAMLR MPAs, see the discussion by Guggisberg in chapter 13.

67 See eg K. Scott, "Area-based Protection beyond National Jurisdiction. Opportunities and Obstacles" (2019) 4 *Asia-Pacific Journal of Ocean Law and Policy* 158.

68 For a general overview see R. M. Warner, "Conserving Marine Biodiversity in Areas Beyond National Jurisdiction. Co-Evolution and Interaction with the Law of the Sea" in D. Rothwell, A. Oude Elferink, K. Scott and T. Stephens (eds) *The Oxford Handbook of the Law of the Sea* (OUP 2015) 752. See also G. Ardito, G. Andreone and M. Rovere, "Overlapping and Fragmentation in the Protection and Conservation of the Marine Environment in Areas Beyond National Jurisdiction" (2023) 9 *Front Mar Sci* 1094266.

69 K. Scott, "Conservation on the High Seas: Developing the Concept of the High Seas Marine Protected Areas" (2012) 27 *International Journal of Marine and Coastal Law* 849.

area-based management tool decisions. Preparations for implementing the BBNJ Agreement should consider the complexities of interactions between competent regimes, particularly RFMOs, simply because fishing is probably the commercial activity that most heavily impacts high-seas marine biodiversity.⁷⁰ These interactions will be defined – among other issues – by how States interpret the ‘not undermine’ obligation imposed on the future Conference of the Parties under the BBNJ Agreement (hereinafter, the COP).⁷¹

There is no lack of ideas to advance the conservation of high-seas biodiversity. Some authors have offered radical ideas by proposing a straightforward non-use measure: banning all fishing on the high seas.⁷² The argument holds that closing the high seas to fishing would favour more equity among States, because high-seas stocks are mainly exploited by rich, industrialised States whose fleets receive heavy subsidies to operate.⁷³ A closure would allow high-seas fish populations to recover, having positive spillover effects, including larger harvests within EEZs – and better prices – that would benefit developing countries. Less fishing effort on the high seas would also reduce fossil fuel burning and the cost of fishing globally.

However, this proposition is unnecessary and unrealistic: sustainable fishing on the high seas may sometimes be elusive, but it is possible. Such proposals would only distract attention from efforts to advance change within the existing legal and political framework. Instead, promoting reasonable area-based measures with feasible conservation goals would offer a pathway forward, even if they do not always consider non-use but other marine conservation and management tools.

There is a reasonable consensus about the positive impacts of area-based measures on marine biodiversity conservation, such as marine reserves and MPAs that may include no-take zones or other forms of prohibitions on fishing.⁷⁴ They include restoring and increasing fish biomass and diversity,

70 See eg G. O. Crespo and D. C. Dunn, “A Review of the Impacts of Fisheries on Open-Ocean Ecosystems” (2017) 74(9) *ICES Journal of Marine Science* 2283.

71 BBNJ Agreement, art 22(2): the Conference of the Parties shall respect the competences of and, not undermine, relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies, see Klerk in chapter 4.

72 R. Sumaila et al, “Winners and Losers in a World Where the High Seas is Closed to Fishing” (2015) 5 *Sci Rep* 8481; J. F. Green and B. Rudyk “Closing the High Seas to Fishing: A Club Approach” (2020) 115 *Marine Policy* 103855. The suggestion to close the high seas to fishing is discussed and debated, see the discussion by Crespo in chapter 3.

73 D. Pauly et al, “Fishing Down Marine Food Webs” (1998) 279 *Science* 860–863.

74 E. Sala and S. Giakoumi, “No-Take Marine Reserves are the Most Effective Protected Areas in the Ocean” (2018) 75(3) *ICES Journal of Marine Science* 1166; M. J. Costello and B. Balantyne, “Biodiversity Conservation Should Focus on No-Take Marine Reserves: 94% of

promoting the dispersal of larvae, helping adults of target and non-target species to disperse to areas outside the protected borders, and making marine ecosystems more resilient to climate change.⁷⁵ Given this generally positive assessment, it is unsurprising that States interested in protecting the high seas favour adopting such measures. However, pushing for area-based management tools with non-use measure content in RFMOS entails several challenges. This section identifies at least four.

There is first a legal challenge. As explained above, RFMOS do not always contemplate an explicit competence to adopt area-based management decisions involving non-use measures. However, this contribution also highlighted that some RFMOS could implement area closures to protect VMES, even when their founding treaties did not have such explicit references. But difficulties may lay ahead, nevertheless.

Consider, for example, some of the arguments advanced to oppose proposals for MPAS in CCAMLR. Opposition to the proposals discussed over the years in CCAMLR was not limited to technical aspects and the management approach to the area. One of China's substantive concerns demanded that "the objectives of proposed MPAS must be in line with the objective of the Convention, as set out in Article II, and should focus on Antarctic marine living resources".⁷⁶ China also stated that "the proposals must not restrict the rational use of Antarctic marine living resources, and must allow reasonable levels of fishing" as "any restriction on fishing activities must have a sufficient legal and scientific basis".⁷⁷ China thus hinted that CCAMLR might not have the competence to adopt ambitious MPAS restricting the 'rational use' recognised in the CAMLR Convention. In other words, China opposed the non-use nature of the proposed measure.

Marine Protected Areas Allow Fishing" (2015) 30(9) *Trends in Ecology & Evolution* 507; O. Aburto-Oropeza et al, "Large Recovery of Fish Biomass in a No-Take Marine Reserve" (2011) 6(8) *PLOS ONE* e23601. However, there are also studies showing that an MPA that is just a no-take area may not necessarily lead to a healthier ecosystem. See R. H. Thurstan et al, "Are Marine Reserves and Non-Consumptive Activities Compatible" (2012) 36 *Marine Policy* 1096.

75 Although marine protected areas provide many ecological benefits, not all of them achieve, or are intended to achieve, all these beneficial outcomes. L. H. Pendleton et al, "Debating the Effectiveness of Marine Protected Areas" (2018) 75(3) *ICES Journal of Marine Science* 1156–1159.

76 CCAMLR Report of the Thirty-Fourth Meeting of the Commission Hobart (Australia 19–30 October 2015), 54. The CAMLR Convention, art II, states that the conservation of marine living resources includes "rational use".

77 *ibid.*

This argument is not sound. There is no reason why rational use under Article 11 could not be restricted for conservation reasons, more so when all members had agreed to a general framework to adopt MPAs just a few years earlier.⁷⁸ But this position should raise some questions: the argument may have more weight regarding RFMOs with no such broad conservation mandate as CCAMLR. The question is therefore pertinent: do RFMOs have the competence to establish and regulate the ecosystems where fish occur beyond the need to protect fish? No RFMO has the explicit competence to adopt MPAs as such. Still, many RFMO treaties provide area-based management tools and non-use measures grounded on ecosystem considerations, offering a base to adopt measures like no-take areas. For those RFMO treaties with no such provisions – or if they are questioned when attempted to be exercised – the best answer would come from asserting the precedent and practice in the management measures adopted by several RFMOs regarding VMES and bottom fishing, as mentioned above.

The CCAMLR experience with the proposals for an MPA in the Ross Sea and East Antarctica illustrates a second challenge: the difficulty of reaching a consensus. The original proposals were ambitious in their intentions to establish primarily an area-based non-use measure. Although most CCAMLR members gradually supported the two proposals, there was opposition from others, particularly China and Russia. After years of complex negotiations, only the Ross Sea MPA (proposed by New Zealand and the USA) was adopted in 2016.⁷⁹ In contrast, the East Antarctica one (then led by Australia, France and the European Union) failed to reach a consensus. Another proposal on Domain 1 is also stuck.⁸⁰ The Ross Sea MPA establishes a General Protection Zone where commercial fishing is prohibited, but there are other areas where such fishing is still possible. The reality of reaching an agreement under consensus-based rules on the Ross Sea region MPA demanded compromise, including adding fishing zones in 20% of the MPA, a duration clause and provisions for research fishing within the whole of the MPA.⁸¹

78 CCAMLR, “General Framework for the Establishment of CCAMLR Marine Protected Areas” (2011) Conservation Measure 91-04, available at <<https://cm.ccamlr.org/en/measure-91-04-2011>> accessed 18 June 2024.

79 CCAMLR, “Ross Sea Region Marine Protected Area” (2016) Conservation Measure 91-05, available at <<https://cm.ccamlr.org/en/measure-91-05-2016>> accessed 18 June 2024.

80 Argentina and Chile first presented a joint proposal for a marine protected area in Domain 1 (Western Antarctic Peninsula and South Scotia Arc) to the CCAMLR Scientific Committee in 2017. This proposal has been under consideration since 2018.

81 C. Brooks et al, “The Ross Sea, Antarctica: A Highly Protected MPA in International Waters” (2021) 134 *Marine Policy* 104795, 6.

As several RFMOs share the consensus rule as the basis for adopting management decisions, the CCAMLR experience warns about the inherent difficulties and the tyranny of the lowest common denominator. There is no way to bypass this rule: the earlier the proponents engage with States that may oppose MPA initiatives, the better – and that should start with the science that underpins proposals. The fact that some RFMOs, such as SPRFMO, contemplate voting procedures and modern mechanisms for objection will not work out as a silver bullet. It is unlikely that implementing and securing compliance with an MPA will succeed in the long term if a voting mechanism can impose such a measure upon one or two dissatisfied members, especially if they are relevant players in the concerned RFMO. Even more critical, it is likely that the tensions left after a voting procedure for an MPA would further strain the dynamics of the whole organisation. The current state of CCAMLR affairs is a warning of the risks of putting too much pressure on advancing conservation goals that others may not share.

A third question is how to deal with non-members of RFMOs. For an area-based measure to succeed, free riders must not undermine it. Complicated as it sounds, this challenge is more theoretical than real. The practice against non-members and unregulated fishing shows that RFMOs – whether their members are contracting parties to the UNFSA – exhibit a consistent approach against unregulated fishing by uncooperative non-parties to RFMOs. RFMOs have treated flags of convenience and other non-members as IUU fishing, applying the same consequences to all, including listing vessels flagged to non-parties.⁸² Compliance with any future MPA or area-based management measure received or accepted by an RFMO should be supported with the same logic: any fishing against it by uncooperative non-members will likely be treated as IUU fishing.

A fourth challenge is the BBNJ Agreement itself. The entry into force, future implementation and interactions with existing regimes are all uncharted waters resting ahead on the BBNJ horizon. Yet the current legal design involves one substantial challenge: for advancing MPAs or similar measures under the BBNJ Agreement, proposals must sort out two processes: one before the BBNJ COP and another with the competent RFMO.

Article 22(1) letters (a), (b) and (c) are critical to understanding the mechanics of the BBNJ Agreement. The treaty accepts that whatever decision the Conference of the Parties (COP) may take (assuming consensus or a majority under Article 23), the existing regional bodies maintain their competence.

82 FAO International Plan of Action (n 11). See, to name a few, SPRFMO Convention, art 1(1)(j) and Conservation and Management Measure 04-2020; IATTC Resolution C-19-02; NPFC Convention, art 1(k) and Conservation and Management Measure 19-02.

Article 22(2) confirms this rule when it requests the COP to “respect the competences of and, not undermine, relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies”. RFMOs will undoubtedly fall under this provision. Under Article 22(1)(a), the COP may establish an MPA or other area-based management tool. However, when some specific measure falls within the scope of an RFMO’s mandate (such as a non-measure targeting fishing), the COP could recommend the BBNJ parties to interact within that RFMO “to promote the adoption” of the measures adopted by the COP. Similarly, under Article 25(4), the BBNJ future parties shall promote within RFMOs of which they are members the implementation of the decisions and recommendations made by the COP under Article 22.

In practical terms, the BBNJ mechanism recognises the need for two successive processes. Adopting an area-based measure limiting high-seas fishing for conservation purposes entails a decision by the COP and another by the competent RFMO to implement such a decision from a fisheries perspective. Article 22(3) attempts to facilitate the process by asking the COP to engage with RFMOs concerning “area-based management tools, including marine protected areas”. The added value of the likely cumbersome process before the future BBNJ COP would probably be that RFMO members would later have less room for manoeuvring out, not least if previously consulted under Article 22(3). Still, the mechanism would involve considerable efforts from interested States and stakeholders.

5 Conclusions: a Tailored Approach to Non-use Measures

Implementing non-use measures as management and conservation tools is not the main business of RFMOs, but they still adopt such measures for different purposes. Reasons behind their adoption vary, including attempts to recover a depleted fishery, conservation of specific non-targeted species and – more recently – broader ecosystem consideration. Consistent with this book’s conceptualisation, this chapter has proposed a typology with two categories of non-use measures, understanding them as the no-take and no-killing of fish: those aiming at specific species (targeted or not) and those inspired by area-based considerations.

The scope of RFMOs’ constitutive instruments varies in recognising an explicit competence to adopt non-use measures. However, practice shows that RFMOs have adopted decisions to protect ecosystems where fish under their mandate occur, whether their treaties recognise such explicit competence or not, as the protection of VMES demonstrates. The positive assessment of

area-based management tools is justified, and it suggests that further discussions and requests for the expansion of these measures would happen, including debates on MPAs. However, RFMOs do not have a clear mandate to adopt marine protected areas as such, whether they include non-use measures. In practice, the existing tools at RFMOs' disposal could suffice to achieve many of the most urgent conservation goals. But equally, the desire to advance integrated approaches to marine conservation and the exploitation of marine living resources will likely push RFMOs to address requests for area-based management measures, including MPAs.

Such steps may face several difficulties, including legal objections and tough decision-making negotiations. Perhaps the most challenging issue will come once the BBNJ Agreement enters into force. The cumbersome 'double process' before the future COP and the regional implementation of its decisions promise demanding efforts for States and stakeholders willing to push for area-based management tools. Whether the BBNJ Agreement will facilitate the adoption of measures to improve the conservation of marine biodiversity is a question that will remain for several years ahead.

Acknowledgments

The author would like to thank professors James Harrison, Erik Molenaar, Catherine Blanchard and Solène Guggisberg for their generous and constructive comments on early versions of this contribution.

The Central Arctic Ocean Fisheries Agreement

Erik J. Molenaar

1 Introduction

The Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA)¹ is a unique treaty that deals with a unique scenario: in an area of the high seas where no fishing has ever taken place, it determines the conditions under which future fishing may commence. The CAOFA's qualified and temporary abstention from high seas fishing² is a fundamental restriction of the freedom of high seas fishing enshrined in Article 116 of the United Nations Convention on the Law of the Sea (UNCLOS)³ and has never been incorporated in a regional fisheries treaty or adopted by a regional fisheries body before. The default in the CAOFA is therefore that fishing is prohibited unless it is permitted. Only the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (CBS Convention)⁴ is somewhat comparable with the CAOFA, with the key difference that the former's prohibition of high seas fishing was adopted following the collapse of the Central Bering Sea pollock (*Gadus chalcogrammus*) stock. So far, there has been no recommencement of fishing for pollock in the high seas portion of the Bering Sea, as the substantive and procedural conditions for this have not been satisfied.⁵

Based on the list of questions drawn up to guide this volume as a whole (see the Annex to chapter 1), this chapter seeks to answer two main research

1 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA) (signed 3 October 2018, entered into force 25 June 2021) OJ 2019 L 73/3.

2 CAOFA, art 3(1) and (3) (discussed in subsection 4.3).

3 United Nations Convention on the Law of the Sea (UNCLOS) (signed 10 December 1982, entered into force 16 November 1994) 1833 UNTS 396.

4 Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (CBS Convention) (signed 16 June 1994, entered into force 8 December 1995) 34 ILM 67 (1995).

5 See eg CBS Convention, arts IV(1)(a) and VII, Part 1 of the Annex, and the reports of the annual Conferences of the Parties (COPs) to the CBS Convention, available at <<https://www.fisheries.noaa.gov/alaska/international-affairs/annual-conference-parties-convention-conservation-and-management-pollock-resources>> accessed 20 June 2024.

questions: (a) what are the origins and drivers that led to the adoption of the CAOFA and (b) what are the key elements of the CAOFA's abstention from fishing? These two main research questions have shaped the chapter's structure. Accordingly, after section 2 offers 'An introduction to the CAOFA', section 3 examines the 'Origins and drivers that led to the adoption of the CAOFA'. As will become clear, the drivers include climate change, lack of knowledge and the precautionary approach. Subsequently, section 4 examines 'Key elements of the CAOFA's abstention from fishing', including its objective, geographical and species coverage, exceptions, decision-making and duration, and non-Parties and accession. Conclusions are offered in section 5.

The terminology, typology and definitions used in this chapter are in line with those adopted in chapter 2. The non-use measure examined in this chapter is the qualified, temporary and treaty-based abstention from fishing in the high seas portion of the central Arctic Ocean (CAO) laid down in the CAOFA. As the abstention relates exclusively to the human activity of marine capture fishing, it is a single-sectoral non-use measure. Fishing is aimed at the extraction of marine living resources and, as these are renewable resources, can be a sustainable activity. Besides the risk of over-exploitation and possible collapse of target fish stocks, however, fishing can also impact non-target species due to by-catch or predator-prey relationships (ie associated and dependent species) or other ecosystem components (eg bottom fishing impacts on benthic habitats). The abstention of all fishing implies an abstention from the use of all fishing gears.

2 An Introduction to the CAOFA

The negotiation of the CAOFA was a stand-alone process that took place outside the scope of the Arctic Council or another existing intergovernmental body. It can be regarded as having consisted of two main phases. The first took place between the five CAO coastal States (Canada, Denmark in respect of Greenland,⁶ Norway, the Russian Federation and the United States). These States are also known as the 'Arctic Five' and the negotiations between them as the 'Arctic Five process' or the 'coastal States phase' of the CAOFA negotiations.

6 In fact, Denmark participated in respect of both Greenland and the Faroe Islands, but is a CAO coastal State exclusively on account of Greenland (see the discussion in E. J. Molenaar, "The CAOFA Agreement. Key Issues of International Fisheries Law", in T. Heidar (ed), *New Knowledge and Changing Circumstances in the Law of the Sea* (Brill Nijhoff 2020) 446–476, 461–462.

That process/phase commenced in June 2010 and concluded on 16 July 2015⁷ with the adoption of the non-legally binding Declaration concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean (Oslo Declaration).⁸ The second phase of the CAOFA negotiations is known as the ‘Five-plus-Five process’ and involved – in addition to the Arctic Five – China, the European Union (EU), Iceland, Japan and South Korea (also known as the ‘Other Five’) in their capacity as high seas fishing States or entities.⁹ The Five-plus-Five negotiations commenced in December 2015 and ended on 3 October 2018, when the CAOFA was opened for signature.¹⁰

In conjunction with these two phases of negotiations, five scientific meetings were convened between 2011–2017 in order to support the negotiations with scientific information and prepare for the CAOFA’s implementation.¹¹ The work of these so-called “Meetings of Scientific Experts on Fish Stocks in the Central Arctic Ocean” (FiSCAO Meetings) was continued after the adoption of the CAOFA by the Provisional Scientific Coordination Group (PSCG), which had three meetings between 2020 and 2022.

The CAOFA entered into force on 25 June 2021 following the formal adherence of all of the Five-plus-Five.¹² The CAOFA does not establish an intergovernmental organisation or a secretariat. Its principal decision-making body is the Conference of the Parties (COP), which convenes through in-person or virtual meetings.¹³ Whereas COP decisions on questions of procedure require a simple majority, questions of substance require consensus (see further subsection 4.4).¹⁴ The first three in-person COPs were held in November 2022, June 2023 and June 2024 in Incheon, South Korea. The COP is supported by the Scientific Coordinating Group (SCG) – which is the successor of the PSCG – whose

7 See the table in Molenaar (n 6) 453.

8 Norwegian Ministry of Foreign Affairs, “Coastal states decide on measures to combat unregulated fishing in the Arctic Ocean” (Oslo, 16 July 2015), available at <<https://www.regjeringen.no/en/aktuelt/fishing-arctic-ocean/id2427705/>> accessed 20 June 2024.

9 Further clarification of the capacities in which the Other Five participated in the Five-plus-Five negotiations is provided in the text accompanying (n 44) and (n 83).

10 See the table in Molenaar (n 6) 453.

11 *ibid.*

12 See the status of participation at Government of Canada, “Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean” (3 October 2018), available at <<https://www.treaty-accord.gc.ca/details.aspx?id=105549>> accessed 20 June 2024.

13 See eg CAOFA, art 5(1) and Rule 3.4, CAOFA COP Rules of Procedure (RoP), included in Appendix 9 of the Report of the 1st (2022) in-person CAOFA COP, available at <<https://vlab.noaa.gov/web/caofa>> accessed 27 August 2024.

14 CAOFA, art 6(3) stipulates that a question “shall be deemed to be of substance if any Party considers it to be of substance”.

functions include providing scientific advice upon request of the COP.¹⁵ The SCG had its 1st in-person meeting in March 2023.

The geographical scope of the CAOFA is limited to the “high seas portion of the [CAO]” that surrounds the Geographic North Pole (see Figure 6.1, included in subsection 4.2.2).¹⁶ The cited wording in the CAOFA clarifies that the CAO consists not only of a high seas portion but also of adjacent coastal State maritime zones, in particular exclusive economic zones (EEZs). As there is no generally accepted definition of the CAO, however, there is also no agreement on its outer limits.

The CAOFA’s abstention from high seas fishing is laid down in paragraphs 1 and 3 of Article 3. Its characterisation as an abstention is based on the paragraphs’ wording, which reflect the Parties’ willingness to agree that their vessels shall not be authorised to engage in commercial and exploratory high seas fishing. The abstention can be regarded as qualified due to four exceptions, which are discussed further in subsection 4.3. The temporary character of the abstention is primarily a consequence of the arrangements on the CAOFA’s duration set out in Article 13. These stipulate that its duration is not indefinite but lasts for an initial period of 16 years following the CAOFA’s entry into force; therefore until 25 June 2037. Thereafter, the CAOFA continues to remain in force for successive five-year periods unless any Party objects.

One possible scenario for the discontinuation of the CAOFA and its abstention from high seas fishing is their replacement by a fully-fledged regional fisheries management organisation (RFMO) or arrangement (RFMA; together RFMO/A) with the usual mandate to regulate fisheries in the high seas portion of the CAO. In fact, some of the participants in the Five-plus-Five process had a preference for establishing such a fully-fledged RFMO/A straight away, but others – in particular the Arctic Five – had a strong preference for a concise instrument focused in particular on the abstention from high seas fishing and the establishment of the Joint Program of Scientific Research and Monitoring (JPSRM). As a compromise, it was agreed to pursue a so-called ‘stepwise’, ‘step-by-step’ or ‘two-step’ approach by which the CAOFA would function as an interim arrangement that would eventually be replaced by one or more fully-fledged RFMO/As.¹⁷ As examined in more detail elsewhere, even though

15 See eg SCG Terms of Reference, para 3(d) (Appendix 7 of the Report of the 1st (2022) in-person CAOFA COP (n 13)).

16 This wording is consistently used throughout the CAOFA. See CAOFA, art 1(a) for the definition of the ‘Agreement Area’.

17 This approach is, *inter alia*, reflected in CAOFA, arts 2 (examined in subsection 4.1), 5(1)(c) and 14(3). See Molenaar (n 6) 468–470.

the delegations understood the Five-plus-Five negotiations to be aimed at establishing something else than an RFMA, the nature of the CAOFA evolved so much during the negotiations that there are good arguments for classifying the CAOFA as an RFMA, even though not a fully-fledged one.¹⁸

3 Origins and Drivers that Led to the Adoption of the CAOFA

Climate change was without a doubt one of the principal drivers for the adoption of the CAOFA. As reflected in the 1st preambular paragraph of the CAOFA, the high seas portion of the CAO used to be covered by sea-ice on a year-round basis and thereby made vessel-based fishing impossible. Anthropogenic-induced climate change has caused sea-ice in the CAO – including in its high seas portion – to recede and become thinner, and the distributional ranges of many global fish stocks have been shifting towards the polar regions. These changes have been ongoing for several decades, and the pace of change has accelerated during this period.¹⁹ Interest in commencing fishing in the CAO – including in its high seas portion – can be presumed to be considerable due to continued high global demand for fish and increasing pressure on global fish stocks.²⁰

Another principal driver for the adoption of the CAOFA was the significant lack of knowledge of the ecosystems in the CAO (not only those in its high seas portion but also those in adjacent coastal State maritime zones), how these would be affected by climate change and other phenomena (eg ocean acidification and increased fresh-water inflow), and what impacts and effects marine

18 See E. J. Molenaar, “Regional Fisheries Management Organizations” in M. Chantal Ribeiro, F. Loureiro Bastos and T. Henriksen (eds), *Global Challenges and the Law of the Sea* (Springer 2020) 81–109, 91–92.

19 See M. Rantanen et al, “The Arctic has warmed nearly four times faster than the globe since 1979” (2022) 3 *Communications Earth & Environment*, 168; Arctic Monitoring and Assessment Programme (AMAP), *Arctic Climate Change Update 2021: Key Trends and Impacts. Summary for Policy-makers* AMAP, Tromsø, Norway, 2021) 16, available at <<https://www.amap.no/documents/doc/arctic-climate-change-update-2021-key-trends-and-impacts-summary-for-policy-makers/3508>> accessed 20 July 2024; FiSCAO, Reports of the Meetings of Scientific Experts on Fish Stocks in the Central Arctic Ocean (*FiSCAO Meetings*, 1 March 2022), available at <<https://www.fisheries.noaa.gov/event/fifth-meeting-scientific-experts-fish-stocks-central-arctic-ocean>> accessed 20 June 2024.

20 See eg FAO, “The State of World Fisheries and Aquaculture – Towards Blue Transformation” (2022), available at <<https://digitallibrary.un.org/record/3978694?v=pdf>> accessed 11 April 2025, Figure 23 at 47.

capture fisheries would have on target and non-target species and other ecosystem components.

The United States was the first of the Arctic Five to respond to these two principal drivers. Already in October 2006, its North Pacific Fishery Management Council (NPFMC) started devoting attention to Arctic fisheries management in the Northern Bering Sea and the EEZ off Alaska north of the Bering Strait. On 5 February 2009 the NPFMC prohibited commercial fishing in the EEZ off Alaska in the Arctic Ocean “until information improves so that fishing can be conducted sustainably and with due concern to other ecosystem components”.²¹ This prohibition was still in effect at the time of writing.

As some of the fish stocks that already occurred in the EEZ off Alaska north of the Bering Strait, or would occur there in the future, might be or become transboundary, the United States also took steps to ensure that its actions for its own maritime zones would be complemented by (similar or equivalent) international action. These steps were also motivated by concerns of a ‘boom-and-bust’ scenario similar to what happened in the high seas pollock fishery in the Bering Sea in the late 1980s. In 2007, the United States Senate adopted joint resolution (SJ Res.) No. 17 of 2007, “directing the United States to initiate international discussions and take necessary steps with other Nations to negotiate an agreement for managing migratory and transboundary fish stocks in the Arctic Ocean”.²² Pursuant to this resolution, the United States initiated a series of bilateral and multilateral discussions during 2007–2009 to explore options for a suitable mechanism or body for convening negotiations. This eventually led to the two phases of stand-alone negotiations – both chaired by Ambassador David Balton from the United States Department of State – and the associated FiSCAO Meetings described in section 2.

The United States based its actions in 2007 and 2009 on its precautionary approach to fisheries management in response to different levels of uncertainty, the need to avoid unregulated fishing, as well as the “social, economic, cultural and subsistence needs” of Arctic indigenous communities.²³ These

21 Arctic Fishery Management Plan (FMP), North Pacific Fishery Management Council, adopted 5 February 2009, effective 3 December 2009, 50 CFR Part 679, sec E.S. 1.2, ES-2; Federal Register, vol 74, no. 211 (3 November 2009), 56734, available at <<https://www.npfmc.org/wp-content/uploads/ArcticFMP-1.pdf>> accessed 11 April 2025.

22 Passed by the Senate on 4 October 2007. The House of Representatives voted in favour of SJ Res. No 17 in May 2008, which resulted in the Public Law 110–243 of 3 June 2008.

23 The citation is Government of the United States, “S. J. Res. 17, 110th Congress” (*Congress* 2007), available at <<https://www.govtrack.us/congress/bills/110/sjres17/text/enr>> accessed 20 June 2024. The references to the precautionary approach and unregulated fishing are included in the Arctic FMP, see (n 21).

needs of Arctic Indigenous communities may not necessarily be affected only by competition for the same target species. Species targeted by Arctic Indigenous Peoples – fish, as well as marine mammals and birds – but not by commercial fishing, may still be affected by commercial fishing due to by-catch and predator-prey relationships.

As regards the precautionary approach to fisheries management and the need to avoid unregulated fishing, the United States' actions were also compatible with Article 6 of the UN Fish Stocks Agreement (UNFSA)²⁴ – titled “Application of the precautionary approach” – as well as Article 8(5) of the UNFSA and paragraph 3.3.2 of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.²⁵ The latter two provisions reflect the commitment by the international community to ensure full high seas coverage with RFMO/As as part of the objective of avoiding unregulated high seas fishing. The integration of the precautionary approach and the need to avoid unregulated fishing are discussed further in section 4. Due to space constraints, issues relating to Arctic Indigenous Peoples cannot be examined here.²⁶

Various non-State actors also had significant influence on the negotiations that culminated in the CAOFA. Representatives of Arctic Indigenous Peoples – in particular from the Inuit Circumpolar Council (ICC) – participated in the delegations of Canada, Greenland (as part of the delegation of the Kingdom of Denmark)²⁷ and the United States, and the delegation of the United States also included representatives of environmental non-governmental organisations (NGOs; in this case The Pew Charitable Trusts).

24 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (signed 4 August 1995, entered into force 11 December 2001) 2167 UNTS 3.

25 FAO, “International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing” (adopted 2 March 2001, endorsed 23 June 2001), available at <<https://www.fao.org/fishery/en/ipoa-iuu>> accessed 20 June 2024.

26 See N. Bankes, “Arctic Ocean Management and Indigenous Peoples: Recent Legal Developments” in N. Bankes, E. J. Molenaar and T. Henriksen (eds), *The Yearbook of Polar Law, Volume 11, 2019* (Brill 2020) 81–120, 109–115; E. J. Molenaar, “The Central Arctic Ocean Fisheries Agreement and Arctic Indigenous Peoples” (2024) 164 *Marine Policy* 106160.

27 In fact, it can be argued that Greenlanders can be regarded as an Arctic Indigenous People. See eg R. L. Johnstone, “The Impact of International Law on Natural Resource Governance in Greenland” (2020) 56 *Polar Record* e21, 1–11, for a discussion on various definitional issues and other complexities, including the two non-Inuit minorities in Greenland.

In April 2012, the Pew Environment Group released a letter signed by 2000 scientists which called on:

Arctic governments to take a lead in developing an international agreement to address fisheries in the central Arctic Ocean, based on sound scientific and precautionary principles, and starting with a catch level of zero as a reflection of the state of understanding of the fisheries ecology of the region.²⁸

The letter received wide coverage and attention, and is regarded as having been an important driver in promoting action by the Arctic Five.²⁹ Following the signature of the 2015 Oslo Declaration, a series of non-governmental ‘CAO Asia Dialogues’ were held in China, Japan and South Korea in order to raise awareness and understanding in these States of the issues at hand, and support for the Five-plus-Five process.³⁰

Finally, reference should also be made to the commitments in 2016 by the fishing industry – facilitated by Greenpeace – not to expand fishing for Arctic cod (*Gadus morhua*) into areas of the North-East Atlantic Ocean where regular fishing had not taken place before.³¹

4 Key Elements of the CAOFA’s Abstention from Fishing

4.1 *Objective*

The objective of the CAOFA is set out in Article 2, which reads:

The objective of this Agreement is to prevent unregulated fishing in the high seas portion of the central Arctic Ocean through the application of precautionary conservation and management measures as part of a long-term strategy to safeguard healthy marine ecosystems and to ensure the conservation and sustainable use of fish stocks.

This wording clearly reflects the stepwise or two-step approach that was pursued during the Five-plus-Five process. Accordingly, the first step of the objective of the CAOFA is to prevent unregulated fishing in the high seas portion of

²⁸ On file with author. Other parts of the letter are cited in P. Harrison et al, “How Non-Government Actors Helped the Arctic Fisheries Agreement” (2020) 2 *Polar Perspectives* 8.

²⁹ Harrison et al (n 28) 8.

³⁰ *ibid* 9–11.

³¹ On file with author.

the CAO, and the intended second step is to eventually replace this by the usual regulation of high seas fishing by RFMO/As. The wording used to capture this second step – “as part of [...] fish stocks” – is clearly inspired by wording used for the objectives of modern RFMO/As.³²

The initial objective of the CAOFA is also reflected in the full title of the CAOFA and its Preamble. Article 2 clarifies that this initial objective is achieved “through the application of precautionary” conservation and management measures (CMMS), which refers primarily to the abstention from high seas fishing laid down in Article 3. The 9th (unnumbered) preambular paragraph stipulates that the prevention of unregulated fishing is “consistent with the precautionary approach”. The CAOFA in its entirety can also be regarded as an application or operationalisation of the precautionary approach to fisheries management as commercial and exploratory fishing will only be allowed in case certain conditions are met (see subsection 4.3).

4.2 *Geographical and Species Coverage*

The determination of the geographical scope of the CAOFA – the Agreement Area – was motivated by several reasons and has various implications. As the CAOFA’s geographical scope is identical to that of the 2015 Oslo Declaration, that determination had essentially already been made during the Arctic Five process. The two subsections below deal with several choices with which the delegations of the Arctic Five were confronted.

The wording and location of the definition of the Agreement Area remained a contentious issue up until the very last stages of the Five-plus-Five negotiations. This was due to the still unresolved dispute on the geographical scope of the Spitsbergen Treaty³³ and thereby its application to Svalbard’s Fisheries Protection Zone (FPZ) and (outer) continental shelf, which are immediately adjacent and partly subjacent to the Agreement Area.³⁴

32 See, for instance, NAFO Convention, art II. Convention on Cooperation in the Northwest Atlantic Fisheries (NAFO) [originally named “Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries”] (signed 24 October 1978, entered into force 1 January 1979) 1135 UNTS 369 (as amended); consolidated version available at <<https://www.nafo.int/Home/NAFO-Governance>> accessed 11 April 2025, which reads: “The objective of this Convention is to ensure the long term conservation and sustainable use of the fishery resources in the Convention Area and, in so doing, to safeguard the marine ecosystems in which these resources are found”.

33 Treaty concerning the Archipelago of Spitsbergen (signed 9 February 1920, entered into force 14 August 1925) 2 LNTS 7.

34 For a discussion see E. J. Molenaar, “Participation in the Central Arctic Ocean Fisheries Agreement” in A. Shibata, L. Zou, N. Sellheim and M. Scopelliti (eds), *Emerging Legal Orders in the Arctic: The Role of Non-Arctic Actors* (Routledge 2019) 132–170, at 153–154.

4.2.1 Only High Seas or also Adjacent Coastal State Maritime Zones

A fundamental choice was whether the actions of the Arctic Five would be confined to the high seas or would also cover adjacent coastal State maritime zones. It seems that the Oslo Declaration's joint programme of scientific research was intended to relate to the CAO in its entirety.³⁵ However, there does not seem to have been any serious consideration of applying its qualified abstention from fishing also to adjacent coastal State maritime zones.³⁶ The United States might have been supportive of the latter option, as it had already prohibited commercial fishing in the EEZ off Alaska in the Arctic Ocean in late 2009. Canada may perhaps have been willing to consider the latter option – possibly partially – in light of its 2008 New Emerging Fisheries Policy,³⁷ other relevant fisheries policies and support for adopting an approach for the Canadian part of the Beaufort Sea similar to that adopted by the United States for the EEZ off Alaska in the Arctic Ocean.³⁸ Whereas the position of Denmark/Greenland at the time was unclear, it seems unlikely that Norway and Russia would have supported coverage of adjacent coastal State maritime zones. This is due to the large-scale commercial fisheries that were already ongoing in the Barents Sea at the time, and the absence of a 'logical' boundary between the Barents Sea and the CAO. However, the United States did not seek to persuade any of the other Arctic Five to take similar or equivalent action in their coastal

See also the declaration made by Iceland upon ratification of the CAOFA, available at <<https://www.treaty-accord.gc.ca/details.aspx?id=105549>> accessed 20 June 2024; and the text accompanying (n 67–70).

35 Whereas the text on the joint programme of scientific research after the second bullet applies only to the high seas portion of the CAO, the sentence "We desire to promote scientific research, and to integrate scientific knowledge with traditional and local knowledge, with the aim of improving the understanding of the living marine resources of the Arctic Ocean and the ecosystems in which they occur" indicates an intention to apply this more broadly.

36 Email from an official of the United States government to author (31 March 2023).

37 Government of Canada, "New Emerging Fisheries Policy" (2008), available at <<https://www.dfo-mpo.gc.ca/reports-rapports/regs/efp-pnp-eng.htm>> accessed 20 June 2024.

38 See also E. J. Molenaar, "Arctic Fisheries and International Law. Gaps and Options to Address Them" (2012) 1 *Carbon & Climate Law Review* 63–77, 71. For more recent developments, see B. Ayles, L. Porta and R. McV Clarke, "Development of an integrated fisheries co-management framework for new and emerging commercial fisheries in the Canadian Beaufort Sea" (2016) 72 *Marine Policy* 246–254; Fisheries and Oceans Canada, Fisheries Joint Management Committee, Inuvialuit Game Council, and Inuvialuit Regional Corporation, *Beaufort Sea Integrated Fisheries Management Framework for the Inuvialuit Settlement Region, Canada* (2014) 64, available at <<https://fjmc.ca/wp-content/uploads/2016/08/Beaufort-Sea-Integrated-Fisheries-Management-Framework-2014-FINAL-version.pdf>> accessed 20 June 2024.

State maritime zones, but focused its efforts entirely on building support for collective action for the high seas portion of the CAO.³⁹

It is not difficult to understand that limiting the abstention of fishing to the high seas portion of the CAO facilitated its acceptance among the Arctic Five, because this left their international rights to fish in their own maritime zones unaffected.⁴⁰ This was very different for the Other Five, as the high seas portion of the CAO was, and still is, the only part of the CAO where they have a robust international right to fish. This was and remains a fundamental difference between the fisheries interests of the Arctic Five on the one hand, and those of the Other Five on the other hand.⁴¹ In essence, it means that, while there will be different scenarios leading to the occurrence of a fish stock in the high seas portion of the CAO that would allow for the commencement of a commercially viable fishery, the Other Five can be expected to be overall more inclined to vote in favour of the commencement of high seas fishing than the Arctic Five. The Arctic Five may only be supportive of such a commencement if they intend to participate in the fishery themselves or, if they do not intend to do so, if this would not significantly conflict with their coastal State fisheries interests.

These coastal State fisheries interests could be predominantly utilisation-oriented or predominantly conservation-oriented.⁴² Conflict with utilisation-oriented coastal State interests of the Arctic Five could for instance arise in case of a straddling fish stock, which is a fish stock occurring in one or more EEZs and the adjacent high seas. Those of the Arctic Five that would allow fishing for such a stock in their own maritime zones adjacent to the high seas portion of the CAO have a clear interest to withhold support for the commencement of fishing for the high seas component of the stock. The high seas would then act as a *de facto* reserve for the replenishment of the stock's coastal component. Moreover, before a northward expansion of a fish stock reaches the high seas portion of the CAO, the stock will first have to traverse the adjacent coastal State maritime zones. Depending once again on different scenarios, one or more of the Arctic Five could therefore be in a position to

39 See (n 36).

40 UNCLOS, arts 2(1), 49(1), 56(1)(a) and 77(4).

41 The ensuing observations are not immediately applicable to Denmark in respect of the Faroe Islands and Greenland, whose hybrid status in the negotiations means it has a much more complex set of interests.

42 The Arctic Five also have utilisation-oriented as well as conservation-oriented interests in relation to the natural resources of their outer continental shelves underlying the high seas portion of the CAO (see, inter alia, CAOFA, art. 1(b); UNCLOS, arts 77(1) and 78(2)).

stifle this northward expansion by increasing fishing effort in their own maritime zones.⁴³

Conflict with conservation-oriented coastal State fisheries interests of the Arctic Five could also arise in relation to a straddling fish stock. Those of the Arctic Five that would prohibit fishing for such a stock in their own maritime zones adjacent to the high seas portion of the CAO – for various reasons – are unlikely to support the commencement of fishing for the high seas component. Moreover, those of the Arctic Five that would prohibit fishing more generally in their own maritime zones may also be hesitant to support the commencement of fishing in the high seas for stocks that do not also occur in their own maritime zones. They could for instance be concerned about effects that high seas fishing might have on ecosystems in their own maritime zones (eg due to by-catch and predator-prey relationships) as well as on the needs and interests of Arctic Indigenous Peoples.

The abstention from high seas fishing therefore affects the fisheries interests of the Other Five far more than those of the Arctic Five. The Other Five managed to address this imbalance in two ways. First, the arrangements on the duration of the CAOFA ensure that the imbalance would be time-bound as all Parties have the right to terminate the CAOFA – after the initial period of 16 years – if they feel that the abstention should be lifted. Second, following a proposal of one of the Other Five, it was agreed to include a reference to the notion of compatibility in Article 3(6) of the CAOFA, which reads:

Consistent with Article 7 of the 1995 Agreement, coastal States Parties and other Parties shall cooperate to ensure the compatibility of conservation and management measures for fish stocks that occur in areas both within and beyond national jurisdiction in the central Arctic Ocean in order to ensure conservation and management of those stocks in their entirety.

It is submitted that this provision does not adequately address the aforementioned imbalance because it applies exclusively to transboundary fish stocks. It does not require the Arctic Five to conduct fisheries management in their own adjacent maritime zones in accordance with a similar or equivalent level of stringency as that is applicable to the high seas. The provision will therefore only trigger constraints on fishing by the Arctic Five in their maritime zones

43 See eg L. Zou and H. P. Huntington, "Implications of the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea for the management of fisheries in the Central Arctic Ocean" (2018) 88 *Marine Policy* 132–138, 135.

adjacent to the high seas portion of the CAO sometime in the future, once the northward migration of fish stocks reaches the high seas portion.

The main reason why the Other Five were nevertheless prepared to accept the abovementioned imbalance is that their participation in the CAOFA strengthens their position in Arctic governance. This is not so much true for Iceland, which is also an Arctic State on account of its membership of the Arctic Council – the principal intergovernmental body for Arctic cooperation – along with the Arctic Five. Conversely, China, Japan and South Korea merely have Observer status in the Arctic Council – obtained in 2013 – whereas the EU was merely granted *de facto* Observer status that year.⁴⁴

The fact that membership of the Arctic Council is limited to the eight Arctic States is not inconsistent with current international law.⁴⁵ However, the balance between the rights and obligations of Arctic Council Observers – in particular non-Arctic States and the EU – has been a sensitive issue for many years. In light of the inferior participatory status of non-Arctic States and entities in the Arctic Council, the ‘Arctic Council System’,⁴⁶ and the new, more peripheral Arctic bodies established in 2014 and 2015,⁴⁷ it is understandable that China, the EU, Japan and South Korea welcomed the opportunity to participate on an equal footing with Arctic States in the Five-plus-Five process. Similarly, these three States and the EU shared a clear interest in bringing the Five-plus-Five process to a successful conclusion, as that would offer the prospect of obtaining an equal participatory status as Arctic States in the CAOFA.

44 Arctic Council, *Kiruna Declaration* (The Eight Ministerial Meeting of the Arctic Council, 15 May 2013, Kiruna, Sweden), available at <<https://oarchive.arctic-council.org/items/bc9e3845-fb69-40e8-a1da-ob516c4ffb6d6>> accessed 20 June 2024. The EU, which is not a State but an intergovernmental organisation *sui generis*, represented all of its then 28 Member States in the Five-plus-Five process. Three of these 28 are Arctic States, namely mainland Denmark, Finland and Sweden, but neither of these is a CAO coastal State. This means that the EU acted in a *de facto* capacity as high seas fishing State, with three of the 28 Member States represented by it being Arctic States.

45 See E. J. Molenaar, “The Arctic, the Arctic Council, and the Law of the Sea”, in R. Beckman, T. Henriksen, K. Dalaker Kraabel, E. J. Molenaar and J. A. Roach (eds), *Governance of Arctic Shipping. Balancing Rights and Interests of Arctic States and User States* (Brill Nijhoff 2017) 24–67, 46–47.

46 See E. J. Molenaar, “Current and Prospective Roles of the Arctic Council System within the Context of the Law of the Sea” (2012) 27 *International Journal of Marine and Coastal Law* 553–595.

47 Arctic Economic Council, *Arctic Economic Council* (Arctic Council, Tromsø, Norway), available at <<https://arcticeconomiccouncil.com/>> accessed 20 June 2024; the Arctic Off-shore Regulators Forum (AORF); and the Arctic Coast Guard Forum (ACGF), 2015, available at <<https://www.arcticcoastguardforum.com/>> accessed 20 June 2024. For an analysis see Molenaar (n 45) 53 and 57–59.

In fact, as the CAOFA is a legally binding instrument and its COP competent to adopt legally binding decisions, an international lawyer would regard it as superior to the Arctic Council, which is ‘merely’ a high-level intergovernmental forum without the competence to adopt legally binding decisions.

4.2.2 Geographical and Species Overlaps with Other RFMO/As

The Agreement Area overlaps in particular with the geographical and species mandates of the following two RFMO/As:⁴⁸ (1) the North-East Atlantic Fisheries Commission (NEAFC) established by the Convention on Future Multilateral Cooperation in the North-East Atlantic Fisheries (NEAFC Convention);⁴⁹ and (2) the Joint Norwegian Russian Fisheries Commission (JNRFC) established by the Agreement between the Government of the Kingdom of Norway and the Government of the Union of Soviet Socialist Republics on Co-operation in the Fishing Industry (JNRFC Agreement).⁵⁰ Whereas the Agreement Area also overlaps with the geographical mandate of the North Atlantic Salmon Conservation Organization (NASCO),⁵¹ this has only limited practical relevance in light of the prohibition on high seas salmon fishing included in Article 2(1) of the NASCO Convention.⁵²

Which species are covered by the CAOFA can be deduced from the definition of ‘fish’ in Article 1(b), which means “species of fish, molluscs and crustaceans except those belonging to sedentary species as defined in Article 77 of [UNCLOS]”. The exclusion of sedentary species would for instance be pertinent for snow crab (*Chionoecetes opilio*), which appears to be regarded by Canada, the EU, Norway and Russia as a sedentary species,⁵³ but possibly not by the

⁴⁸ The qualification of these bodies as RFMO/As is dealt with in subsection 4.3 below.

⁴⁹ Convention on Future Multilateral Cooperation in the North-East Atlantic Fisheries (NEAFC Convention) (signed 18 November 1980, entered into force 17 March 1982) 1285 UNTS 129, as amended (consolidated version available at <<https://www.neafc.org/basictexts>>).

⁵⁰ Agreement between the Government of the Union of Soviet Socialist Republics and the Government of the Kingdom of Norway concerning mutual relations in the field of fisheries (JNRFC Agreement) (signed 15 October 1976, entered into force 21 April 1977) 1157 UNTS 139, art III(1).

⁵¹ See Convention for the Conservation of Salmon in the North Atlantic Ocean (NASCO Convention) (signed 2 March 1982, entered into force 1 October 1983) 1338 UNTS 33, art 1(1); and the line of argumentation in J. J. Maguire, P. McGinnity and E. J. Molenaar, “Report of the Third NASCO Performance Review” (Council Report, 14 March 2023) NASCO doc. CNL(23)17, 9, available at <https://nasco.int/wp-content/uploads/2023/05/CNL2317rev_Report-of-the-Third-NASCO-Performance-Review.pdf> accessed 21 June 2024.

⁵² See (n 51).

⁵³ As regards Canada and the EU: letter dated 5 August 2015 from the European Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE) to the Director General, “Subject: Snow Crab Fisheries in the NEAFC Regulatory Area” (Brussels), available at <<https://www.politico.eu/wp-content/uploads/2017/06/SPOLITICO-17061514340>>.

United States.⁵⁴ This divergence of views might have future relevance in light of possible northward shifts of the snow crab stocks in the Bering Sea.⁵⁵

The overlap between the Agreement Area and the NEAFC Convention Area⁵⁶ is shown in Figure 6.1. NEAFC’s species mandate can be deduced from



FIGURE 6.1 High seas portion of the CAO and NEAFC Convention Area

pdf accessed 21 June 2024> accessed 28 July 2024; as regards Norway and Russia this is reflected in: Note Verbale No. 96/15 from the Mission of Norway to the EU (30 October 2015) (on file with author).

54 As suggested in the letter by DG MARE (n 53).

55 See E. J. Fedewa et al, “Recent Shifts in Northern Bering Sea Snow Crab (*Chionoecetes Opilio*) Size Structure and the Potential Role of Climate-Mediated Range Contraction” (2020) 181–182 *Deep Sea Research Part 11: Topical Studies in Oceanography* 104878; C. Szuwalski et al, “Climate change and the future productivity and distribution of crab in the Bering Sea” (2021) 78(2) *ICES Journal of Marine Science* 502–515.

56 The NEAFC Convention Area is defined in NEAFC Convention, art 1(a).

the definition of ‘fishery resources’ in Article 1(b) of the NEAFC Convention, which excludes sedentary species covered by Article 77(4) of UNCLOS,⁵⁷ highly migratory fish species (eg tuna and tuna-like species) and anadromous fish species (eg salmon).

As regards the JNRFC Agreement, nothing in its title, preamble or body is explicitly devoted to its geographical scope. The Agreement – and thereby the mandate of JNRFC – is therefore not exclusively confined to the maritime zones of Norway and Russia, the adjacent high seas areas or the Barents Sea. Fisheries for species whose distributional ranges extend into the high seas pocket of the Barents Sea (the so-called Loophole) or beyond the Barents Sea into the Norwegian Sea, the Greenland Sea or the CAO – including the high seas portion of the Norwegian Sea (the so-called Banana Hole) and the high seas portion of the CAO – therefore fall in principle within JNRFC’s mandate.⁵⁸

The JNRFC Agreement does not define the species mandate of JNRFC, and merely contains a reference to “the living resources of the sea” in its preamble. Its constitutive instrument therefore provides JNRFC with an essentially unlimited species mandate. The practice of JNRFC has also confirmed this, for instance by its regulation of the harvesting of harp and hooded seals.⁵⁹

Whereas the undefined geographical mandate of JNRFC meant that a geographical overlap between the CAOFA and JNRFC could not be avoided during the CAOFA negotiations, this is different for the geographical overlap between the CAOFA and NEAFC. The two phases of the CAOFA negotiations could also have agreed to exclude the ‘Atlantic segment’ of the high seas portion of the CAO from the Agreement Area. During the Arctic Five phase, however, Norway apparently strongly opposed a proposal in this regard.⁶⁰ If accepted, this would have meant that Svalbard’s FPZ and outer continental shelf would not be immediately adjacent, and partly subjacent, to the Agreement Area. This would have possibly posed a risk to Norway’s status as a CAO coastal State in the context of the CAOFA and the associated entitlements such States could (potentially) have pursuant to the CAOFA. Moreover, Norway is also likely to have been cognizant of the fact that, even though recognition of its status as a CAO coastal State and the associated entitlement to participate on an equal

57 This is a consequence of the phrases “area(s) under the jurisdiction of a Contracting Party” which also cover outer continental shelves, see NEAFC Convention, arts 5 and 6.

58 See, JNRFC Agreement, art 7.

59 As reflected in JNRFC, The Protocols of the Annual Joint Norwegian Russian Fisheries Commission (JNRFC) Meetings, available at <<https://www.jointfish.com/>> accessed 28 July 2024.

60 Information provided to the author through email on 16 June 2018 by two participants of one delegation to the Arctic Five negotiations at the time.

footing with other CAO coastal States would strictly speaking be limited to the context of the CAOFA, such recognition would also have broader geopolitical significance.

The overlap between the Agreement Area and the NEAFC Convention Area was also discussed during the early stages of the Five-plus-Five process, but no delegation felt strongly about avoiding it. Assurances that the role and mandate of NEAFC would not be undermined are included in Article 14(4) of the CAOFA and in the 7th (unnumbered) preambular paragraph.⁶¹ The implications of these overlaps for fishing under the auspices of NEAFC and JNRFC will be discussed in the next subsection.

4.3 *Exceptions to the Abstention from Fishing*

As noted in section 2, there are four exceptions to the abstention from fishing in paragraphs 1 and 3 of Article 3.⁶² These paragraphs read as follows:

1. Each Party shall authorize vessels entitled to fly its flag to conduct commercial fishing in the Agreement Area only pursuant to:
 - a. conservation and management measures for the sustainable management of fish stocks adopted by one or more regional or subregional fisheries management organizations or arrangements, that have been or may be established and are operated in accordance with international law to manage such fishing in accordance with recognized international standards, or
 - b. interim conservation and management measures that may be established by the Parties pursuant to Article 5, paragraph 1(c)(ii).
- [....]
3. A Party may authorize vessels entitled to fly its flag to carry out exploratory fishing in the Agreement Area only pursuant to conservation and management measures established by the Parties on the basis of Article 5, paragraph 1(d).

Commercial fishing⁶³ is therefore governed by paragraph 1 and exploratory fishing⁶⁴ by paragraph 3. Paragraph 1 contains three exceptions to the

61 For further analysis see eg Molenaar (n 6) 456–457.

62 Para 4 deals with “scientific research activities involving the catching of fish”.

63 Defined in CAOFA, art 1(d) as “fishing for commercial purposes”.

64 Defined in CAOFA, art 1(e) as “fishing for the purpose of assessing the sustainability and feasibility of future commercial fisheries by contributing to scientific data relating to such fisheries”.

abstention from commercial fishing and paragraph 3 contains one exception for exploratory fishing.

The first exception concerns commercial fishing pursuant to existing RFMO/As. There was consensus among the Five-plus-Five that NEAFC qualifies as an RFMO. Whereas NEAFC never had a prohibition on fishing in the Atlantic segment of the high seas portion of the CAO in effect, there has not been any fishing for species regulated by NEAFC in these waters so far.

As regards JNRFC, some delegations were not convinced that it qualifies as an RFMO or an RFMA. As argued elsewhere by this author, there are nevertheless good arguments in favour of qualifying JNRFC as an RFMA.⁶⁵ The phrase “[...] and are operated in accordance with international law” was proposed by these delegations in furtherance of their positions and their associated concern that fishing by Norwegian and Russian vessels under the auspices of JNRFC in the high seas portion of the CAO would constitute an exception to the abstention.⁶⁶

Similar to NEAFC, whereas JNRFC never had a prohibition on fishing in the high seas portion of the CAO in effect, such fishing had not occurred there at the time of writing. Reference should nevertheless be made to two legally binding instruments adopted in 2021 and 2022: the December 2021 Norway-United Kingdom Arrangement on Fisheries Cooperation,⁶⁷ and the April 2022 Norway-EU Ad-hoc exploratory consultations in relation to the fisheries in ICES areas 1 and 2.⁶⁸ These two instruments were intended to resolve the disputes that had arisen in December 2020 between Norway, on the one hand, and the

65 See Molenaar (n 18) 90–91.

66 Note also that the 7th (unnumbered) preambular paragraph explicitly mentions NEAFC but not JNRFC or any other regional fisheries bodies, and also contains the phrase “established [...] international law”. For a more in-depth discussion see Molenaar (n 6) 458–459.

67 Text available at Norwegian Ministry of Industry and Fisheries, “Norway and Great Britain agree on fisheries agreement” (*Press Release*, 21 December 2021), available at <<https://www.regjeringen.no/no/aktuelt/norge-og-storbritannia-enige-om-fiskeriavtale/id2893070/>> accessed 21 June 2024; United Kingdom’s Department for Environment, Food & Rural Affairs, “Fisheries: cooperation between the UK and Norway” (*Policy Paper*, 13 January 2022), available at <<https://www.gov.uk/government/publications/fisheries-cooperation-between-the-uk-and-norway>> accessed 21 June 2024.

68 Text available at European Commission, “Fisheries: EU and Norway strengthen cooperation for sustainable fishing in the Northeast Arctic” (*Press Release*, 28 April 2022), available at <https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2722> accessed 21 June 2024; Norwegian Ministry of Industry and Fisheries, “Understanding between Norway and the EU on fishing in the fishing protection zone at Svalbard and in the northern waters”, available at <<https://www.regjeringen.no/no/aktuelt/forstaelse-mellom-norge-og-eu-om-fiske-i-fiskevernsonen-ved-svalbard-og-i-de-nordlige-farvann/id2910636/>> accessed 21 June 2024.

United Kingdom and the EU on the other hand, on fishing for Arctic cod in the Svalbard FPZ against the background of the broader unresolved dispute on the geographical scope of the Spitsbergen Treaty. In return for Norway's commitment to restore the long-standing allocation of Arctic cod that was interrupted in December 2020, the United Kingdom and the EU make various commitments that have the effect of strengthening the role of JNRFC and the authority of Norway and Russia through so-called 'creeping coastal State jurisdiction'⁶⁹ in the three high seas areas covered by the arrangements – the Loophole, the Banana Hole and the Atlantic segment of the high seas portion of the CAO – while at the same time weakening NEAFC and the CAOFA and the authority of high seas fishing States there.⁷⁰ The inclusion of the Atlantic segment of the high seas portion of the CAO in these two instruments can be regarded as the most recent assertion of JNRFC's competence in this area. Whether this is a prelude to the actual use of the exception in Article 3(1)(a) of the CAOFA remains to be seen.

The second exception relates to commercial fishing under the auspices of future RFMO/As. This is based on the stepwise approach. The establishment of one or more of such RFMO/As would then lead to a complete or partial termination (or 'lifting') of the abstention, or the termination of the CAOFA in its entirety, either by not extending its duration or otherwise.⁷¹

The chapeau of Article 5(1)(c) of the CAOFA contains the so-called 'trigger' for the commencement of negotiations to establish one or more additional RFMO/As. Due to the word "shall" in the chapeau of Article 5(1), the COP is required to determine whether to commence such negotiations. This determination can only be made after the COP's preliminary determination that "the distribution, migration and abundance of fish in the Agreement Area would support a sustainable commercial fishery". That preliminary determination must be based on

the scientific information derived from the [JPSRM], from the national scientific programmes, and from other relevant sources, and taking into account relevant fisheries management and ecosystem considerations,

69 The incremental process of seaward extension of coastal State authority. For a discussion see Molenaar (n 34) 142–145.

70 For a more in-depth discussion see E. J. Molenaar, "Overlapping Geographical Mandates of RFMOs" in B. Kunoy, T. Heidar and C. Yiallourides (eds), *International Fisheries Law* (Routledge forthcoming) at section 4.4.

71 CAOFA, art 13, paras (2) and (3).

including the precautionary approach and potential adverse impacts of fishing on the ecosystems.

The third exception is commercial fishing under the auspices of the COP of the CAOFA. Once the COP has agreed to commence negotiations to establish one or more additional RFMO/As, Articles 3(1)(b) and 5(1)(c)(ii) authorise it to adopt interim CMMS on commercial fishing. This recognises that it may take a considerable number of years before negotiations to establish an RFMO/A are concluded and the RFMO/A is also formally established.

At the time of writing, the limited abundance and distribution of fish in the high seas portion of the CAO did not allow for a commercially viable fishery.⁷² For several reasons, it seems unlikely that the COP will authorise commercial fishing before 2037. These include the arrangements on duration in Article 13, consensus decision-making, and the utilisation- and conservation-oriented fisheries interests of the Arctic Five. As explained in subsection 4.2.1, these interests mean that the Arctic Five can be expected to be overall less inclined to vote in favour of the commencement of high seas fishing than the Other Five.

The fourth exception is exploratory fishing. Article 3(3) of the CAOFA entitles Parties to authorise their vessels to conduct exploratory fishing, provided this occurs ‘pursuant to’ CMMS adopted by the COP on the basis of Article 5(1)(d). The latter requires (“shall”) the COP to adopt these CMMS on exploratory fishing within three years of the CAOFA’s entry into force; before 25 June 2024 therefore. Once these CMMS have been adopted, however, the CAOFA does not give the COP an approval role for the actual engagement in specific exploratory fishing plans. Article 5(1)(d)(III) merely stipulates that “a Party may authorize exploratory fishing only after it has notified the other Parties of its plans for such fishing and it has provided other Parties an opportunity to comment on those plans”. Instead of this latter duty of notification combined with limited review, some delegations proposed during the Five-plus-Five negotiations that specific authorisations on exploratory fishing would need prior approval by the COP. That proposal failed to attract sufficient support.⁷³

Read in conjunction, Articles 3(3) and 5(1)(d) make the exercise of each CAOFA Party’s right to engage in exploratory fishing conditional on the

72 See eg the results of various expeditions including the 2019–2020 Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC) expedition discussed in the Report of the 3rd (2022) PSCG Meeting (available at <<https://vlab.noaa.gov/web/caofa>> accessed 14 April 2025) at 11, which indicate that fish density in the high seas portion of the CAO is extremely low and most fish are small.

73 Based on the notes of the author.

adoption – by consensus – of CMMS by the COP. The negotiations on the CMMS on exploratory fishing commenced in December 2023 by means of a virtual meeting of the COP's Ad Hoc Working Group on Exploratory Fishing (EF-WG), chaired by Kelly Kryc of the United States.⁷⁴ Despite the many virtual meetings of the EF-WG between January-June 2024, and the meetings during the 3rd (2024) in-person CAOFA COP, it was decided that the draft CMMS had not sufficiently advanced for them to be adopted by the COP before the deadline set out in Article 5(1)(d) of the CAOFA. Instead, the COP adopted interim CMMS on exploratory fishing that repeat the conditional right set out in Article 3(3) of the CAOFA, and require Parties to endeavour to adopt final CMMS on exploratory fishing at the 4th (2025) in-person COP.⁷⁵

As expected, the differences between the fisheries interests of the Arctic Five and those of the Other Five were reflected in their positions and proposals on substantive and procedural aspects of the envisaged CMMS on exploratory fishing. Some of these positions and proposals were aimed at constraining or delaying the commencement of exploratory fishing, by proposing conditions in addition to those laid down in Article 5(1)(d). It is unclear what the consequences would be if the new, softer deadline of June 2025 is not met either. Fortunately, at the time of writing, the abundance and distribution of fish in the high seas portion of the CAO did not give rise to concrete interest in commencing exploratory fishing in the near future.

4.4 *Decision-Making and Duration*

In light of the fundamental difference between the fisheries interests of the Arctic Five and the Other Five as explained in subsection 4.2.1, it was clear from early on in the Five-plus-Five negotiations that the rules and procedures for decision-making would be the most difficult issue to resolve. This was underlined further by repeated assertions by some of the Arctic Five of their special role in the high seas portion of the CAO and demands for preferential treatment in decision-making and the conditions for the CAOFA's entry into force. Such a special role and preferential treatment were opposed by essentially all of the Other Five. Not only because of their fisheries interests but also due to concerns for the precedent-setting effects this would have for 'multilateral'

74 Report of the 2nd (2023) in-person CAOFA COP, para 27 and Appendix 10, available at <<https://vlab.noaa.gov/web/caofa>> accessed 27 August 2024.

75 Report of the 3rd (2024) in-person CAOFA COP, para 23 and Appendix 7, available at <<https://vlab.noaa.gov/web/caofa>> accessed 27 August 2024. This decision has some similarities with the decision of the States Parties to the UNCLOS (SPLOS) on the deadline set out in art 4 of Annex II to the UNCLOS (as reflected in Decision SPLOS 72 (May 2001)).

creeping coastal State jurisdiction in the domain of the international law of the sea. Similar assertions and demands of a special role and preferential treatment were also being made by ‘adjacent coastal States’ during the negotiations on what became the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement),⁷⁶ which were held in parallel with the Five-plus-Five negotiations.⁷⁷

The negotiations on decision-making had converged to multiple decision-making procedures towards the end of the 5th Meeting (March 2017). Decisions on questions of substance would, in the absence of consensus, be made by a three-fourths majority including at least three of the Arctic Five. A separate decision-making procedure would be applied for the determination to commence negotiations to establish one or more RFMO/As (see subsection 4.3). In such a scenario, the commencement of commercial fishing could be delayed for a period of up to two years at the request of a particularly affected coastal State. As became clear at the outset of the 6th Meeting (November 2017), however, these arrangements no longer enjoyed sufficient support, because one of the Arctic Five demanded a veto for the Arctic Five and some of the Other Five rejected any special role of the Arctic Five in decision-making whatsoever. During the last hours of the 6th Meeting, the delegations agreed on one single decision-making procedure for all matters of substance – ie consensus decision-making – as part of a package-deal on decision-making, conditions for the CAOFA’s entry into force and the Agreement’s duration. The package-deal’s element on decision-making is laid down in Article 6 of the CAOFA.

The idea of having a ‘sunset clause’ or some other limitation on the duration of the CAOFA had been floated in advance of the 6th Meeting. This mechanism had proved to be crucial for the successful adoption of the Ross Sea region marine protected area by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in October 2016.⁷⁸ Experience with the substantive and procedural conditions for re-commencing fishing for pollock in the Bering Sea Donut Hole are certain to have been in the minds

76 Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, signed 20 September 2023. Not in force). Certified true copy available at <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-10&chapter=21&clang=_en>.

77 Molenaar (n 34), at 144–145 and 167–168. See also E. J. Molenaar, “Multilateral Creeping Coastal State Jurisdiction and the BBNJ Negotiations” (2021) 36 *International Journal of Marine and Coastal Law* 5.

78 See CCAMLR Conservation Measure 91–05 (2016), paras 20–21; see also the discussions by Urrutia in chapter 5 and by Guggisberg in chapter 13.

of the participants of the Five-plus-Five process as well;⁷⁹ and possibly even their experience with the substantive and procedural conditions for re-commencing commercial whaling under the auspices of the International Whaling Commission.⁸⁰

Support for some sort of sunset clause quickly spread at the 6th Meeting once progress on decision-making stalled. Discussion centred above all on the length of the initial period of duration and the procedure by which duration could be extended. Proposals on the initial period of duration ranged from 10 to 30 years. The delegations that favoured a longer initial period were eventually prepared to settle for 16 years once agreement had in principle been reached on the requirements for entry into force. They assumed that there would be a considerable number of years between the agreement on the text of the CAOFA in November 2017 and the CAOFA's entry into force, which would amount to a *de facto* extension of the initial period of duration. The period eventually turned out to be about 3.5 years. Finally, reference should be made to Article 12 of the CAOFA, which contains each party's right to withdraw from the Agreement by means of a written notification to the depositary.

During the negotiations on the COP's Rules of Procedure (RoP), several Parties had a preference for decision-making by a qualified majority for some matters, for instance on applications for observer status and inviting individuals or organisations to attend the COP. The negotiations on these issues can be regarded as relating to the nature of particular decisions; procedural or substantive. Moreover, Parties can also agree – by consensus – on exceptions to the general rules in Article 6. In the end, however, it was agreed that all matters would be subject to consensus decision-making.⁸¹ This was due to the insistence by some Parties – implicitly or explicitly – that the decisions under discussion had a substantive nature and/or that they were not prepared to accept exceptions to the general rule.

79 See (n 5).

80 Pursuant to International Convention for the Regulation of Whaling (ICRW) (signed 2 December 1946, entered into force 10 November 1948) 161 UNTS 72, arts III(2) and V(1), this requires a three-fourths majority. See also the discussion by Jeffries and Latos in chapter 7.

81 See the alternative text of Rules 5.2 and 5.6 of the last draft of the COP RoP included in Appendix 8 of the Report of the 1st (2022) in-person CAOFA COP (n 13). Rule 5.6 was in the end left out entirely. The only instance in which the COP RoP use a qualified majority is in relation to the quorum in Rule 9.1.

4.5 *Non-Parties and Accession*

As explained in section 2, the negotiations on the CAOFA was a stand-alone process that consisted of two phases. The composition of participation in the first – CAO coastal States – phase was quite evident.⁸² The Arctic Five – led by the United States – then initiated a broader process that became known as the Five-plus-Five phase because the commitments of the Arctic Five in the Oslo Declaration were not opposable to other States and entities. The Other Five appear to have been invited to this second phase for a number of reasons, including: representation of all Arctic States; relative proximity to the high seas portion of the CAO; capability and interest in distant-water, high latitude fisheries; participation in ‘nearby’ RFMO/As; the desire to ensure that the Arctic Five were not outnumbered by non-CAO coastal States and entities; and the preference to keep the negotiations to a manageable size. The principal reason for not inviting Taiwan despite its presumed capability and interest in distant-water, high latitude fisheries, is likely to have been the wish to avoid having to address – in the presence of China – the complexities associated with Taiwan’s disputed status under international law.⁸³

Article 8 of the CAOFA – titled ‘Non-Parties’ – is modelled to a large extent on Article 33 of the UNFSA. It requires CAOFA Parties to encourage non-Parties to take measures consistent with the CAOFA and to take measures consistent with international law to deter undermining activities by vessels of non-Parties. As already noted, the limited abundance and distribution of fish in the high seas portion of the CAO did not allow for a commercially viable fishery at the time of writing. Even if such a fishery would be commercially viable for CAOFA Parties, however, the non-opposability of the CAOFA’s abstention from fishing to non-Parties is unlikely to pose problems in practice. This is due to the technological and logistical challenges of distant-water, high latitude fisheries, in particular when CAOFA Parties can be assumed not to open their ports for vessels of non-Parties.

Pursuant to Article 11(1) of the CAOFA, the Agreement enters into force after all the Five-plus-Five have formally adhered to it. Article 10 stipulates that, once the Agreement has entered into force “the Parties may invite other States with a real interest to accede to this Agreement”. The use of “States” implies

82 But see eg (n 60) and accompanying text on Norway’s reasons for opposing the exclusion of the Atlantic segment of the high seas portion of the CAO from the Agreement Area.

83 For a more extensive discussion see Molenaar (n 34) 162–164. It should also be noted that the term ‘entity’ in Rule 5.1 of the CAOFA COP RoP was chosen with Taiwan in mind, even though a Taiwanese request for Observer status is extremely likely to be blocked by China pursuant to Rule 5.2.

that entities such as Taiwan or any other regional economic integration organisation besides the EU cannot accede.⁸⁴

Besides the requirement relating to statehood, the CAOFA only contains one substantive eligibility criterion/requirement: that of real interest. It thereby uses the same terminology as Article 8(3) of the UNFSA and is the first constitutive instrument of an RFMO/A to do so. This is not necessarily commendable or troublesome, however, as there is no generally accepted definition or interpretation of the notion of real interest. Everything will therefore depend on the Parties' practice in interpreting and applying this criterion/requirement, and the perspective from which this practice is assessed. The Parties have given themselves the widest possible margin of appreciation in, on the one hand, inviting non-user States and flag States engaged in fishing or wishing to do so to accede and, on the other hand, rejecting requests by the same categories of States that wish to be invited to accede. The same result could therefore also have been achieved by not including any substantive criterion at all.⁸⁵

If any States and, if so, how many, will be invited to accede is highly speculative, except for the fact that no further CAO coastal States can be invited as all are already involved. This necessarily means that all accessions will increase the number of high seas fishing States and entities. Even though consensus decision-making gives the Arctic Five a *de facto* veto, they may not feel comfortable to be (significantly) outnumbered. None of the current participants are also likely to be keen to invite high seas fishing States capable of becoming significant competitors for the resources. Some of the Arctic Five could nevertheless be favourable to inviting non-user States, and some of the Other Five could be favourable to inviting like-minded, but 'relatively insignificant' high seas fishing States.⁸⁶ Finally, the fact that not only the original Five-plus-Five are entitled to object to the extension of the duration of the CAOFA pursuant to Article 13(2) – and thereby terminate the Agreement – but new parties have this entitlement as well, will probably mean that the Original Parties will proceed with extreme caution when considering potential new parties.

84 See also (n 83).

85 Similar to eg NEAFC Convention, art. 20(4); (n 49).

86 See also R. Rayfuse, "Regulating Fisheries in the Central Arctic Ocean: Much Ado About Nothing?" in N. Vestergaard, B. A. Kaiser, L. Fernandez and J. N. Larsen (eds), *Arctic Marine Resource Governance and Development* (Springer 2018) 35–51, 47–48.

After already expressing an interest in accession in 2021,⁸⁷ and participating as an observer during the 2nd (2023) and 3rd (2024) in-person CAOFA COPs,⁸⁸ the United Kingdom implicitly requested to be invited to accede to the CAOFA during the 3rd in-person COP.⁸⁹ Even though most Parties were supportive of this request, one Party opposed the request's substantive consideration, and consensus could also not be reached on establishing steps towards developing processes and procedures on accession.⁹⁰ The main cause for this is highly likely to have been the United Kingdom's support of Ukraine in its ongoing war against Russia.

5 Conclusions

The non-use measure examined in this chapter is the qualified, temporary and treaty-based abstention from fishing in the high seas portion of the CAO laid down in the CAOFA. This abstention and related arrangements determine the conditions under which a future commercial fishery may commence.

The principal drivers that led to the adoption of the CAOFA included climate change – which has, *inter alia*, caused sea-ice in the CAO to recede and become thinner, and many global fish stocks to shift towards the polar regions – the significant lack of knowledge of CAO ecosystems, and the needs of, and impacts on, Arctic Indigenous Peoples. In conjunction with the precautionary approach to fisheries management and the need to avoid unregulated fishing, these drivers formed the basis on which the United States initiated and led the two negotiation processes that culminated in the adoption of the CAOFA.

The abstention from fishing in the high seas portion of the CAO managed to attract support from the Five-plus-Five for different reasons. Although the possibility to extend the abstention to adjacent coastal State maritime zones was not really discussed during either of the two negotiation processes, it speaks for itself that having the abstention confined to the high seas was of paramount importance to the Arctic Five. Of critical importance for the Other Five – except for Iceland – were their strengthened position in Arctic governance, because participation in the negotiation and operation of the CAOFA

87 As indicated by J. Rumble, Head of the Polar Regions Department, United Kingdom's Foreign, Commonwealth and Development Office, "Arctic Governance Observer Event" (Online event organised by the Icelandic Chairship of the Arctic Council, 21 April 2021).

88 Report of the 2nd (2023) in-person CAOFA COP, para 3 (n 74) and Report of the 3rd (2024) in-person CAOFA COP, para 3 (n 75).

89 Report of the 3rd (2024) in-person CAOFA COP, para 41 (n 75).

90 *ibid* para 42.

gave them an equal seat at the table as Arctic States. The acceptability of the abstention was further ensured by its qualified and temporary nature, due to the various exceptions relating to commercial fishing under existing and future RFMO/As, commercial or exploratory fishing under the CAOFA COP, and the arrangements on the CAOFA's duration. Finally, the lack of any prior fishing meant that none of the Five-plus-Five experienced pressure by their fishing industry relating to investments or catch track records.

At the time of writing, the limited abundance and distribution of fish in the high seas portion of the CAO did not allow for a commercially viable fishery. For a number of reasons – including the arrangements on duration, consensus decision-making, and the utilisation- and conservation-oriented fisheries interests of the Arctic Five – it seems unlikely that the COP will authorise commercial fishing before 2037. The non-opposability of the CAOFA's abstention from fishing to non-Parties is unlikely to pose problems in practice due to the technological and logistical challenges of distant-water, high latitude fisheries. This would probably even be true in case fishing would become commercially viable for CAOFA Parties.

Acknowledgments

The author is very grateful to the editors, Nadia Bouffard, Nicolas Kempf and various other persons for providing information or comments on drafts. The views in this chapter are those of the author and not necessarily those of the Netherlands Government or the European Commission.

The International Moratorium on Commercial Whaling

A Brief History and Socio-Legal Assessment

Cameron Jefferies and Kate Latos

1 Introduction

The International Convention for the Regulation of Whaling, 1946, (ICRW or Convention) is a long-standing international wildlife treaty.¹ The Convention established and empowered the International Whaling Commission (IWC or Commission) to operate as the primary venue for international whale conservation and management through the maintenance of the ICRW's legally binding regulatory Schedule and non-binding resolutions.² The ICRW/IWC regime is premised on dual, but interconnected, purposes: to “provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry”.³ Unfortunately, the ICRW/IWC has rarely achieved either objective.⁴

The Convention/IWC's history can be divided into two phases: (1) market control (1946–1982); and (2) non-use (1982–present).⁵ The catch-restriction period encompasses the IWC's efforts to steward the commercial whaling industry by preventing overexploitation through regulatory market-based use measures (eg catch quotas and associated mechanisms), as informed by the technical work of the IWC's Scientific Committee.⁶ The transition from market control to non-use was actualised by the passage of a legally binding non-use measure in the form of the commercial whaling moratorium in 1982, which

1 C. Jefferies and H. Stock, “As one door closes, does another open? Assessing the future of the protectionist agenda at the International Whaling Commission post-Japan's withdrawal” in N. Sellheim and J. Morishita (eds), *Japan's Withdrawal from International Whaling Regulation* (1st ed, Routledge 2024) 43.

2 *ibid.*

3 International Convention for the Regulation of Whaling (ICRW) (adopted 2 December 1946, entered into force 10 November 1948) 161 UNTS 72.

4 Jefferies and Stock (n 1).

5 ICRW.

6 *ibid.*

became effective as an amendment to the regulatory Schedule for the 1985/86 whaling season. The moratorium, which was initially designed as a temporary measure to allow whale stocks to replenish and stabilise, has become a *de facto* permanent ban on commercial whaling that also signalled a broader shift at the IWC towards a preservationist agenda.⁷ The moratorium has been the subject of considerable debate and attention since its passage and, most recently, made international headlines in 2019 when Japan formally withdrew from the IWC to resume commercial whaling within its exclusive economic zone (EEZ) after repeatedly failing to have the moratorium over-turned.⁸

The IWC's commercial moratorium stands as one of the most prominent examples of a non-use measure in international environmental law. It is remarkable for the dramatic shift in whaling policy it achieved and for its embodiment of the evolving norms of precaution, sustainability, and wildlife stewardship.⁹ Moreover, it remains one of most polarising actions taken by the IWC in its 76-year history. Whaling, which is an extractive practice can, at least in theory, be sustainably continued so long as catch limits and associated monitoring and enforcement procedures are developed and applied. The IWC's decision to eliminate commercial hunting was a reaction to decades – if not centuries – of unsustainable use. In addition to the commercial moratorium, the IWC has also utilised Whale Sanctuaries, which are ocean spaces dedicated to whale conservation and preservation, as another non-use measure to aid species recovery and to backstop the commercial moratorium by prohibiting whaling within defined regions. While this chapter focuses on the commercial moratorium, Whale Sanctuaries will be discussed as appropriate.

Our contribution to this volume offers an assessment of the legal and socio-political conditions that made it possible for the IWC to pass the commercial moratorium. The goal is to offer a concise history of the commercial moratorium that can be used when considering the role of non-use measures in other legal forums. Specifically, this chapter focuses on the ICRW's legal framework, the negotiating and voting preferences for key ICRW Contracting Governments, and the impact that the moratorium has had on the ICRW/IWC's subsequent implementation. This chapter adds to the ongoing debate regarding the IWC's utility by examining the ICRW/IWC's functionality, situated

7 A. M. Ruffle, "Resurrecting the International Whaling Commission: Suggestions to Strengthen the Conservation Effort" (2002) 27(2) *Brooklyn Journal of International Law* 639.

8 I. Hurd, "Almost Saving the Whales: The Ambiguity of Success at the International Whaling Commission" (2012) 25(1) *Ethics and International Affairs* 104, 104.

9 See eg A. Peez and L. Zimmerman, "Contestation and norm change in whale and elephant conservation: Non-use or sustainable use?" (2021) 57(2) *Cooperation and Conflict* 113, 226.

within the socio-legal context that influenced the IWC's adoption of the commercial moratorium.

The analysis proceeds in sections. Following this introduction, section 2 introduces the IWC's political and legal history. Next, section 3 presents the 1970–1982 transitional period at the IWC, within some of its Member States, and in other international forums, when concerns about whaling moved further towards conservation. In section 4, we examine the circumstances leading up to and including the vote to set zero catch quotas for commercial whaling at the IWC in 1982 and work to unpack the various and competing justifications that were presented for and against the adoption of this non-use measure. Finally, in section 5, we consider the commercial moratorium's impact on the IWC and its utility as a model for future non-use measures.

2 The IWC – History, Socio-Political Perspectives, and Legal Framework

2.1 *Pre-IWC Efforts to Manage Whaling*

Whales have been utilised as an important natural resource for millennia. Modern industrial whaling, which began in earnest in the 19th century, fell under the “doctrine of freedom of the high seas”¹⁰ and whales were an open-access resource, free for all States to hunt.¹¹ Uncontrolled access to whales and twentieth-century mechanised whaling meant that the major whaling States' pursuit of oil, baleen, meat and blubber exploited various whale populations to near collapse.¹² The decline in whale populations precipitated some cooperative effort to manage whaling for the purposes of safeguarding the whaling industry in the 1920s and 1930s,¹³ including the 1931 Convention for the Regulation of Whaling and the 1937 International Agreement on the Regulation of

10 L. Viikari, “International Whaling Commission as a Natural Resource Management Regime: Quest for Balance Between Western Science, State Governance and Indigenous Self-Determination” (2023) 30(2) *International Journal on Minority and Group Rights* 1, 6. See also V. Schneider and D. Pearce, “What Saved the Whales an Economic Analysis of 20th Century Whaling” (2004) 13 *Biodiversity Conservation* 543, 544.

11 *ibid* 6.

12 Jefferies and Stock (n 1) 46.

13 G. Smith, “The International Whaling Commission: An Analysis of the Past and Reflections on the Future” (1984) 16(4) *Natural Resources Lawyer* 543, 545.

Whaling. These early efforts floundered owing to a lack of State participation, lax enforcement, and a dominating industry protection milieu.¹⁴

In 1938, the Whaling Committee of the International Council for the Exploration of the Sea “recommended a limit on the allowable amount of oil produced by whaling”, with a particular focus on Antarctic whaling.¹⁵ Initially hindered by global conflict, the Whaling Committee acted aggressively in 1944 to “set a maximum catch limit well below the pre-war catch level”.¹⁶ However, even these actions were insufficient to halt whale stock decline.

2.2 *Establishment of the ICRW and the IWC*

Post-World War II, and recognising the “need for proper and effective conservation and development of whaling stocks” and the whaling industry, fifteen whaling States concluded the International Convention for the Regulation of Whaling and, thus, constituted the International Whaling Commission.¹⁷ The Convention’s original focus and work has been critiqued as a “club for whaling and industries they supported”,¹⁸ with the majority of Contracting Governments participating to ensure or preserve their commercial whaling interests.¹⁹ The drafters, who were mindful of global fat and oil shortages and post-World War II economic recovery, sought to meet “the need to avoid economic and nutritional distress in the regulation of the whaling industry” while simultaneously “regulating catches in various ways to restore the depleted stocks to full productivity and to prevent overfishing of other stocks”.²⁰ This statement captures the Convention’s internal tension – balancing of whale conservation with short-term economic goals and the long-term orderly industrial development.²¹

14 S. T. Latson, “United States Whale Policy: The Judiciary Casts Its Vote in Favor of a Moderate Approach” (1987) 20(1) *Vanderbilt Journal of Transnational Law* 123, 127.

15 Jefferies and Stock (n 1) 46.

16 R. Gambell, “International Management of Whales and Whaling: An Historical Review of the Regulation of Commercial and Aboriginal Subsistence Whaling” (1993) 46(2) *The Arctic Institute of North America* 97, 98.

17 C. Jefferies, *Marine Mammal Conservation and the Law of the Sea* (1st ed, OUP 2016) 42.

18 Jefferies and Stock (n 1), 46. See also M. Kolmaš, “International pressure and Japanese withdrawal from the International Whaling Commission: when shaming fails” (2021) 75(2) *Australian Journal of International Affairs* 197.

19 S. Geha, “International Regulation of Whaling: The United States’ Compromise” (1987) 27 *Natural Resources Journal* 931.

20 R. Gambell, “Whale Conservation: Role of the International Whaling Commission Whale conservation: Role of the International Whaling Commission” (1977) 1(4) *Marine Policy* 301, 303.

21 *ibid* 302.

The Convention does not define ‘whale’ for the purposes of establishing regulatory jurisdiction; rather, it lists the commercially desirable ‘great whale’ species that are within the IWC’s regulatory jurisdiction. Accordingly, medium and small-sized whales “are probably outside of the remit of the Convention”.²² The Convention’s whaling regime contemplates three whaling types: commercial whaling, Aboriginal (Indigenous) whaling, and special permit scientific whaling. In addition to the main focus on promoting a sustainable whaling industry, the Convention also sought to “encourage and promote studies into related (whaling) matters”.²³

The Convention is widely available for State participation owing to an open accession clause that does not require any “actual involvement in whaling” to become a Contracting Government and voting member of the IWC.²⁴ Pursuant to Article II.4, a State must simply deposit an instrument of ratification or give notice of adherence. Additionally, the IWC’s Rules of Procedures, section E has a “relatively low financial assessment of the regime, establishing no threshold for most states”.²⁵ Together, these features have facilitated a fluctuating membership over the past eight decades, which has had particular ramifications for setting or implementing the IWC’s regulatory trajectory, in particular with non-whaling States wielding considerable influence.

2.3 *The ICRW/IWC’s Legal Framework and Functionality*

2.3.1 Decision-Making at the IWC

Decisions of the IWC, including proposed Schedule amendment, are made through consensus or by vote and any proposal for a Schedule amendment must contain the text of the proposed regulatory action.²⁶ Proposals to amend the Schedule require a three-quarter voting majority of those casting an affirmative or negative vote to effect an amendment.²⁷ Despite the requirement of a three-quarter majority vote, the Schedule has been amended many times.²⁸

22 M. Fitzmaurice, “International Convention on the Regulation of Whaling” (2017) *United Nations Audiovisual Library of International Law*, available at <https://legal.un.org/avl/pdf/ha/icrw/icrw_e.pdf> accessed 17 February 2023.

23 ICRW, art VIII.

24 Viikari (n 10) 10.

25 *ibid.* The IWC assesses countries’ financial contributions based on membership, the user-pays principle, and delegation size at meetings.

26 IWC Rules of Procedure and Financial Regulations, ICRW 68th meeting, (amended 26 October 22), E.3(b) (Rules of Procedure). For all other proposals that do not amend the Schedule only a simple majority for those casting votes or consensus.

27 *ibid.* E.3(a). For all other proposals that do not amend the Schedule only a simple majority for those casting votes or consensus.

28 *ibid.* art. III (2) in conjunction with art V.

This majoritarian law-making is a deviation from the principle of consent; however, consent is safeguarded through Article v(3) of the Convention, which allows Contracting Governments to object to an amendment.²⁹

Each Contracting Government, as per Article III.1, can issue one vote, which is taken by a show of hands or roll call.³⁰ The IWC's Rule of Procedures requires the attendance of the majority of the members of the Commission to constitute a voting quorum.³¹ This requirement has allowed delegations to block amendments simply by breaking the quorum rule. For example, at the 68th meeting of the IWC in 2022, 14 Contracting Governments coordinated walkouts to ensure that the vote to approve the creation of a new South Atlantic Whale Sanctuary could not proceed.³² This has some Contracting Governments calling for a clear definition of attendance to ensure that quorum blocking does not become a recurring issue.³³

2.3.2 Regulatory Authority and Schedule Amendments

The ICRW is a short convention, with only eleven articles that establish the relevant legal framework.³⁴ Much of the heavy lifting is achieved through the legally binding regulatory Schedule that sets the parameters for legal whaling and serves as the chief mechanism available to the IWC to manage whale conservation through evolving circumstances.³⁵ The Schedule is regularly updated and, prior to the commercial whaling moratorium, was used to set commercial whaling quotas.³⁶

IWC regulations, which are found in the Schedule, as amended, *must* relate to the "conservation and utilization of whale resources",³⁷ be based on scientific findings,³⁸ and relate to one of the enumerated subjects in Article v.1 of the Convention: (1) designating protected species; (2) designating whaling seasons; (3) designating open and closed waters, including sanctuaries;

29 A. Peters, "The International Convention for the Regulation of Whaling: Dead or Alive?" (2021) 45 *Animals in International Law* 134, 153.

30 Rules of Procedure (n 26) E.3(d).

31 *ibid* B.1.

32 L. Kyzer, "Iceland Among Nation to Boycott Vote on South Atlantic Whale Sanctuary" (2023) *Iceland Review*, available at <www.icelandreview.com/politics/iceland-among-nations-to-boycott-vote-on-south-atlantic-whale-sanctuary/> accessed 17 February 2023.

33 *ibid*.

34 ICRW, art III.

35 Peters (n 29) 152.

36 Viikari (n 10) 7.

37 Peters (n 29), 151. See also Rules of Procedure (n 26), art v(1).

38 ICRW, art v(1)(a-h). When the moratorium on whaling was introduced by way of a Regulation, one of the main criticisms of the moratorium was that it lacked scientific findings.

(4) creating species-specific size limits; (5) restricting whaling intensity and methods; (6) restricting whaling gear; and (7) prescribing record-keeping.

Article v.3(a) of the Convention allows Contracting Governments to opt out of any Schedule amendment by presenting their objection within ninety days of the vote. The Commission then notifies each Contracting Government and an additional ninety-day period commences wherein any other Contracting Government may object.³⁹ After the second period passes, the amendment becomes effective on all non-objecting Contracting Governments.⁴⁰ This opt-out system is a significant concession that limits the Schedule's regulatory impact.⁴¹ Using the opt-out clause, Contracting Governments can avoid decisions detrimental to their interests even if their actions work against the Convention's purposes. Conversely, failure to "include any such mechanism could have reasonably led to the alienation of some states, thus undermining whatever chances for interstate cooperation and action may have existed at the time".⁴²

2.3.3 Enforcement and Compliance

The IWC's legal authority is limited in that the Convention does not establish enforceable penalties or provide recourse to dispute resolution.⁴³ The ICRW's enforcement provision, Art. IX, leaves Contracting Governments to take "appropriate measures to ensure the application and provisions of this convention".⁴⁴ Accordingly, Contracting Governments are to take the necessary legislative and prosecutorial actions to prohibit and penalise Convention infringements.⁴⁵

In addition to the IWC's limited authority to control and sanction Contracting Governments, the IWC's influence on non-members and objecting Contracting Governments is minimal.⁴⁶ External to the IWC, there is some guidance and expectations for international whale conservation found in the

39 ICRW, art v(2)(b).

40 *ibid*, art v(2)(c).

41 Fitzmaurice (n 22) 2.

42 *ibid*.

43 Gambell (n 20) 303.

44 Peters (n 29) 154.

45 *ibid*.

46 *Whaling in the Antarctic (Australia and New Zealand (intervening) v Japan)* (2014) ICJ Rep 226.

United Nations Convention on the Law of the Sea (UNCLOS).⁴⁷ Specifically, Article 65 provides that:

Nothing in this Part restricts the right of a coastal State or the competence of an international organization, as appropriate, to prohibit, limit or regulate the exploitation of marine mammals more strictly than provided for in this Part. States shall *cooperate with a view to the conservation of marine mammals and in the case of cetaceans shall in particular work through the appropriate international organizations for their conservation, management and study.* (emphasis added)

The scope of Article 65 is broadened by Article 120, which expands its application to the high seas, and its content is considered to reflect customary international law.⁴⁸ While true that the word ‘cooperate’ is ambiguous, McDorman argues that it is the duty to cooperate in ‘good faith’.⁴⁹ Young and Sullivan argue that the ICJ’s endorsement of a “reasonableness standard” in the *Whaling in the Antarctic* decision is “very much like a good faith standard”.⁵⁰ This good faith standard applies not only to the application of member States’ obligations under the IWC but also to the obligations owed by non-member States to the ICRW.⁵¹ If this interpretation is correct, even States that object to any Schedule amendment or are not Contracting Governments to the Convention have an obligation to cooperate and cannot take any actions “that undermine their obligation to work through appropriate international organizations in good faith”.⁵²

47 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3.

48 R. Steenkamp and C. Jefferies, “In Pursuit of the White Whale of Cooperation: The Ability of UNCLOS to Steer the Trajectory of (Future) Commercial Japanese Whaling Operations” (2020) 5(2) *Asia-Pacific Journal of Ocean Law and Policy* 245, 261.

49 T. McDorman, “Canada and Whaling: An Analysis of Article 65 of the Law of the Sea Convention” (1998) 29 *Ocean Development and International Law* 179, 181.

50 Steenkamp and Jefferies (n 48) 268. See also M. Young and S. Sullivan, “Evolution Through the Duty to Cooperate: Implications of the Whaling Case at the International Court of Justice” (2015) 16 *Melbourne Journal of International Law* 311, 335.

51 Steenkamp and Jefferies (n 48) 268.

52 *ibid.*

3 The IWC in Transition: 1970–1982

3.1 *A Changing Seascape*

By the late 1960s, the IWC was in crisis as it struggled to implement sustainable catch limits and manage the whaling operations.⁵³ The IWC's management challenges were exacerbated by the declining value – and utility – of whale oil that was being replaced by reliable fossil fuels and by the increasing difficulty that whalers experienced in finding and catching whales.⁵⁴ With the economic justification for industrial whaling dwindling, the stage was set for conservation to emerge as the IWC's top priority.⁵⁵

A temporary whaling moratorium was proposed at numerous IWC meetings throughout the 1970s but “whaling nations were sufficient in number to block the [three-quarter] majority required to adopt the [necessary] resolution”.⁵⁶ This would soon change as an aggressive recruitment campaign, led by the United States using diplomatic pressure and buttressed by the United Nations Secretary General urging all UN members to adhere to the ICRW, attracted new Contracting Governments.⁵⁷ This period of recruitment would have a significant effect on the IWC's trajectory and voting outcomes. Our examination of the IWC's meetings in the decade leading up to the 1982 vote on a commercial whaling moratorium demonstrates a significant shift in the IWC's activity and a transformation in its functionality. This section explores these developments, chronologically and thematically, to isolate the key moments that helped actualise the enactment of the moratorium.

3.2 *The Rise of Environmentalism and ‘Save the Whales’*

On April 22nd, 1970, 20 million people marched in protest of environmental destruction on what is now marked annually as Earth Day. The event evidenced a shift in attitudes, values and beliefs of citizens around the world,

53 Viikari (n 10) 8.

54 K. Dorsey, “National Sovereignty, the International Whaling Commission, and the Save the Whales Movement” in E. M. Bsumek, D. Kinkela, M. A. Laurence (eds), *Nation-State and the Global Government: New Approaches to International Environmental History* (OUP 2013) 43, 51.

55 L. Kobayashi, “Lifting the International Whaling Moratorium” (2006) 29(2) *Environ* 177, 198, available at <<https://environs.law.ucdavis.edu/volumes/29/2/kobayashi.pdf>> accessed 28 August 2022.

56 *ibid* 193.

57 P. Birnie, “The Role of Developing Countries in Nudging the International Whaling Commission From Regulating Whaling to Encouraging Nonconsumption Uses of Whales” (1985) 12(4) *Ecology Law Quarterly* 937, 952.

but most importantly within the United States where an interest in protecting the whales was being voiced by their citizens. Whale preservation was one strand of this movement and it emerged as “symbol of a planet in peril”.⁵⁸ The American Cetacean Society was founded in 1971 and was quickly followed by the creation of other environmental not-for-profit organisations, such as the Humane Society of the US, the Sierra Club and the World Wildlife Fund (WWF) that lobbied for whale preservation, domestically and internationally. By 1975, Greenpeace had launched a campaign to ‘Save the Whales’, which became “an intense international campaign to ban whaling”.⁵⁹ During this decade, the anti-whaling movement moved from a “broad range of arguments for ending whaling”, to coalescing around the “idea that whales, because of their complex behaviour, should be treated as entities roughly equal to humans”.⁶⁰ Public perception of whales in many jurisdictions had shifted significantly.⁶¹

The impact of this citizens and environmental group pressure was multifaceted and significant, as New Zealand’s experience usefully illustrates. New Zealand’s withdrawal from the IWC in 1968 received minimal domestic consideration. But, by 1973, New Zealand’s government was being pressured by citizens to return to the IWC in order to pursue the end of whaling.⁶² By 1974, the government reported that such requests “began pouring in” and that they presented “a wide range of arguments against whaling”.⁶³ New Zealand rejoined the IWC in 1976 and, in its introductory remarks, echoed their citizens’ public sentiment by urging Contracting Governments to use their influence to preserve whales.⁶⁴ New Zealand’s experience was not unique; the anti-whaling movement reached global impact⁶⁵ and countries such as Argentina, the United Kingdom, and the United States began to address the IWC about the institution’s responsibility to conserve dwindling whale populations.

3.3 *Domestic Legal Action and Political Pressure in the United States*

By the start of the 1970s, the United States had protected all commercially hunted whale species under the Endangered Species Act, effectively banning

58 Dorsey (n 54) 51.

59 B. van Drimmelen, “The International Mismanagement of Whaling” (1991) 10(1) *Pacific Basin Law Journal* 240, 249.

60 Dorsey (n 54) 51.

61 Viikari (n 10) 9.

62 *ibid* 52.

63 *ibid*.

64 *ibid*.

65 International Whaling Commission, “Twenty-Eighth Meeting” (21–25 June 1976) IWC/28/16, 10–11 (Verbatim, 1976).

the importation of whale products⁶⁶ and precipitating the closure of the last whaling station on United States territory.⁶⁷ Further, the United States' expansive approach to endangered species protection enabled the listing of species threatened with global extinction, which means they would be protected and their taking could trigger sanctions, even if they were found in foreign jurisdictions or on the high seas.⁶⁸ This approach prompted enhanced consultation with foreign governments concerning species listing and also prompted renewed efforts to protect species through bilateral and multilateral treaties.⁶⁹

In 1973, the United States adopted the Marine Mammal Protection Act (MMPA) – a comprehensive legislation specific to marine mammals. The MMPA introduced a moratorium on the “taking in the United States of all marine mammals and products and prohibited their importation”,⁷⁰ while more generally directing marine mammals to be “protected and conserved at or above optimum sustainable population levels”.⁷¹ In addition, the MMPA required federal executives to engage in international conservation activities with the following mandate:

to initiate bilateral and multilateral agreements to protect and conserve all marine mammals, to amend the existing international treaties to which the United States was a party to make such treaties consistent with the purpose and policies of the MMPA, and to endeavour to convene a ministerial meeting on marine mammals to negotiate a binding international convention that would ensure comprehensive protection for various species.⁷²

The United States' domestic legislative and policy shift impacted international relations and, ultimately, the IWC. Early in the 1970s, the United States took the position that the ICRW should be re-negotiated to create an International

66 Endangered Species Act of 1973, 16 U.S.C. § 1531 et seq. (adopted 28 December 1973, as amended), 87 Stat 884; “Humpback Whale” (NOAA Fisheries), available at <<https://www.fisheries.noaa.gov/species/humpback-whale>> accessed 1 May 2025.

67 Smith (n 13) 554.

68 Birnie (n 57) 946.

69 *ibid*; E. Couzens, *Whales and Elephants in International Conservation Law and Politics: A Comparative Study* (Routledge 2014) 26–27.

70 Birnie (n 57) 946; Marine Mammal Protection Act of 1972, Pub. L. No 92–522, § 107, 86 Stat. 1027 (1972) (codified at 16 U.S.C. §§ 1361–1407 (1982)).

71 *ibid* 947. See also the MMPA (n 70) s 2(6).

72 *ibid*.

Cetacean Commission that would have whale protection as its chief focus.⁷³ While this initiative was unsuccessful, the United States influenced voting directions at the IWC by leveraging their political and economic power towards developing States.⁷⁴ The major tools in this respect were two-fold. First, the 1971 Pelly Amendment to the Fisherman's Protective Act of 1967⁷⁵ allowed the Secretary of Commerce to certify to the President that other countries were fishing in a way that diminished the effectiveness of an international fisheries program or an endangered species protection regime to which the United States was party. Based on this certification, the President could restrict imports from the certified State. Second, the 1979 Packwood-Magnuson Amendment to the 1976 Fisheries Conservation and Management Act⁷⁶ addressed whaling specifically and operated such that:

when a nation was certified as conducting fishing operations or engaging in trade or taking that diminished the effectiveness of the ICRW, the president was required to cut its fishery allocation in United States waters by at least 50 per cent.⁷⁷

The Packwood Amendment directly supported the United States' proposed commercial whaling moratorium and the mere threat of certification was enough to persuade "nonmember IWC states to join the IWC, and discouraged IWC members from resorting to procedural objections to defeat conservatory amendments".⁷⁸ This legislation proved particularly persuasive for Latin American countries such as Chile and Peru, that joined the IWC after the threat of certification by the United States. Furthermore, other whaling States including Spain and South Korea joined the IWC in the late 1970s as a result of US pressure.⁷⁹ Slowly but surely, the United States government and other key States leveraged their political power to transform the IWC's membership from

73 P. Forkan, "A World Order for Whales" (Humane Society of the United States, mimeographed article published in 1979 by Project Interspeak) 77, 80.

74 S. Scott, "Intergovernmental Organizations as Disseminators, Legitimizers, and Disguisers of Hegemonic Policy Preferences: The United States, the International Whaling Commission, and the Introduction of a Moratorium on Commercial Whaling" (2008) 23(8) *Leiden Journal of International Law* 581, 593.

75 *ibid.*

76 *ibid.*

77 *ibid.*

78 Birnie (n 57) 948–950.

79 Scott (n 74) 595. Australia is another State that transformed its domestic approach to whaling and whale conservation in the 1970s to emerge as a pro-conservation State by 1977.

“one predominated by whaling nations into one concerned with conservation” with the goal of enacting a three-quarter voting majority.⁸⁰

3.4 *Activity at the IWC and at Other International Legal Forums*

The 1972 United Nations Conference on the Human Environment (UNHE) produced three whale conservation proposals targeted at the IWC: (1) a recommendation to strengthen the Commission, which spurred an increase in IWC membership by non-whaling States; (2) a call to increase international whale research efforts; (3) a recommendation for a ten-year commercial whaling moratorium to facilitate population recovery. The vote amongst UNHE participating States on the commercial moratorium passed 56 to 0 (12 abstentions).⁸¹ Although not enforceable, it was a demonstrable show of strength by non-whaling States that applied political pressure to the IWC.

Following the UNHE, the United States advanced the first proposed moratorium on commercial whaling before the IWC in 1972. This proposal was premised on the existence of scientific uncertainty, in particular in light of the complexity of the marine ecosystem. The United States asserted that the need for a moratorium “happens to be the view of most of the countries in the world”.⁸² Japan responded that whaling provided Japan with the most important means of protein and was a significant industry valued at US\$110 million.⁸³ It expressed concern about the socio-economic impact of a moratorium.⁸⁴ Japan also reminded the IWC that the Convention’s object and purpose was to “make possible the orderly development of the whaling industry”, and that a moratorium was not “compatible with the intent in the spirit of the convention”.⁸⁵ The USSR echoed these concerns, pointing to insufficient scientific data to justify a moratorium.⁸⁶ Denmark suggested that the IWC was making progress in the right direction using existing management measures, and that they would not support a moratorium at this time.⁸⁷ The United States’ proposal ultimately failed with 4 yes votes, 6 no votes, and 4 abstentions.

80 Birnie (n 57) 953.

81 United Nations, “Report of the United Nations Conference on the Human Environment” (5–16 June 1972) UN Doc A/CONF.48/14/REV.1, Recommendation No 33.

82 International Whaling Commission, “Twenty-Fourth Meeting” (London, 26 June 1972) IWC/24/10, 52.

83 *ibid* 55.

84 *ibid*.

85 *ibid*.

86 *ibid* 54.

87 *ibid* 55.

The United States reintroduced a proposal for a ten-year moratorium on commercial whaling at the IWC at the end of 1973.⁸⁸ For the first time, several developing countries (Mexico, Argentina, and Panama) voted in favour of the proposal, but it still fell short of the necessary three-quarter majority. Importantly the United Kingdom, another former whaling power, signalled its shift to conservation efforts by banning whaling and whaling-related products in 1973.⁸⁹ 1973 also marked the first year that conservation groups started applying for accreditation to attend IWC meetings as non-governmental observers.

In 1974, a commercial moratorium was once again proposed by the United States and defeated. Alternatively, the IWC adopted Australia's proposed New Management Procedure, which set a new quota setting mechanism that would serve as a 'selective moratorium' for species too depleted to sustain a hunt.⁹⁰ Using improved biological knowledge and scientific data, whale stocks would be managed with the concept of the maximum sustainable yield. The goal was to reduce the level of captured whales to a level that would ensure their conservation. This effort, however, did little to improve the status of stocks. In 1978, Panama advanced two separate commercial whaling moratorium proposals.⁹¹ The verbatim records for the 1978 IWC meeting evidence the continued clash between conservation and economic concerns. Ultimately these proposals failed.

Frustration continued to mount at the IWC meetings, which featured "inconclusive blockages leading to unsatisfactory compromises" with "little attention paid to quotas and other important issues".⁹² Accordingly, Contracting Governments and environmental groups increasingly focussed their efforts on the growing IWC membership for the purposes of influencing voting outcomes.⁹³ At this point all but one of the world's whaling States – Portugal – were Contracting Governments, and the recruitment effort to defeat the whaling State contingent with the necessary three-quarters majority vote focused on developing States and pro-conservation States that did not have a history of whaling.⁹⁴ Sweden, for example, became the first State whose main motivation in joining the IWC was to oppose commercial whaling. The Seychelles, which also joined in 1979, was motivated primarily by an interest in creating

88 International Whaling Commission, "Twenty-Fifth Meeting" (London 25 June 1973) IWC/25/13.

89 "Whale imports banned" (1973) 242 *Nature* 220.

90 Smith (n 13) 555.

91 International Whaling Commission, "Thirteenth Meeting" (26–30 June 1978) IWC/13 6.

92 Birnie (n 57) 961.

93 *ibid.*

94 *ibid* 962.

a sustainable tourist industry focussed on whale-watching. The Seychelles had strong environmental policies and emerged as a “counterweight to the traditional attitudes of the developing member states that were dominated by economic and sovereign considerations”.⁹⁵ It was the first developing country to join the call for a commercial moratorium.

In parallel, discussion about whale conservation was pursued in a new forum – the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES, which was concluded in 1973 and entered into force two years later, requires species to be listed in appendices according to their conservation status. Under CITES, the international trade of listed species is more or less strongly restricted, depending on their appendix designation. Trade in Appendix II species, which are less threatened, only requires an import permit, while both import and export permits are needed for Appendix I species. Importantly, CITES parties have to demand non-parties they might be trading with to produce similar documentation as that required under the treaty. Some whale species were listed on CITES Appendices at the first Conference of the Parties in 1976 and, by 1979, all great whale species were listed on CITES appendices. This placed additional legal and economic pressure on those States that were still trading in whale products. The IWC followed suit, recommending that its Contracting Governments refrain from supplying whales and whale products to non-Contracting Governments. This policy further prompted South Korea to join the IWC in 1979 so that they could trade whale products with Japan.⁹⁶

The final major legal development that occurred through the 1970s and into the 1980s was the Third United Nations Conference on the Law of the Sea (UNCLOS III, 1973–1982), which ultimately produced UNCLOS. Somewhat surprisingly given the politically charged nature of whale conservation and whaling, marine mammals were singled out “as a special resource deserving additional consideration”⁹⁷ during UNCLOS III. The result was Article 65, which is extended to the high sea by Article 120.

In 1980, when the first draft of Article 65 was proposed by the United States delegation, Ambassador Elliot Richardson opined that “the new provision establishes a sound framework for the protection of whales and other marine mammals” through which “States and international organizations may pursue

95 *ibid* 957.

96 *ibid*.

97 H. S. Schiffman, “The International Whaling Commission: Challenges from within and without” (2004) 10(2) *Journal of International and Comparative Law* 367, 369.

the future protection of these wonderful creatures for generations to come”.⁹⁸ In relation to the IWC, it is salient that Article 65 mandates States to “work through the appropriate international organizations for [cetacean] conservation, management and study”⁹⁹ but does not name the IWC specifically and also contemplates multiple organisations fulfilling this function. This can be explained by the fact that “history allows one to conclude that the drafters of UNCLOS had it [the IWC] in mind”¹⁰⁰ and that they were alive to the fact that the United States had previously proposed the creation of a new successor organisation focussed on conservation rather than utilisation.

The developments between 1970–1982 dramatically altered the international whale management dynamic, both within the IWC and outside of it. Governments then faced considerable public and political pressure to act to protect whales. Also, the efforts of environmental groups and conservation-focused Contracting Governments to recruit non-whaling and pro-conservation States to the IWC now bore fruit. From 1974–1982, twenty-four new Contracting Governments joined the IWC, increasing membership from fourteen nations to thirty-nine in 1982 (Table 7.1).¹⁰¹ The intense recruitment efforts resulted in an IWC membership overwhelmingly comprised of non-whaling States, which tilted the balance of power. The stage was set for a dramatic shift in international whale management at the IWC’s 34th annual meeting in 1982.

4 The IWC Enters the Non-use Era

4.1 *Review of the 34th International Whaling Commission Meeting: July 1982, Brighton, UK*

4.1.1 Technical Committee Consideration

Five Contracting Governments advanced commercial moratoria proposals at IWC34 under Agenda Item 6 ‘Ending of Commercial Whaling’: “Seychelles – A Negotiated End to Commercial Whaling; United Kingdom – Cessation of All Commercial Whaling; US – Indefinite Moratorium on Commercial Whaling; France – Suspension of Commercial Whaling of Great Cetaceans and Australia – Cessation of Commercial Whaling”.¹⁰² In advance of the meeting,

98 Forkan (n 73).

99 UNCLOS, art 65.

100 Schiffman (n 97) 370.

101 Kobayashi (n 55) 198.

102 Subcommittee on Human Rights and International Organizations, “Review of the 34th International Whaling Commission Meeting” (2nd session, Washington, 16 September 1982), available at <<https://li.proquest.com/elhpdf/histcontext/HRG-1982-FOA-0050.pdf>>

the pro-moratorium States agreed that the Seychelles' proposal had the best prospect of success. They further agreed to test the waters before the IWC's Technical Committee, which, at that time, would consider, debate, and vote on a limited number of agenda items in advance of the plenary. If a proposal was considered, voted on by the Technical Committee, and passed the vote by simple majority, that proposal must then be debated and voted on by the Plenary.

While introducing their proposal to the Technical Committee, the Seychelles stressed the need for the IWC's Contracting Governments to find a workable compromise that would take a "gradual approach towards ending commercial whaling" while allowing for a "reorientation of the whaling industry".¹⁰³ The Seychelles proposal was framed as zero catch limits for all stocks for the 1986 coastal and 1985/86 pelagic seasons; the term 'moratorium' was notably absent. This is pure semantics, in our opinion, since the effect – eliminating all commercial whaling on each specific hunted species – accords with a traditional view of what constitutes a moratorium at international law: "a postponement or suspension of an activity" that is a "deviation from the proper or expected course" to "serve certain purposes" or represent "an exception to normal practice".¹⁰⁴ The proposal also shifted the burden of proof to whaling States to propose non-zero catch quotas on a species-by-species basis if they intended to return to commercial whaling under the auspices of the IWC.¹⁰⁵ This reduced the ability of whaling States to overturn the decision to establish a moratorium, as there would need to be a three-quarter majority vote in favour of restoring the quotas at the individual species level.¹⁰⁶ The Seychelles' proposal picked a gradual phase to a zero catch limit starting in 1985 because the majority of the existing whaling quotas would have ended at that time.¹⁰⁷ The Seychelles' proposal passed through the Technical Committee, easily surpassing the simple majority requirement. In fact, the proposal passed with one vote over the three-quarter majority that would be required at the Plenary.¹⁰⁸

accessed 28 August 2023. The Technical Committee is a distinct advisory Committee to the IWC. It has not, however, convened in recent years as its work has been taken on by other administrative structures.

103 *ibid.*

104 W. Yin, "Moratorium in International Law" (2012) 11(2) *Chinese Journal of International Law* 321, 321.

105 Subcommittee on Human Rights and International Organizations (n 102).

106 *ibid.* 7.

107 *ibid.*

108 *ibid.* 8.

4.1.2 The Plenary: the Moratorium Vote and Voting Positions

1982 was a unique moment in the history of the IWC. After ten years of discussion, pro-whaling and pro-conservationist Contracting Governments arrived at the IWC³⁴ Plenary with the common recognition that whale stocks required additional management efforts. This common ground, however, diverged at the level of management goals. Conservation-focused Contracting Governments wanted to halt the commercial hunt of whales regardless of population recovery, while pro-whaling States sought whale stock restoration in support of a sustainable future for the whaling industry. On July 24, 1982, the Plenary voted on the Seychelles' proposal, and the resulting vote was: 25 yes, 7 no, and 5 abstentions. This vote exceeded the three-quarter majority required to amend the regulatory Schedule, and resulted in the following addition to section 10 (classification of stocks):

Notwithstanding the other provisions of paragraph 10, catch limits for the killing for commercial purposes of whales from all stocks for the 1986 coastal and the 1985/86 pelagic seasons and thereafter shall be zero. This provision will be kept under review, based upon the best scientific advice, and by 1990 at the latest the Commission will undertake a comprehensive assessment of the effects of this decision on whale stocks and consider modification of this provision and the establishment of other catch limits.¹⁰⁹

The Contracting Governments agreed to a four-year grace period to allow time for whaling States to adjust to the economic impact of zero catch quotas, which is why zero catch quotas did not take effect until 1985/86. The zero catch quotas were also expressly contemplated as being temporary, with the possibility of commercial whaling resuming when stocks had sufficiently recovered.¹¹⁰

The complete voting record is presented in Table 7.1 at the end of this chapter, which also identifies whether the Contracting Government had joined the IWC within the IWC's transitional period (1970–1982), as explored in section 3. Many of the votes are as expected (eg United States, United Kingdom, Australia, New Zealand voted yes while Iceland, Japan, and Norway voted no).

¹⁰⁹ ICRW, Schedule s.10(e).

¹¹⁰ Once the moratorium came into effect, the IWC tasked its Scientific and Technical Committees with producing a "Revised Management Procedure" (to generate a method of setting sustainable catch limits) and a "Revised Management Scheme" (for inspection, observation and enforcement of said catch limits). While a Revised Management Procedure was developed, a Revised Management Scheme has never been developed and this is one reason the moratorium remains in effect today.

Interestingly, developing countries were largely united in their support of the moratorium while some previously pro-whaling nations, such as Denmark, who had previously voted against a moratorium, had voted yes on this occasion. Other surprises came when Brazil voted no and with Chile and South Africa defecting from the pro-whaling group to abstain from the vote.¹¹¹

4.2 *Multicausal Explanation for the Commercial Moratorium*

To understand how the zero-catch quota passed by three-quarters of the IWC membership at the Plenary, it is appropriate to analyse the meetings' verbatim record.¹¹² The verbatim record clearly reveals a multicausal explanation for why the moratorium passed and indicates that neither the 'yes' vote or the 'no' vote was motivated by a unified perspective. Our review of the record has organised these motivations into seven categories, which are canvassed below: (1) the object and purpose of the Convention; (2) the need for precautionary decision-making and scientific uncertainty; (3) the requirement of science-based decision-making; (4) the implications for sovereignty and sovereign rights; (5) the humaneness of whaling; (6) the economic and social impact of a commercial whaling cessation upon whaling States; and (7) the future of the IWC. The complete voting record is presented in Table 7.1 at the end of this chapter, which also assigns each motivation to the Contracting Government that expressly or implicitly invoked it during debate and discussion.

4.2.1 Object and Purpose of the Convention

Several Contracting Governments queried whether the proposed moratorium was consistent with the object and purpose of the Convention. The Convention, as previously introduced, was established to create a system of international regulation for whale fisheries "to ensure proper and effective conservation and development of whale stocks [...] and thus make possible the orderly development of the whaling industry".¹¹³

A number of Contracting Governments asserted that the proposed zero catch limit aligned with the object and purpose of the Convention. For example, Australia asserted that owing to steep declines in whale populations, the ICRW's conservation objective must, at this time, become the "over-riding

111 International Whaling Commission, "34th Annual Meeting" (Brighton, 19–24 June 1982) osc/33 72 (Verbatim, 1982).

112 Before beginning this analysis, it is interesting to note which States chose not to comment during the decision-making process. The USSR, for example, was the only Contracting Government that voted no who did not take part in a commentary.

113 ICRW, preamble.

factor” in making regulatory decisions.¹¹⁴ New Zealand agreed that the proposed moratorium was “consistent with the Convention and emphasized the continuing need for scientific research during the moratorium period”.¹¹⁵

Several States, however, disagreed. Norway stated that “the intention to end whaling is not in the purpose of the IWC for rational management of renewable living resources”¹¹⁶ and went so far as to say that the proposal was deplorable and incompatible with the purpose of the IWC. Spain also asserted that the proposal was incompatible with the Convention’s core objective.¹¹⁷ South Korea agreed with Spain and Norway, stating that the moratorium was “in contradiction with the Convention’s objectives”.¹¹⁸ Iceland argued that the “adoption of a moratorium on all commercial whaling based on the strength of votes but not on scientific findings nor recommendations of the Scientific Committee [...] is in our opinion most certainly contrary to the fundamental objectives and purposes of the Commission”.¹¹⁹ Japan stated that the proposal violated the Convention and that the fundamental duties and rights of the Convention could not be changed in this way.¹²⁰

4.2.2 Precautionary Decision-Making and Uncertainty

The verbatim record reveals that several countries stated that the lack of scientific certainty and the current management system were unable to give whales the required protection they deserved and asserted that this uncertainty justified precautionary action. St. Lucia drew attention to this uncertainty, observing that “the scientific uncertainty as to the rationale behind the exploitation of most stocks of whales has led us to believe that we are in a state of grave doubt”.¹²¹

Several Contracting Governments made statements that aligned with precautionary thinking. The Netherlands commented that the history of “the IWC management has shown that a serious decline in stocks has occurred, which must not occur again”, stating that the “benefit of the doubt must be given to the whales”.¹²² This was echoed by the delegation from the United Kingdom, which stated that there is a “possibility of changes in scientific advice in future

114 Verbatim, 1982 (n 111) 72.

115 *ibid* 73.

116 *ibid* 72.

117 *ibid* 73.

118 *ibid*.

119 *ibid* 79.

120 *ibid* 77.

121 *ibid* 78.

122 *ibid*.

years” and that they will support the proposal based on their preference for a precautionary approach.¹²³ Spain acknowledged the need for “some precautionary measures in the exploitation of whales”¹²⁴ and referenced their own domestic precautionary measures adopted in regard to sperm whales, but did not believe that a full moratorium was the appropriate response. The United States stated its desire for effective conservation that would guarantee wise management; as justification for strong precautionary action, it pointed to the IWC’s overriding focus on economic needs, which had by then resulted in the species being driven into protection status.¹²⁵

4.2.3 The Requirement of Science-Based Decision-Making

In opposition to some State’s arguments based on a precautionary approach in light of scientific uncertainty, several other countries however believed that the lack of scientific knowledge was the reason the moratorium should not be supported.¹²⁶

Spain asked for the members to consider the Scientific Committee report, which stated that there is no scientific justification for a zero catch limit.¹²⁷ Japan opined that the present management procedures did not threaten whale stocks and that the collection of additional scientific data collection – which relied on the examination of dead whales – would be hampered by a moratorium.¹²⁸ Japan pointed to the Scientific Committee’s continued position that a zero catch limit was not necessary and highlighted that not a single scientist had claimed that a moratorium was the “only means, to achieve the conservation of the whales”.¹²⁹ Japan pointed to the Scientific Committee’s estimate of over 300,000 mature minke whales in the Southern Ocean to bolster the position that some stocks could sustain a hunt.¹³⁰ South Korea stressed that the proposal, which “defies the basic objective of the IWC”, lacked scientific support.¹³¹ Iceland stated that adopting the moratorium based on votes instead of scientific findings is contrary to the fundamental purpose of the Commission, which demands science-based decision-making. Norway echoed this and opined that the absence of a recommendation by the Scientific Committee

123 *ibid* 82.

124 *ibid*.

125 *ibid* 73.

126 *ibid*.

127 *ibid*.

128 *ibid*.

129 *ibid* 76.

130 *ibid* 77.

131 *ibid* 83.

to adopt a moratorium rendered the proposal an “abdication of management responsibilities [of] the IWC”.¹³²

4.2.4 Sovereignty and Sovereign Rights

Several States opposed the moratorium on the basis that it would not be consistent with coastal States’ rights in their EEZs.

Latin American countries were particularly focused on preserving sovereignty and sovereign rights. Uruguay was the first country to raise the issue of sovereignty/sovereign rights within the 200-mile EEZ of coastal States at the IWC. The EEZ, which was contemporaneously being negotiated at UNCLOS III, allows coastal States to claim management jurisdiction over marine resources which were historically accessible for all States to exploit. Uruguay stated that they agreed with the moratorium but that it would not apply within their EEZ.¹³³ Uruguay’s position was supported by Mexico, Peru, Brazil, Argentina, Costa Rica, and Chile. Costa Rica, however, added that this position should not “diminish the proposal put forward by the Seychelles”.¹³⁴ France’s verbatim record shows that they too declared sovereign rights over the resources in their EEZ, but that they had chosen to apply a moratorium to all their waters.¹³⁵

Japan and the USSR spoke to the implications of the moratorium vote as being “crucial to the future of the Commission, including resource utilization within the 200 miles zone and the sovereign rights issues”.¹³⁶ Japan’s delegation pointed out that the proposal for a moratorium which would “prevent member countries from utilizing whale stocks in their coastal waters represents a flagrant infringement of the sovereign rights of those countries” and concluded that the moratorium was inconsistent with the “practice and customary law” of the EEZ.¹³⁷

4.2.5 Humaneness

Several countries including the United Kingdom and Antigua and Barbuda questioned the humaneness of whaling and offered this consideration as

¹³² *ibid* 78.

¹³³ *ibid*.

¹³⁴ *ibid* 84.

¹³⁵ *ibid* 81.

¹³⁶ *ibid* 74.

¹³⁷ *ibid* 77. It is notable that the Convention itself, in Article 1(2), provides that it applies within “all waters in which whaling is prosecuted by such factory ships, land stations, and whale catchers”, which, in our view, clearly establishes the IWC’s authority within all coastal waters, including what we now recognise as the Territorial Sea and the EEZ, so long as whaling occurs there.

justification to prohibit the activity. The IWC has long considered issues in humane killing methods, including advanced methods of whaling and efforts towards instantaneous death or minimised pain and suffering. Antigua and Barbuda referred to a report previously submitted to the IWC by Japan entitled 'A Summary of Experiments on Humane Catching of Whales' that investigated and evaluated improvements in whaling techniques.¹³⁸ In response to this report, Antigua and Barbuda posited that "there is no humane method of continuing this needless form of industry" and that humanitarian considerations ought to constitute the "over-riding issue".¹³⁹

4.2.6 Economic and Social Impact of a Commercial Whaling Cessation upon Whaling Countries

Considerations related to the socio-economic impacts of a moratorium were addressed by both proponents and opponents of this non-use measures. The Seychelles, who proposed the moratorium, spoke of the need for "sufficient time to wind down [whaling] without undue hardship".¹⁴⁰ They proposed three years as a reasonable amount of time for countries to shift their industries and Australia supported this phasing out approach.¹⁴¹

However, several States expressed strong arguments against the moratorium because of its envisaged socio-economic impacts. To India and Costa Rica's argument that whale stock recovery through conservation efforts was essential in order to facilitate future utilisation,¹⁴² Iceland responded that the moratorium had no regard for the economic or social importance of whaling.¹⁴³ Spain echoed that view, "as a fishing and whaling nation especially concerned about the economic and social implications that this measure implied and the effort that the governments [would] have to make to overcome these problems".¹⁴⁴ They stated that their firm position was that whales should be "managed in such a way that consideration such as the further use of them or the reasons or means for their capture should not be taken into consideration".¹⁴⁵

¹³⁸ *ibid.*

¹³⁹ *ibid* 77.

¹⁴⁰ *ibid* 75.

¹⁴¹ *ibid* 81.

¹⁴² *ibid* 72–74; Opening Statement Costa Rica, IWC Doc. OS/33, Costa Rica; Opening statement by India, IWC Doc. OS/33.

¹⁴³ *ibid* 79.

¹⁴⁴ *ibid* 82.

¹⁴⁵ *ibid.*

4.2.7 Future of the IWC

A final consideration that warrants attention, but is less explicit than those canvassed above, is the broader impact of the moratorium vote on the IWC's future; such argument was generally brought up by States supporting the moratorium. For example, St. Lucia recognised that, when the ICRW was signed in 1946, whale stocks were not depleted – or at least not regarded as such – and that the Convention, as drafted, did not anticipate overexploitation or the need to pause commercial whaling.¹⁴⁶ In support of the moratorium, St. Lucia pointed to shifting public opinion and international conservation efforts, evidenced for example by the World Conservation Strategy and the work of CITES, as signs that the IWC needed to evolve.¹⁴⁷ The United Kingdom spoke to the need to consider the future of the IWC at the time of this vote, which, in this context, is an acknowledgement that this vote represented not only a decision on the appropriateness of instituting a non-use measure but would also demark a shift in the Commission's future work as stewards of the world's great whale species.

However, States opposing the moratorium also referred to the future of the IWC, in particular by arguing that the adoption of such a measure, by going against the object and purpose of the Convention, would be fatal for the regime. Japan, for example, stated that they believed that the proposed moratorium would result in the eventual collapse of the IWC.¹⁴⁸

4.3 *Reactions to the Moratorium*

States that had voted against the whaling moratorium reacted in different ways. Brazil, for example, accepted the majority decision and did not take any additional action. Iceland, at first, did not object to the moratorium, but it subsequently withdrew from the IWC in 1992. When it later re-adhered to the ICRW in 2002, it did so with a reservation to the commercial moratorium and resumed commercial whaling in 2006.¹⁴⁹

Several other States that had opposed the moratorium, Norway, the USSR, Peru, and Japan, made timely objections pursuant to Article v of the Convention. This allowed them to continue commercial whaling.¹⁵⁰ From there, their paths differed. While Japan had initially objected, it then withdrew its objection under political pressure from the United States.¹⁵¹ Peru and the USSR also

¹⁴⁶ *ibid* 78.

¹⁴⁷ *ibid* 81.

¹⁴⁸ *ibid* 77.

¹⁴⁹ International Whaling Commission, "Iceland", available at <<https://iwc.int/iceland>> accessed 3 March 2024.

¹⁵⁰ Peru ultimately did not formalise their objection.

¹⁵¹ Kobayashi (n 55) 199.

eventually accepted the moratorium due to political pressure, while Norway resumed commercial whaling in 1992 and Iceland in 2006.¹⁵²

5 The Current State of the Moratorium and Concluding Thoughts

After the moratorium came into effect, whaling continued in a number of forms, including commercial whaling by those States that had objected (eg Norway) and also under the auspices of Special Permit scientific whaling pursuant to Article VIII of the Convention (eg Japan). Japan's reliance on Article VIII resulted in many years of "heated and destructive debates at the IWC"¹⁵³ and, ultimately, in Australia seeking relief before the International Court of Justice in 2010. In 2014, in *Whaling in the Antarctic, Australia and New Zealand (intervening) v Japan*,¹⁵⁴ the ICJ held that Japan's scientific whaling program in the Southern Ocean did not properly fall within the scope of Article VIII and thus violated the commercial moratorium.

The ICJ's decision further escalated tension at the IWC as pro-sustainable use Contracting Governments urged the IWC to return to regulated commercial activities while a strong majority urged maintenance of the moratorium and a bolstered preservationist agenda. For example, at the 67th meeting of the IWC in 2018, Japan submitted a package of documents called "The Way Forward of the IWC – IWC Reform Proposal including a draft Resolution and proposed Schedule Amendment", which "represented an attempt to restore the function of the IWC as a resource management organization".¹⁵⁵ The package proposal, which was initially supported by 16 Contracting Governments, was subsequently revised and submitted as a proposal to, inter alia, establish a Sustainable Whaling Committee, move forward with calculating catch limits of abundant stocks through the Schedule, and to amend the Convention to require a simple majority rather than a three-quarter super majority for future Schedule amendments.¹⁵⁶ The proposal, which would have required consensus to pass owing to the proposed Convention amendment, was not adopted with a final vote of 27 in favour, 41 against, and 2 abstentions.¹⁵⁷ In stark contrast to Japan's proposal, the Commission then proceeded to adopt the Florianópolis Declaration as introduced by Brazil, which reaffirmed a

¹⁵² *ibid.*

¹⁵³ *ibid.*

¹⁵⁴ *Whaling in the Antarctic* (n 46).

¹⁵⁵ International Whaling Commission, "Chair's Report of the 67th Meeting" (Florianópolis, 10–14 September 2014) IWC/67/08 28.

¹⁵⁶ *ibid* Rev1.

¹⁵⁷ *ibid* 29.

commitment to the moratorium, affirmed the goal of returning whale populations to pre-industrial levels, and acknowledged the seriousness of the “cumulative effects of multiple, existing and emerging threats to cetacean populations such as entanglement, bycatch, underwater noise, ship strikes, marine debris and climate change”.¹⁵⁸ Later in 2018 Japan stated its intention to leave the IWC, which it formally did in 2019.

The commercial moratorium has arguably become a “law in a state of suspension” that is moving towards “permanent postponement” of whaling.¹⁵⁹ In this form, the moratorium is representative of a preservationist approach to whale conservation that has effectively displaced the sustainable use approach to whale management. The strongest arguments advanced during the debate at the IWC before the moratorium vote in favour of the moratorium were premised on scientific uncertainty regarding population assessment and the need for precautionary action.¹⁶⁰ These arguments do not carry as much weight today as increased scientific evidence suggests that some species such as the minke whale can sustain a hunt. Nonetheless, and as observed by Epstein, “the whaling ban, and the convergence of state and nonstate action that enabled it, entrenched endangered species protection as the first global environmental norm, both in the IWC and beyond” and it “remains a defining paradigm for global environmental action”.¹⁶¹ The whaling moratorium demonstrated the potential for strong prohibitions and arguably paved the way for other international non-use measures, including the 1989 CITES Ivory Ban.¹⁶² It has more generally been important as a point of comparison for other non-use measures.¹⁶³ It is the product of a convergence of factors – legal, political, and scientific – at a moment in time when the balance of power at the IWC tipped sufficiently in favour of a conservationist movement that the super-majority needed to amend the Schedule was possible. In this way, the whaling moratorium serves as a model for future non-use measures in various international legal venues.

158 International Whaling Commission, “The Florianopolis Declaration on the Role of the International Whaling Commission in the Conservation and Management of Whales in the 21st Century” (2018) Resolution 2018–5.

159 Schiffman (n 97) 386.

160 *ibid.*

161 C. Epstein, “The Making of Global Environmental Norms: Endangered Species Protection” (2006) 6(2) *Global Environmental Politics* 32.

162 Peez and Zimmerman (n 9) 226.

163 See eg S. Lieberman, T. Gray and A. J. R. Groom, “Moratoria in International Politics: A Comparative analysis of the Moratoria on Genetically Modified Products and Commercial Whaling” (2011) 14(4) *The British Journal on Politics and International Relations* 518.

The whaling moratorium, however, also serves as a cautionary lesson on the impact of non-use measures, as it illustrates both what can go right and what can go wrong when administering international legal regimes that balance strong competing interests.¹⁶⁴ It moreover highlights the complex interaction of international legal rules and restrictions on individual States¹⁶⁵ and demonstrates how action in one international forum can have spill-over effects into other forums.¹⁶⁶ While some Contracting Governments have since given up on whaling altogether, others have sought creative ways to continue to whale (such as Japan's use of Article VIII). The moratorium has been highly successful in transitioning the world from open whaling to a highly restricted hunt, observed by all but the most highly whaling-motivated States. These changes, however, have not extinguished the debate on whether to maintain or lift the moratorium, and both the anti-whaling and pro-sustainable use blocs use its continued existence as a "legitimizing device [...] in defense of their position".¹⁶⁷ Additionally, by remaining such a polarising issue at the IWC, the commercial whaling issue has occupied a disproportionate amount of time and energy and has distracted from the efforts needed to mitigate decidedly 21st century threats to whale stewardship, such as ship strikes, bycatch and fishing gear entanglements, noise pollution, habitat degradation, and climate change. The commercial whaling moratorium is also illustrative of broader international law dilemmas beyond the domain of whales and whalers, including "supermajority decision rules, changes brought by new members, contested amendments to the mandate of an organization and the pull of civil-society groups".¹⁶⁸

164 I. Hurd, "Almost Saving the Whales: The Ambiguity of Success at the International Whaling Commission" (2012) 25(1) *Ethics Int aff* 104, 104.

165 *ibid.*

166 See N. Sellheim, "Spill-over? The Convention on International Trade in Endangered Species after Japan's Withdrawal from the Whaling Convention" in N. Sellheim and J. Morishita (eds), *Japan's Withdrawal from International Whaling Regulation* (1st ed, Routledge 2024), 95. Here, Sellheim (n 166) notes that "From the very early days on, those whales that have been under the ambit of the IWC were automatically listed under Appendix II of the Convention. In the late 1970s, when the IWC placed more and more whale species under full protection from commercial whaling, also CITES responded by placing those species onto Appendix I. When the full moratorium on commercial whaling was adopted by the IWC, it was these species for which no export or import permits were issued anymore, essentially placing them on Appendix I as well".

167 Hurd (n 164) 110.

168 *ibid* 104.

TABLE 7.1 Voting data from the 1982 IWC commercial moratorium vote

Contracting government	1982 moratorium vote	Objection status to vote	Joined between 1970–1982?	Stated reasons for or against moratorium
Countries voting 'YES' on 1982 moratorium				
Antigua and Barbuda	YES	N/A	YES	1982 Humaneness, Science
Argentina	YES	N/A	NO	1960 Rational exploitation, Economic and social impact
Australia	YES	N/A	NO	1947 Humaneness, Precaution, Conservation, Economic and social impact
Belize	YES	N/A	YES	1982 No record available
Costa Rica	YES	N/A	YES	1981 Precaution, Sovereign rights, Conservation
Denmark	YES	N/A	NO	1950 No record available
Egypt	YES	N/A	YES	1981 No record available
Federal Republic of Germany	YES	N/A	YES	1982 No record available
France	YES	N/A	NO	1948 Sovereign rights
India	YES	N/A	YES	1981 No record available
Kenya	YES	N/A	YES	1981 No record available
Mexico	YES	N/A	NO	1949 Sovereign rights
Monaco	YES	N/A	YES	1982 No record available
Netherlands	YES	N/A	YES	1977 Precaution, Conservation
New Zealand	YES	N/A	YES	1976 Science, Purpose of the IWC

TABLE 7.1 Voting data from the 1982 IWC commercial moratorium vote (cont.)

Contracting government	1982 moratorium vote	Objection status to vote	Joined between 1970–1982?		Stated reasons for or against moratorium
Oman	YES	N/A	YES	1980	No record available
Senegal	YES	N/A	YES	1982	No record available
Seychelles	YES	N/A	YES	1979	Precaution, Science
Spain	YES	N/A	YES	1979	Science, Purpose of the IWC
St. Lucia	YES	N/A	YES	1981	Precaution, Science, Future of the IWC
St. Vincent & the Grenadines	YES	N/A	YES	1981	No record available
Sweden	YES	N/A	YES	1979	No record available
United Kingdom	YES	N/A	NO	1947	Humaneness, Science, Future of the IWC
Uruguay	YES	N/A	NO	1981	Sovereign rights
United States of America	YES	N/A	NO	1947	Precaution, Science, Conservation, Rational exploitation, Economic and social impact

Countries voting 'NO' on 1982 moratorium

Brazil	NO	N/A	YES	1974	Sovereign rights
Iceland	NO	Reserved in 2002	NO	2002	Science, Purpose of the IWC, Rational exploitation, Economic and social impact
Japan	NO	Objected, but later withdrawn	NO	1951	Science, Sovereign rights, Purpose of the IWC
Norway	NO	Objected	NO	1960	Purpose of the IWC

TABLE 7.1 Voting data from the 1982 IWC commercial moratorium vote (*cont.*)

Contracting government	1982 moratorium vote	Objection status to vote	Joined between 1970–1982?	Stated reasons for or against moratorium	
Peru	NO	Objected, but later withdrawn	YES	1979	Sovereign rights
South Korea	NO	N/A	YES	1978	Science, Purpose of the IWC
Soviet Union	NO	Objected, but not formalized	NO	1948	No record available

Countries abstaining from vote on 1982 Moratorium

Chile	ABSTAIN	N/A	YES	1979	Sovereign rights
China	ABSTAIN	N/A	YES	1980	No record available
Philippines	ABSTAIN	N/A	YES	1981	No record available
South Africa	ABSTAIN	N/A	NO	1948	No record available
Switzerland	ABSTAIN	N/A	YES	1980	Science
Dominica	ABSENT/ INELIGIBLE	N/A	YES	1981	N/A
Jamaica	ABSENT/ INELIGIBLE	N/A	YES	1981	N/A

TABLE PREPARED BY THE AUTHORS

Non-use of Ocean Space for Waste Disposal

The Evolution of the Global Dumping Regime

James Harrison

1 Introduction

For many years, the oceans were utilised for disposing of materials that were considered too difficult or dangerous for land-based disposal because of the risks to human life and health. Mid-twentieth century, it was common for States to authorise the disposal of materials such as sewage, military munitions and nuclear waste at sea. This practice reflected a general attitude towards waste disposal and the oceans at the time. As noted by one contemporary source, “historically, producers of wastes have often only reluctantly applied safe methods of disposal when the effects of uncontrolled releases have damaged strong interests or outraged public opinion”.¹ Disposal at sea was seen as cost-effective and it avoided having to engage with local communities over the construction of disposal facilities in their locality.

Whereas dumping of waste at sea was once widespread, the scope for the use of the oceans as a space for waste disposal has gradually narrowed through the evolution of international rules on dumping. These rules treat dumping as a ‘spatial-extension resource’; dumping utilises ocean space, with potential impacts on other marine users or the general health of the marine environment. With this in mind, the objective of the principal dumping treaty is to

take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.²

1 International Atomic Energy Agency (IAEA), *Safety Series No. 5: Radioactive Waste Disposal into the Sea* (1961) 22.

2 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (LDC) (adopted 29 December 1972, entered into force 30 August 1975) 1046 UNTS 120, art 1.

The emphasis of this treaty is thus on controlling the negative effects of dumping. To some extent, this has involved a prohibition on the dumping of certain materials, such as mercury and other heavy metals, persistent plastics, and crude oil and related petroleum products. In other words, the dumping regime has reflected a degree of non-use from the outset. However, there has been no outright prohibition on the dumping of all materials and in many cases the regime calls instead for the regulation of dumping as a use of the oceans. At the same time, attitudes towards the desirable level of regulation have changed over time and the evolution of the dumping regime reflects in part a greater awareness of the risks posed by dumping to the marine environment, but also changing opinions about appropriate uses of ocean space. Overall, the trajectory of the dumping regime would seem to be towards ever greater restrictions being placed on this activity, possibly even moving towards an almost complete ban on the use of the oceans for the disposal of waste, with only limited exceptions. It follows that an analysis of the dumping regime may offer insights into how non-use policies evolve over time, as well as the challenges that might be associated with their successful implementation.

To this end, this chapter will address a number of overarching questions posed by this volume: under which circumstances have non-use measures been successfully adopted? What are the factors that have influenced the development of non-use measures in the context of dumping? Does the mandate of an international organisation and their decision-making processes impact upon the development of non-use measures and their effectiveness? What is the impact of the rights of non-parties on the development of non-use measures and their effectiveness?

The focus of this analysis will be on the global treaties dealing with dumping, namely the 1972 Convention on the Prevention of Pollution of the Marine Environment by Dumping at Sea (1972 Convention) and the 1996 Protocol³ thereto. There are also a number of regional treaties introducing supplementary rules on dumping, but they will only feature in this analysis insofar as they are relevant to an understanding of developments at the global level.

Section 2 of the chapter explains the historical development of the global rules on dumping, from the 1950s onwards. Section 3 analyses the key factors that have influenced these developments, whereas section 4 highlights some of the ongoing challenges that face the dumping treaties. The final section offers some reflections on what the dumping regime tells us about the evolution of

3 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (LDP) (adopted 7 November 1996, entered into force 24 March 2006) 36 ILM 1.

non-use measures, as well as considering the future direction of the dumping regime.

2 Historical Development

2.1 *Origins*

The first discussions on multilateral controls over dumping stemmed from attempts by States to codify the law of the sea in the 1950s and they centred on concerns about the disposal of one particular substance: nuclear material, particularly from the emerging civil nuclear industry. It was argued by proponents of nuclear waste disposal at sea that “because of its tremendous capacity, the sea appears attractive as an environment for the application of the dilution and dispersal technique of waste disposal”,⁴ typifying the contemporaneous attitude, at least in major industrialised societies, towards the oceans as an inexhaustible resource. However, even advocates of dumping noted the need for limits, albeit largely on the grounds of protecting human health or related values rather than environmental protection per se.⁵

In the negotiations towards a new treaty on the high seas, the emergence of radioactive waste disposal at sea was identified as ‘a new source of pollution’ and it was proposed that “every State shall draw up regulations to prevent pollution of the seas from the dumping of radioactive waste”.⁶ Some States thought that the law should go a step further, calling for a complete prohibition on the dumping of radioactive materials at sea.⁷ In contrast, other States, led by the United Kingdom and the United States, argued that the matter should be dealt with by the newly established International Atomic Energy Agency (IAEA)⁸ and they urged that it was premature to impose a complete prohibition on the activity. A compromise formula was adopted in the final

4 IAEA (n 1) 24.

5 *ibid.*

6 See The Netherlands, “Comments on the Provisional Articles concerning the Regime of the High Seas” (1956) 11 *Yearbook of the International Law Commission* 253.

7 See eg interventions by Czechoslovakia, USSR, Ukraine, Bulgaria at the 29th meeting, 10 April 1958: United Nations Conference on the Law of the Sea, “Summary Records of Meetings and Annexes” (29th meeting, 10 April 1958) UN Doc A/CONF.13/C.2/SR.29 in *Official Records of the United Nations Conference on the Law of the Sea, Volume IV: Second Committee*, available at <https://legal.un.org/diplomaticconferences/1958_los/docs/english/vol_4.pdf> accessed 22 June 2024.

8 See the Statute of the International Atomic Energy Agency (adopted 26 October 1956, entered into force 29 July 1957) 276 UNTS 3.

treaty text whereby States agreed to “take measures to prevent pollution of the seas from the dumping of radioactive waste, taking into account any standards and regulations which may be formulated by the competent international organisation”.⁹ Although contained in a treaty dedicated to the high seas, this provision is drafted in general terms and it conceivably covers ocean dumping of radioactive waste wherever it occurs. However, it fell short of a complete ban on the practice, which continued for several decades.¹⁰

2.2 *The London Convention*

Further multilateral discussion of the use of the oceans as a space for the disposal of waste took place in the early 1970s, leading to the adoption in 1972 of the London Dumping Convention. The origin of the treaty was a draft proposed by the United States,¹¹ aimed at the better regulation of dumping combined with encouragement of further research on the effects of dumping on the marine environment. However, the objective of the treaty was modified during the course of the negotiations, in part inspired by developments at the regional level,¹² so that the final text of the Convention includes a prohibition on the dumping of specific materials listed in an Annex to the treaty. The treaty covers dumping wherever it takes place. In accordance with developments

9 Convention on the High Seas (adopted 29 April 1958, entered into force 30 September 1962) 450 UNTS 11, art 25(1). A resolution adopted by the conference also recommended that the IAEA pursue studies and take necessary action to assist States in controlling the discharge or release of radioactive materials to the sea, including promulgating standards and international acceptable regulations, see United Nations Conference on the Law of the Sea, “Resolutions adopted by the Conference” (10th meeting, 23 April 1958) UN Doc A/CONF.13/L.56 in *Official Records of the United Nations Conference on the Law of the Sea, Volume II: Plenary Meetings*, 143, available at <https://legal.un.org/diplomaticconferences/1958_los/docs/englishhttps://legal.un.org/diplomaticconferences/1958_los/docs/english/vol_2.pdf/vol_2.pdf> accessed 13 August 2024.

10 D. P. Calmet, “Ocean Disposal of Radioactive Waste: Status Report” (1989) 4 *IAEA Bulletin*, 47–50 reports that the last known dumping operation took place in 1982 in the North-East Atlantic Ocean.

11 United States, Draft Convention on the Regulation of Ocean Dumping (1971) 10 *ILM* 1021–1028. See also T. L. Leitzell, “The Ocean Dumping Convention – A Hopeful Beginning” (1973) 10 *San Diego Law Review* 502, who describes some of the domestic legal and policy background in the United States at the time.

12 See 1972 Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (adopted 15 February 1972, entered into force 1 May 1974) 932 UNTS 3. Johnston notes that the drafting of a new global convention was significantly influenced by the regional convention on dumping that had been adopted by States in the North-East Atlantic in February 1972. See D. M. Johnston, “Marine Pollution Control: Law, Science, and Politics” (1972/1973) 28 *International Journal* 69–102, 88.

agreed shortly afterwards at the Third United Nations Conference on the Law of the Sea, the coastal State was responsible for regulating dumping within the territorial sea, the exclusive economic zone and on the continental shelf,¹³ whereas dumping in areas beyond national jurisdiction was subject to control by the flag State of a vessel engaged in dumping or the State in which the material to be dumped was loaded.¹⁴

The original list of prohibited materials covered certain chemical compounds, heavy metals (mercury and cadmium), persistent plastics and other persistent synthetic materials, certain oil products, high-level radioactive matter,¹⁵ and materials produced for biological and chemical warfare. The effect of the Convention was that the oceans could not be used to dispose of these wastes, subject to exceptions relating to situations involving ‘trace contaminants’¹⁶ or where materials are “rapidly rendered harmless by physical, chemical or biological processes in the sea”.¹⁷

Beyond the prohibition on dumping wastes listed in Annex I, dumping of other materials could continue, subject to a requirement to carry out an impact assessment and to issue a permit.¹⁸ Annex III sets out a list of factors to be considered by a party prior to issuing a permit, including the “practical availability of alternative land-based methods of treatment, disposal or elimination”.¹⁹ The Waste Assessment Guidelines (WAG) subsequently developed by the meeting of the parties reinforce the waste hierarchy by emphasising that “a permit to dump wastes or other matter shall be refused if the permitting authority determines that appropriate opportunities exist to re-use, recycle or treat waste without undue risks to human health or the environment or disproportionate costs”²⁰ and the guidance underlines the need for a waste prevention strategy to be adopted.²¹ In other words, dumping at sea should only be pursued as a

13 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3, art 210(5).

14 LDC, art 7(1)(a)-(b).

15 See further IAEA, “The Definition required by Annex I, paragraph 6 to the Convention and the Recommendations required by Annex II, Section D” (Document INFCIRC/205/ADD.1, 10 January 1975). The definition and guidance have been periodically reviewed and revised by the IAEA.

16 LDC, Annex I, para 9.

17 *ibid* Annex I, para 8.

18 *ibid* arts 1, 4(2) and Annex III, Section C.

19 *ibid* Annex III, Section C, para 4.

20 International Maritime Organization (IMO), “Generic Waste Assessment Guidelines (WAG)” (Document LC 30/16, 2008), Annex 3, para 3.2.

21 *ibid* section 2.

last resort and the Convention suggests that the parties should be proactive in developing alternatives.²²

Selection of the dumping site is another key consideration in the assessment process.²³ Sites should be selected where the physical characteristics, including tides and currents, will maintain the integrity of the dumpsite, preventing the spread of dumped material. Furthermore, there is need to take into account both amenity and the physical and biological properties of a site. It follows that dumpsite selection should consider the presence of *inter alia* areas of special scientific or biological importance, such as sanctuaries, spawning, nursery and recruitment areas, migration routes, and seasonal and critical habitats.²⁴ This process may therefore lead to the non-use of particular areas which are more sensitive to the impacts of dumping. This emphasis on careful site selection will be an important consideration as States continue to expand their marine protected area networks to meet the targets in the Global Biodiversity Framework²⁵ and it will also become increasingly important in areas beyond national jurisdiction when the new Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction enters into force and States begin to establish area-based management tools under that Agreement (BBNJ Agreement).²⁶

An important development in the regime is the endorsement of a precautionary approach to the implementation of the Convention, which not only includes taking preventative measures even in the absence of conclusive evidence of a causal relationship between inputs and their effects, but also encourages the “prevention of pollution at source, by the application of clean production methods, including raw materials and selection, product substitution and clean production technologies and processes and waste minimisation throughout society”.²⁷ The tenor of this guidance is that waste disposal at sea should be avoided wherever feasible, even if there are no demonstrable risks to the marine environment. Ultimately, however, it is up to individual countries

22 LDC, art 9(c).

23 *ibid* Annex IIIB; WAG, (n 20) para 6.1.

24 *ibid* para 6.4.

25 Convention on Biological Diversity (CBD), “Kunming-Montreal Global Biodiversity Framework – Oceans and Climate Change” (CBD, 19 December 2022) COP Decision 15/4, Annex, target 3.

26 Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, Document A/CONF.232/2023/4 (30 June 2023).

27 Resolution LDC 44(14), para 2(a).

to give effect to this guidance and decide on whether to authorise ocean dumping within the parameters of the Convention.

A key feature of the 1972 Convention is the ability to expand the list of prohibited substances through a tacit amendment procedure.²⁸ An ad hoc Scientific Group was established for the purpose of inter alia reviewing scientific and technical information relating to dumping, particularly concerning newly synthesised compounds or newly discovered hazards, and making recommendations for amendments.²⁹ This mechanism ensures that parties have access to the latest scientific information but the decision to amend the list of prohibited substances is ultimately a political choice made by the parties. Amendments must be adopted by a two-thirds majority of parties present and voting at a meeting,³⁰ although in practice the parties will often strive to achieve consensus. Once adopted by the meeting of the parties, all parties are bound by the amendment, unless an individual party makes a declaration within 100 days that they object.³¹ This allows for the rapid evolution of the treaty regime, but also recognises the sovereignty of States to opt out of decisions with which they do not agree.

The tacit amendment procedure has been used on multiple occasions to update the list of substances in Annex I, thereby broadening the scope of the prohibition on dumping. The first substantive amendments to the Annex of the Convention were adopted in 1978, in order to introduce controls on incineration at sea, requiring a special permit to be issued for such activity, taking into account the Regulations for the Control of Incineration of Wastes and Other Matter at Sea.³² The Regulations reinforce that

contracting parties shall first consider the practical availability of alternative land-based methods of treatment, disposal or elimination [... and] incineration at sea shall in no way be interpreted as discouraging progress towards environmentally better solutions including the development of new techniques.³³

Two States (Federal Republic of Germany and New Zealand) objected to the 1978 amendment, although both of them withdrew their objections in 1983,

28 Resolution LDC 31(11).

29 Resolution LDC 7(IV), Annex.

30 LDC, art 15(1)(a).

31 *ibid* art 15(2).

32 Resolution LDC 12(III).

33 *ibid* Annex, Regulation 2(2).

and so it quickly came to apply to all parties to the Convention. More far-reaching amendments were adopted in 1993 in order to significantly expand the original list of prohibited substances.

Firstly, States agreed, after a decade of negotiations,³⁴ on expanding the prohibition on the dumping of high-level radioactive wastes to cover other radioactive substances, with the exception of “wastes or other materials [...] containing de minimis levels of radioactivity as defined by the IAEA and adopted by the Contracting Parties”.³⁵ The case for extending the ban on radioactive waste dumping was led by smaller developing States, who in part advocated for a precautionary approach to the topic given that the evidence of significant risk from this practice was limited.³⁶ The amendment was adopted by a vote, although only the Russian Federation subsequently exercised its right to object to the amendment.

Secondly, a phased prohibition on the dumping of industrial waste at sea, subject to some exceptions, was also introduced in 1993.³⁷ The effect of this amendment was to remove the option of dumping for many waste streams. Industrial waste is defined as “waste materials generated by manufacturing or processing operations”,³⁸ but it goes on to exclude from that definition:

- a. dredged materials;
- b. sewage sludge;
- c. fish waste or organic materials resulting from industrial fish processing operations;

34 Previously, parties had agreed to a voluntary suspension of dumping of radioactive substances at sea; see eg Resolution LDC 14(7); Resolution LDC 21(9). See also Resolution LDC 41(13) which extended the suspension to the disposal of radioactive wastes into sub-seabed repositories accessed from the sea. On this matter, see C. E. Curtis, “Legality of Seabed Disposal of High-Level Radioactive Wastes under the London Dumping Convention” (1985) 14 *Ocean Development and International Law* 383–415.

35 Resolution LDC 50(16). See IAEA, *Application of Radiological Exclusion and Exemption Principles to Sea Disposal: The Concept of De Minimis for Radioactive Substances under the London Convention 1972* Document IAEA-TecDoc-1068 (International Atomic Energy Agency, 1999); IAEA, *Determining the Suitability of Materials for Disposal at Sea under the London Convention 1972 and London Protocol 1996: A Radiological Assessment Procedure* (International Atomic Energy Agency, 2015).

36 According to one source, “none of the technical evidence presented to the [Inter-governmental Panel of Experts on Radioactive Waste Disposal] working group in the seven years of its existence indicated that any significant radiological impact has resulted or would result from properly conducted sea disposal of low-level radioactive waste in accordance with IAEA recommendations”, see IAEA Bulletin 2/1994, 15.

37 Resolution LDC 50(16). The prohibition only applied to the dumping of industrial waste after 1 January 1996.

38 LDC, Annex I, para 11.

- d. vessels and platforms or other man-made structures at sea, provided that material capable of creating floating debris or otherwise contributing to pollution of the marine environment has been removed to the maximum extent;
- e. uncontaminated inert geological materials the chemical constituents of which are unlikely to be released into the marine environment;
- f. uncontaminated organic materials of natural origin.

States were given a period of time in which to comply with this new prohibition, which did not take effect until 1 January 1996. Nevertheless, Argentina and Australia issued objections to this amendment.³⁹ In the case of Argentina, the objection was quickly removed prior to the ban entering into force. In the case of Australia, its declaration expressed the view that it would apply the amendment to all types of industrial wastes from 1 January 1996, with the exception of jarosite waste, which it would permit until 31 December 1997. This was premised upon the need to find an alternative for this particular waste stream.

Thirdly, a new amendment on incineration was introduced in 1993 to supplement the prohibition on dumping of industrial wastes by prohibiting the incineration of industrial waste and sewage sludge using marine incineration facilities.⁴⁰ No objections were made to this amendment and it entered into force for all parties on 20 February 1994.

2.3 *The London Protocol*

Alongside the narrowing of the permitted dumping that may take place under the 1972 Convention, a parallel development in the dumping regime has been the adoption of a new instrument, the 1996 Protocol, which adopts a different model for regulating dumping. The parties to the 1996 Protocol have undertaken to prohibit all dumping, apart from the disposal of those substances that are listed in an Annex to the treaty.⁴¹ This approach thereby reverses the role of listing under the 1972 Convention and it would seem to evidence a revised attitude to dumping by the parties, whereby a particular use of the oceans for the purposes of dumping must be assessed and agreed at the international level before it can be authorised by individual States. The Protocol also imposes a general prohibition on incineration at sea,⁴² thereby going beyond the 1972 Convention.

39 See Report of the Seventeenth Consultative Meeting, Document LC 17/14 (1993) para 2.2.1.

40 Resolution LDC 50(16).

41 LDP, art 4(1).

42 *ibid* art 5.

In its original form, the Protocol permitted the following substances to be dumped: dredged material; sewage sludge; fish waste; vessels and platforms; inert, inorganic geological material; organic material of natural origin; bulky items primarily comprising iron, steel, concrete, or similarly harmless materials.⁴³ Where a party wishes to dump these materials, an impact assessment must still be carried out in order to minimise any risks to the marine environment around the dumpsite.⁴⁴ The requirements for assessment under the Protocol largely mirror those in the 1972 Convention,⁴⁵ but the Protocol expressly embeds the precautionary approach in a much more explicit manner compared to its predecessor.⁴⁶ It also prohibits the export of materials for the purpose of dumping, with no exceptions.⁴⁷

Like the Convention, the Protocol establishes a tacit amendment procedure.⁴⁸ In the first instance, this procedure was used to add carbon dioxide streams from carbon dioxide capture processes to the list of substances that could be placed in the oceans.⁴⁹ Although consensus was not forthcoming and the amendment was adopted by a vote,⁵⁰ no States actually made an objection. Whilst this process is concerned with disposal of a waste product in the seabed, it was deemed desirable to permit it given that it serves a higher environmental purpose, namely international efforts to address climate change.⁵¹ Yet, strict conditions apply: disposal must consist overwhelmingly of carbon dioxide and it must take place into a sub-seabed geological formation.⁵² Furthermore, an assessment must be carried out and a dedicated risk assessment framework underlines the importance of site selection in order to *inter alia* minimise leakage.⁵³

43 *ibid* Annex 1.

44 *ibid* art 4.1.2.

45 *ibid* Annex 2.

46 *ibid* art 3(1).

47 *ibid* art 6.

48 *ibid* art 22.

49 Resolution LP.1(1).

50 IMO, *Report of the Twenty-Eighth Consultative Meeting, Document LC 28/15* (London Convention 2006) para 101.

51 At the same time, an amendment to the prohibition on exporting wastes for dumping in Article 6 of the Protocol was adopted in order to permit the export of carbon dioxide streams for storage purposes. This amendment has not yet entered into force, although States have agreed that it may be provisionally applied; Resolution LP.5(14).

52 Resolution LP.1(1).

53 IMO, *Risk Assessment and Management Framework for CO₂ Sequestration in Sub-seabed Geological Structures (CS-SSGs)* (International Maritime Organization 2006) (Source LC/SG-CO2 1/7, Annex 3).

The Protocol's tacit amendment procedure has also been used to 'narrow' the limits of permissible uses of the oceans for the purposes of dumping. In 2022, the parties agreed to remove sewage sludge from the list of permissible wastes that can be dumped under the Protocol.⁵⁴ In the report prepared for the meetings it was noted that the practice had reached a peak in about 1980 (when approximately 17 million tonnes of sewage sludge were dumped) but very small amounts were being dumped today.⁵⁵ Indeed, many regional treaties had already phased out the practice.⁵⁶ Nevertheless, there is some scope for countries to phase in the new prohibition; the resolution adopting the amendment expressly notes that "Contracting Parties with active permits which have been issued may maintain those permits until the expiry date, but not later than 31 May 2027".⁵⁷ This text is particularly aimed at Australia, which had indicated during the discussion of the amendment that it had two current permits for the dumping of sewage sludge which would expire in October 2023 and May 2027. Subject to this minor exception, the new amendment represents a further tightening of the regime for dumping under the Protocol, which came into effect on 15 January 2023. Whilst three countries (Canada, China and Finland) made objections to the amendment, they all indicated that they would accept it as soon as internal approval procedures had been carried out.⁵⁸

An even more significant revision of the Protocol has been the addition of rules on geoengineering. Marine geoengineering is contemplated as a means of facilitating the uptake of carbon dioxide by the oceans, through techniques such as iron fertilisation. Whilst the deposit of substances for the purposes of geoengineering does not technically amount to the disposal of waste, it falls within the scope of the dumping regime which also covers the "placement of matter for a purpose other than the mere disposal thereof" where such placement is contrary to the aims of the regime.⁵⁹ To this end, a resolution adopted by the meeting of the parties in 2008 confirmed that "the scope of the London

54 Resolution LP.6(17).

55 Current practices of managing or dumping of sewage sludge at sea: Secretariat, "Note by the Secretariat" (14 July 2021) London Convention, Document LC/40/10, Annex, 5.

56 See eg Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted 22 September 1992, entered into force 25 March 1998) 2354 UNTS 67, Annex II art 3(2)(c). It is also banned under the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention) (adopted 9 April 1992, entered into force 17 January 2000) 2009 UNTS 197, art 11; and under the 1995 Protocol for the Prevention and Elimination of pollution of the Mediterranean Sea by dumping from ships and aircraft or incineration at sea (adopted 10 June 1995, not yet in force), art 4.

57 Resolution LP.6(17).

58 See IMO, *Status of IMO Treaties* (19 April 2023) 575.

59 LDP, art 1(4)(2)(2); LDC, art 3(1)(b)(11); UNCLOS, art 1(5)(b)(11).

Convention and Protocol includes ocean fertilization activities”⁶⁰ on the basis that “ocean fertilization activities other than legitimate scientific research [...] should be considered as contrary to the aims of the Convention and Protocol”.⁶¹ Furthermore, in October 2013, the parties to the Protocol adopted amendments that establish a new regime for the authorisation of geoengineering activities falling under the auspices of the Protocol. The amendment introduces a new article into the Protocol, according to which:

contracting parties shall not allow the placement of matter into the sea from vessels, aircraft, platforms or other man-made structures at sea for marine geo-engineering activities listed in Annex 4, unless the listing provides that the activity or the subcategory of an activity may be authorised under a permit.⁶²

At present, only iron fertilisation is listed in Annex 4 and it can only be permitted for the purposes of ‘legitimate scientific research’, although parties are currently considering whether to add other types of geoengineering activities to the list. Given it is an amendment to the main body of the Protocol, rather than the Annex, the 2013 amendment must be accepted by two-thirds of the contracting parties before it enters into force. As of October 2024, only seven parties have accepted the amendment, so its formal entry into force is still a long way off. Pending the entry into force of the amendment, marine geoengineering, with the exception of legitimate scientific research, would still be prohibited as a form of placement contrary to the aims of the Protocol.

3 Factors that have Contributed to the Trend towards Non-use Measures in the Dumping Regime

3.1 *Tacit Amendment and Transitional Arrangements*

A key factor in the evolution of the dumping regime has been the inclusion of tacit amendment procedures in the relevant treaties. As seen above, the amendment procedure under the 1972 Convention has been used on numerous occasions in order to expand the prohibition on dumping by adding materials to the list in Annex I of the treaty. Indeed, tacit amendment has been used not only to cover a much broader range of substances within the ban on dumping,

⁶⁰ Resolution LC-LP.1, para 1.

⁶¹ *ibid* para 8.

⁶² LDP, art 6bis, introduced by Resolution LP.4(8) Annex.

but also to expressly address incineration as an alternative form of at-sea waste disposal. Similarly tacit amendment under the Protocol has allowed the narrowing of substances that may be dumped.

Whilst this technique has permitted a significant degree of dynamism in the dumping regime, the procedures also allow States to object to amendments that they do not support. The emphasis on consensus in the rules of procedure of the meeting of the parties means the objection procedures have been used infrequently. Indeed, it is striking that objections have not proliferated, even when amendments have been adopted by a vote. On most occasions, objections have been temporary in order to allow a State to adapt to the new requirements. Where dumping is already taking place, it must be remembered that States will have to identify other forms of waste disposal before they can stop dumping at sea. By way of example, Russia initially objected to the 1993 amendment to ban the dumping of radioactive material and it did not withdraw its objection until 2005, by which time it had constructed alternative facilities to deal with its radioactive waste. This need for time to adjust is also reflected in the explicit recognition of transitional periods in some of the amendments, most recently in the case of the 2022 prohibition on dumping sewage sludge under the 1996 Protocol.

3.2 *Role of Civil Society*

Whilst States are the main actors in the dumping regime, the rules of procedure⁶³ adopted by the treaty bodies also provide an opportunity for non-State actors to participate in meetings, which has allowed groups seeking to promote greater environmental protection a voice in the development of the regime.⁶⁴ Such groups may not only participate at the international level, but they may also play a role in national processes designed to give effect to the treaties. Such participation is particularly significant in the context of permitting procedures. Whilst neither treaty explicitly requires public consultation on these matters, the Waste Assessment Guidelines recommend that “opportunities are provided for public review and participation in the permitting process”.⁶⁵

63 See Rules of Procedure for the London Convention, Rule 3, which allows “any non-governmental organisation with specialised technical expertise relating to the objectives of the Convention” to be invited to attend as observers.

64 See eg R. Parmentier, “Greenpeace and the Dumping of Waste at Sea: A case of Non-State Actors’ Intervention in International Affairs” (1999) 4 *International Negotiation* 433–455. Other groups represented at the annual meeting include World Wide Fund for Nature, Pew Charitable Trusts, the International Union for Conservation of Nature, and the Advisory Committee on the Protection of the Seas.

65 WAG (n 20) para 9.2.

Environmental groups have played a particularly important role in ensuring that ocean dumping is not conducted without scrutiny, leading to some high-profile instances of proposed dumping capturing the popular imagination as was the case with the Brent Spar in 1995.⁶⁶ It was largely the negative public opinion against the dumping of the former oil platform which led to the decision by Shell to seek an alternative solution.⁶⁷ Indeed, it has been suggested by some authors that this case provides an example where decision-making was influenced primarily by the public media campaign run by Greenpeace, based upon a general opposition to dumping at sea, rather than the clear evidence about the risks posed by the proposed disposal of the installation.⁶⁸ In other words, the involvement of environmental groups means that the debate about dumping is not concerned exclusively with technical assessment of risk, but is also informed by other values and public opinion. This can lead to wider application of non-use measures, even where demonstrable risk is not high.

4 Issues and Challenges

4.1 *Scope of the Regime and Interaction with Other Regimes*

As Douglas Johnston noted in the early 1970s when the dumping regime was first emerging, marine pollution by dumping represents only a small percentage of pollution entering the marine environment and it arguably “represents the most easily solved part of the whole”.⁶⁹ This observation raises a critical question about the precise reach of the dumping regime and how it interacts with international rules relating to other sources of marine pollution.

The central focus on the dumping regime is on disposal of wastes at sea, but disposal has proven to be a flexible concept.⁷⁰ As already noted, States agreed early on to regulate incineration at sea through the dumping regime

66 For a recent retrospective of the Brent Spar campaign, C. Hacke, “The Sea is Not a Dustbin: Remembering Greenpeace’s Brent Spar Campaign of 1995” (*History Matters*, 6 January 2023), available at <<http://www.historymatters.group.shef.ac.uk/the-sea-is-not-a-dustbin-remembering-greenpeaces-brent-spar-campaign-of-1995/>> accessed 8 July 2024.

67 J. Kuszewski and Y. Crowther, “Brent Spar: The Battle that Launched Modern Activism” (*Reuters*, 5 May 2010), available at <<https://www.reutersevents.com/sustainability/business-strategy/brent-spar-battle-launched-modern-activism>> accessed 8 July 2024.

68 M. Huxman and D. Sumner, “Emotion, Science and Rationality” (1999) 8 *Environmental Values* 349–368.

69 Johnston (n 12) 73.

70 See K. N. Scott, “From ocean dumping to marine geoengineering: The evolution of the London Regime”, in R. Rayfuse et al (eds), *Research Handbook on International Marine Environmental Law* (Edward Elgar 2023) 244–245.

even though it differs from the core activity of dumping waste material into the water column. The further expansion of the regime has been facilitated by the inclusion of language in the treaties on the “placement of matter” where it is “contrary to the aims of this Convention”,⁷¹ permitting the parties to address other issues that threatened to circumvent the restrictions on dumping, such as the construction of artificial reefs using former train carriages or military equipment.⁷² Furthermore, it is this broad legal provision which allowed the extension of the dumping regime to deal with marine geoengineering, at least insofar as it involves the placement of material into the marine environment.⁷³

At the same time, the scope of the dumping regime has been carefully crafted to ensure that other legitimate uses of the sea are not affected. Thus the definition of dumping expressly excludes “the disposal at sea of wastes or other matter incidental to or derived from the normal operation of vessels, aircraft, platforms, or other man-made structures at sea and their equipment”⁷⁴ and the “disposal of wastes or other matter directly arising from, or related to the exploration, exploitation and associated offshore processing of seabed mineral resources”.⁷⁵ This careful delineation of dumping does not necessarily exempt such ‘normal operations’ from regulation, however, as they may be subject to different regulatory regimes, such as the 1973/78 International Convention for the Prevention of Pollution from Ships.⁷⁶

This assumes a clear division of authority between different treaties, but there may be cases where responsibilities become blurred. In practice, the parties to the dumping treaties have worked in close collaboration with other treaty bodies in order to overcome such challenges. For example, pending the entry into force of the 2001 International Convention on the Control of Harmful Anti-Fouling Substances on Ships,⁷⁷ which has the effect of prohibiting the use of certain substances as anti-fouling agents on the hulls of ships, the parties to the dumping treaties developed guidance on the removal of anti-fouling coatings from ships as a means to minimise the dispersal of these elements into the wider marine environment and prevent them from becoming mixed with

71 LDC, art 3(1)(b)(11).

72 See London Convention and Protocol/UNEP Guidelines for the Placement of Artificial Reefs, UNEP Regional Seas Reports and Studies No 187 (2009).

73 See Scott (n 70) 254–258.

74 LDC, art 3(1)(b)(1).

75 *ibid* art 3(1)(c).

76 Protocol relating to the 1973 International Convention for the Prevention of Pollution from Ships (adopted 17 February 1978, entered into force 2 October 1983) 1340 UNTS 61.

77 International Convention on the Control of Harmful Anti-Fouling Substances on Ships (adopted 5 October 2001, entered into force 17 September 2008) UN Registration No 56215.

dredged material which might then be dumped under the London Convention or Protocol. This guidance was adopted by the meeting of the parties in 2008 and forwarded to the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO), as the body responsible for the 2001 Convention, for approval.⁷⁸ Some further modifications were agreed at the MEPC,⁷⁹ with the guidelines ultimately being issued as a joint circular issued by both institutions.⁸⁰ Another issue addressed jointly by these two institutions is the management of spoilt cargoes.⁸¹

There are other situations in which the dumping regime clearly has limits and it will not prevent all disposal of waste into the sea, particularly from land-based inputs. These limitations have been debated recently in the context of the proposed discharge of treated water from the Fukushima nuclear power plant through pipelines. Some States considered that this proposal should be regulated under the dumping treaties, which would have meant that it would likely be prohibited as it involved the disposal of radioactive material. However, legal advice on this question from the secretariat concluded that “it is not certain that a broad interpretation of [the] London Protocol would consider that such disposal would fall within the scope of the treaty”.⁸² The result is that the less stringent provisions on land-based sources of marine pollution under Article 207 of UNCLOS apply. It is important to note that Japan would still be under a due diligence obligation to prevent pollution of the marine environment and IAEA guidance would still be pertinent to ensuring that this obligation was met. Moreover, the mere fact that disposal of substances through pipelines from land-based facilities is not dumping does not mean that it is beyond the competence of the parties to the dumping treaties to discuss these matters. In this respect, the advice from the secretariat explicitly noted that the meeting of the parties was able to debate the issue, even if it could not be considered as dumping.⁸³ Indeed, it should not be forgotten that the drafters of the 1972 Convention had explicitly anticipated the need for parties to consider working with other regimes by pledging in Article 12 “to promote within the competent specialised agencies and other international bodies, measures

78 Report of the 30th Consultative Meeting, LC30/16, para. 9.26.

79 See Report of the 59th Meeting of the MEPC, Document MEPC 59/24, paras 13.1–13.5. In particular, the MEPC decided to remove text relating to in-water hull cleaning.

80 IMO, Guidance on Best Management Practices for Removal of Anti-Fouling Coatings from Ships, Including TBT Hull Paints, AFS.3/Circ.3 (22 July 2009).

81 See IMO, MEPC.1/Circ.809, Revised Guidance on the Management of Spoilt Cargoes (28 June 2013).

82 Document LC/44/11, para 19.

83 *ibid* para 21.

to protect the marine environment against pollution” caused by other activities not considered to be dumping. To this end, the contracting parties have adopted a number of resolutions calling for general international action on a range of matters from land-based sources⁸⁴ to plastic.⁸⁵ It follows that, whilst there are limits to what can be achieved by the dumping regime in isolation, this explicit linkage to other relevant treaties permits States to pursue a coordinated approach to marine environmental protection and to attempt to ensure that stricter regulation on the use of the oceans for dumping cannot be circumvented by carrying out similar activities under a different guise.

4.2 *Limited Number of Parties*

As treaty instruments, the effectiveness of the dumping treaties will in large part depend upon States consenting to be bound. As of October 2024, the 1972 Convention has 87 parties and the Protocol has 55 parties, with 40 States being party to both of the treaties. In terms of geographical representation, a greater proportion of States in the Western European (79%) and Latin American (72%) regions are parties to at least one of the treaties, with less participation in the Eastern European (56%), Asia-Pacific (40%) and African (35%) regions. However, 30 of the States that are not a party to either treaty are landlocked and these countries will have more limited opportunities to carrying out dumping. This still means that 61 coastal States are not a party to either of the treaties, revealing the limited geographical coverage of the regime.

Despite limited direct participation, the dumping treaties may also have broader application by virtue of Article 210 of UNCLOS which lays down more general rules on dumping. Article 210 demands that UNCLOS parties “adopt laws and regulations to prevent, reduce and control pollution of the marine environment by dumping”⁸⁶ and further provides that “national laws, regulations and measures shall be no less effective in preventing, reducing and controlling such pollution than global rules and standards”.⁸⁷ This so-called rule of reference is a way of broadening the application of existing international rules beyond the parties to a particular treaty.⁸⁸

Given that the 1972 Convention was already in place when UNCLOS was negotiated, it is generally accepted that Article 210(6) means that all parties

84 Resolution LDC 40(13).

85 Resolution LDC 22(9).

86 UNCLOS, art 210(1).

87 *ibid* art 210(6).

88 See generally W. van Reenen, “Rules of Reference in the new Convention on the Law of the Sea, in particular in connection with the pollution of the sea by oil from tankers” (1981) 12 *Netherlands Yearbook of International Law* 3.

to UNCLOS must ensure that they prohibit dumping of substances listed in Annex I of the 1972 Convention, as well as take steps to ensure that other forms of dumping are carried out in accordance with the procedural requirements in the 1972 Convention, whether or not they are a party to the 1972 Convention. The rule of reference is drafted in such a way that it can be interpreted as including those substances that have been subsequently added to Annex I of the 1972 Convention by way of amendment, although a more difficult question is whether States that have objected to amendments would nevertheless be bound by virtue of Article 210(6). It is suggested that such an interpretation of Article 210(6) is difficult to maintain, as it directly collides with the principle of State sovereignty, and the reference to global rules should include permitted exceptions to those rules, including objections that have been lawfully made in accordance with the global rules themselves.⁸⁹ However, as seen above, there are relatively few States who have made and maintained such exceptions in practice. In general, the effect of Article 210(6) is that the prohibition on dumping laid down in the 1972 Convention has a much broader application beyond its 87 parties, covering at least the 168 parties to UNCLOS.⁹⁰ Yet, this conclusion is limited to the substantive rules of the 1972 Convention and non-parties would not be required to comply with the institutional requirements, such as reporting to the meeting of the parties. This is an important observation, given the importance of the institutional framework under the 1972 Convention for overseeing the implementation of the rules and for putting pressure on States to comply.⁹¹

Some authors have argued that Article 210(6) goes further by demanding that national rules are at least as effective as the 1996 Protocol, as this instrument also in principle has 'global' application.⁹² Whilst this approach may be more attractive from the perspective of furthering environmental protection, it must be asked whether it reflects the reality of State practice, given that far fewer States having accepted the 1996 Protocol compared to the 1972

89 See J. Harrison, *Saving the Oceans through Law* (OUP 2017) 107.

90 Arguably, this provision of UNCLOS also reflects customary international law and so it might even apply beyond parties to the Convention. On the customary status of some of the environmental provisions of UNCLOS, see International Court of Justice, *Alleged Violations of Sovereign Rights and Maritime Spaces in the Caribbean Sea* (Nicaragua v Colombia) (2022) 1CJ Rep 266, para 95.

91 Harrison (n 89) 99–100.

92 See eg F. Wacht, "Article 210" in A. Proelss (ed), *United Nations Convention on the Law of the Sea: a commentary* (Beck 2017) 1418; L. de la Fayette, "The London Convention 1972: Preparing for the Future" (1998) 13 *International Journal of Marine and Coastal Law* 515, 516.

Convention. Moreover, it would mean that a significant number of States that have chosen to be a party to the 1972 Convention but not the 1996 Protocol could nevertheless be held to the higher standards contained in the latter. Yet, it still begs the question of the conditions which must be met if the 1996 Protocol is to represent the global rules and standards for the purposes of Article 210(6), as one day it might. Does it require all parties to the 1972 Convention to become party to the 1996 Protocol, essentially leaving the latter as a dead letter instrument? Or could this position be reached once more States have accepted the Protocol than the Convention? These are important questions that are worthy of further reflection or even a request for an advisory opinion from the International Tribunal for the Law of the Sea (ITLOS).

4.3 *Implementation and Reporting*

A final challenge is the need to ensure effective implementation of the rules agreed at the international level. Some States may find it easier to introduce restrictions on dumping than others and the need for capacity building and technical assistance is expressly identified in the treaty texts.⁹³ Needs may include not only support in implementing technological alternatives to dumping, but also advancing scientific and technical capacity to assess and monitor dumping. However, both treaties only contain an obligation to ‘promote’ such measures and it therefore depends upon the willingness of parties to provide support, although the Protocol foresees a role for the IMO in actively brokering and providing assistance to States.⁹⁴ The Protocol also contains a compliance mechanism, in part designed to assist States with implementation.⁹⁵

Any assessment of compliance demands information about how parties have implemented their commitments. Both the 1972 Convention⁹⁶ and the 1996 Protocol⁹⁷ impose obligations on the parties to report on implementation, but compliance with this obligation has been very poor. For 2018, the reporting rate for all parties was only 35%.⁹⁸ Indeed, the First World Ocean Assessment concluded in 2015 that there is “a major knowledge gap about the implementation

93 LDC, art 9; LDP, art 13(1)(5).

94 LDP, art 13(2).

95 LDP, art 11. See J. Harrison, “Compliance Mechanisms under Treaties relating to protection of the marine environment”, in R. Rayfuse et al (eds), *Research Handbook on International Marine Environmental Law* (2nd ed, Edward Elgar 2023) 107–110.

96 LDC, art 6(4).

97 LDP, art 9(4).

98 Report of the Forty-third consultative meeting and the sixteenth meeting of the contracting parties, Document 43/17, 11 November 2021, para 7.3.

of the 1972 London Convention and the 1996 London Protocol”⁹⁹ and little has improved since,¹⁰⁰ despite the meeting of the parties experimenting with various methods of trying to improve reporting, including through increased outreach and capacity-building.¹⁰¹ The parties have agreed that improvement of reporting is a key strategic goal in their 2017 Strategic Plan, but the target for 75% of parties to report by 2022¹⁰² would appear to have been missed. It is difficult to know what more could be done at the international level, apart from keeping the item on the agenda and maintaining pressure on States to comply, but this is perhaps one area where non-governmental groups could step up their activity within domestic political processes in order to encourage better reporting.

5 Concluding Remarks

This chapter has considered the evolution of the prohibition on dumping, which has seen a gradual expansion of the prohibition on disposing of wastes at sea from a relatively narrow list to a much broader range of substances. The precise scope of the permitted use of the oceans for waste disposal will depend on whether a State is a party to the 1972 Convention or the 1996 Protocol, with the latter offering a stricter approach, albeit with a smaller number of parties. Yet, arguably both regimes now reflect a different ethos towards disposal of waste at sea, reflecting a precautionary approach that was not evident when the 1972 Convention was first adopted. What is also common across both regimes is their flexibility to regulate emerging uses, such as incineration at sea, carbon capture and storage, and marine geoengineering. The annual meeting of the parties provides a forum to keep developments under review, such as its recent work on the launch of spacecraft and their impact on the marine environment.¹⁰³

99 A. Simcock and J. Wang (eds), “Chapter 24: Solid Waste Disposal” in *First Global Oceans Assessment* (United Nations 2016) 12.

100 United Nations, *The Second World Oceans Assessment, vol II* (2021) 176 noted that “owing to substantial underreporting by many contracting parties and a lack of published data, it is difficult to track implementation and understand the current extent of the challenge that exists”.

101 See Harrison (n 95) 109–110.

102 Strategic Plan for the London Protocol and the London Convention, Document LC 38/16 (18 October 2016) Annex 2, targets under SD2.

103 See Report of the Forty-third Consultative Meeting, Document LC/43/17 (2021) para 10.15. See Scott (n 70) 260, suggesting this activity falls beyond the definition of dumping.

In practice, reported use of the oceans for waste disposal has dramatically decreased in the five decades since the adoption of the 1972 Convention. Today, by far the most common item dumped is dredged material – in other words, material that is being moved from one area of the marine environment to another. Thus, in 2019, out of 2270 dumping permits reported by the parties, 1506 were for maintenance dredging and 235 were for capital dredging. Yet, even with this seemingly benign activity, there are problems with contamination by other materials, such as plastic litter.¹⁰⁴ Whilst there are techniques for separating macro-plastic from dredged material, the challenges of separating micro-plastics from large amounts of dredged material are “considerable and, at present, such separation is logistically and economically impractical”.¹⁰⁵ Given the persistence of plastics in the marine environment and the threats posed to a wide range of marine life, parties have been encouraged to “take into account the issue of plastics and marine litter when applying the dredged material waste assessment guidance”.¹⁰⁶ Similarly dumped sewage sludge, now prohibited under the 1996 Protocol but still allowed under the 1972 Convention, can contain plastic contamination. Ultimately, this issue can only be solved through other regimes concerned with the original source of plastic pollution. International negotiations on a new plastic treaty may contribute to this end,¹⁰⁷ but this example underlines the need for a coordinated approach to tackling all sources of marine pollution.¹⁰⁸ In this endeavour, the parties to the dumping treaties have as much of a role to play in debates on waste avoidance than waste disposal.

Looking to the future, it can be asked how far the dumping treaties should go in implementing non-use measures for waste disposal at sea. As noted above, public attitudes towards the use of the oceans for waste disposal have changed dramatically since the inception of the dumping regime, with opposition to dumping in some quarters whether or not there is a demonstrable risk to the marine environment. The objective of the Protocol also explicitly raises the prospect of eliminating dumping, ‘where practicable’,¹⁰⁹ in effect highlighting the potential for a complete non-use measure. In this light, it can be asked whether we should be using the oceans for dumping waste – at least

104 See IMO, *Review of the Current State of Knowledge Regarding Marine Litter in Wastes Dumped at Sea under the London Convention and the London Protocol: Final Report* (International Maritime Organization 2016).

105 *ibid* 4.

106 Report of the 38th Consultative Meeting, Document LC/16 (2006) para 9.31.4.

107 United Nations Environmental Assembly Resolution 5/14.

108 LDC, art 1; LDP, art 2.

109 LDP, art 2.

waste generated from land-based activities - as a matter of principle. It must be recognised that this debate can no longer focus exclusively on technical assessments of risks, but must also take into account broader values associated with the protection of the marine environment.

There is evidence beyond the global treaties that dumping is increasingly considered as an undesirable option for waste disposal. Many of the regional dumping treaties go further than the global rules on dumping in their prohibition on materials that may be dumped.¹¹⁰ A leading example is the Helsinki Convention which prohibits all dumping in the Baltic Sea region, with the exception of dredged material and, even then, under strictly controlled circumstances.¹¹¹ Such measures are encouraged by the 1996 Protocol, which recognises that “it may be desirable to adopt, on a national or regional level, more stringent measures with respect to prevention and elimination of pollution of the marine environment from dumping at sea than are provided for in international conventions or other types of agreements with global scope”.¹¹² More ambitious action towards this goal may be achieved more easily at the national or regional level, compared to the global level, where change is likely to be slower and incremental given the broader range of parties and interests at stake. Yet even at the global level, there has been a clear increase in non-use measures in relation to waste disposal at sea.

110 See further Harrison (n 89) 110–112.

111 Helsinki Convention, Annex v.

112 LDP, preamble. See also arts 3(4) and 12.

PART 3

The Deep Seabed



Deep-Seabed Mining: Environmental Knowledge and Implications for Use and Non-use of the Deep Sea

Sabine Gollner, Patricia Esquete and Jesse M. A. van der Grient

1 Introduction

Critical scientific gaps in environmental knowledge on deep-sea ecosystems currently hinder the ‘effective protection of the marine environment’ from harmful effects which may occur from deep-seabed mining activities.¹ Whilst in the 19th century it was hypothesised that the abundance and variety of marine life would decrease with increasing depth (the Azoic Theory), and that no marine life could exist below 550 metres depth,² today it is known that down to 11 kilometres depth our ocean is full of diverse life.³ Our deep ocean provides over 90 percent of Earth’s habitable space, which includes all seabed (also known as ‘benthic’ ecosystem) and water masses (also known as water column or ‘pelagic’ ecosystem) at depths greater than 200 metres. This space hosts a great variety of habitats, comparable to what we observe on land, making the benthic and pelagic ecosystems not uniform, but heterogeneous environments. The presence of mountain chains, hills, volcanoes, and canyons across the benthic environment creates heterogeneity on the seafloor. Variations in light levels, temperature, oxygen concentration, nutrients and currents cause great heterogeneity in the pelagic and benthic ecosystems. Comparable to the different landscapes on Earth where different species thrive (think for example, in mountain areas or in savannas), each of these ‘seascapes’ harbours distinct forms of life which, in turn, support ecosystem services that are essential to human and ocean health globally.⁴

1 D. J. Amon et al, “Assessment of Scientific Gaps Related to the Effective Environmental Management of Deep-Seabed Mining” (2022) 138 *Marine Policy* 105006.

2 T. R. Anderson and T. Rice, “Deserts on the Sea Floor: Edward Forbes and His Azoic Hypothesis for a Lifeless Deep Ocean” (2006) 30 *Endeavour* 131.

3 E. Ramirez-Llodra et al, “Deep, Diverse and Definitely Different: Unique Attributes of the World’s Largest Ecosystem” (2010) 7 *Biogeosciences* 2851.

4 DOSI, “What Does the Deep Ocean Do for You?” (2022) *Deep Ocean Stewardship Initiative Policy Brief*, available at <<https://www.dosi-project.org/wp-content/uploads/Deep-Ocean>

More than half of the global ocean is considered areas beyond national jurisdiction (ABNJ) and it is regulated by a variety of legal instruments. Two regimes are of special relevance when it comes to environmental questions relative to the use and non-use measures of non-renewable mineral resource extraction on the seafloor. First, the International Seabed Authority (ISA) is the organisation through which States Parties to the United Nations Convention on the Law of the Sea (UNCLOS)⁵ organise and control all mineral-resources-related activities in the parts of the seabed that are not under national jurisdiction (also known as the 'Area') for the benefit of humankind as a whole as per Articles 137 and 157 of UNCLOS. Currently, the ISA is drafting a code for mineral exploitation ('Mining Code') that shall organise and control deep-seabed mining and ensure the effective protection of the marine environment from harmful effects that may arise from these deep-seabed-related activities. Second, in March 2023, a treaty on the sustainable use and protection of marine biodiversity of areas beyond national jurisdiction (BBNJ Agreement) was concluded, including a large chapter on area-based management tools. Both instruments have the obligation of sustainable use and protection of the marine environment, and recognise the importance of scientific knowledge in achieving these goals.

In this chapter, aimed at a readership without a direct natural sciences background, we first provide an overview of the natural environment of deep-seabed ecosystems that are currently explored for mineral resources (section 2). Second, we evaluate the main spatial and temporal environmental impacts and effects that can be expected from deep-seabed mining (section 3). Third, we provide scientific rationales and review the available scientific knowledge and (un)certainly in support for the need of non-use measures for mineral-extraction in ABNJ (section 4).

2 Mineral Rich Deep-Sea Ecosystems

Three benthic ecosystems are known to harbour mineral-rich deposits: abyssal plains with polymetallic nodules, seamounts with cobalt-rich ferromanganese crusts, and hydrothermal vents with polymetallic sulphides.⁶ In addition, it

-Ecosystem-Services-Brief.pdf> accessed 12 July 2024; A. R. Thurber et al, "Ecosystem Function and Services Provided by the Deep-Sea" (2014) 11 *Biogeosciences* 3941.

5 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 396.

6 S. Gollner et al, "Resilience of Benthic Deep-Sea Fauna to Mineral Mining Activities" (2017) 129 *Marine Environmental Research* 76–101.

needs to be pointed out that the benthic environment and the pelagic environment above are connected. The term ‘connectivity’ describes the ecological linkages between locations and habitats, individual organisms and the resources they require.⁷ This can come in the form of, for instance, food provision or larval dispersal facilitation. For example, the majority of deep-sea organisms are dependent on food that derives from the surface waters (upper 200 metres) as photosynthesis does not take place in waters deeper than 200 metres. The food sinking down is used and reworked by organisms in the water column until it arrives on the ocean floor where it is further re-used and finally stored as carbon, a process called the biological carbon pump.⁸ The majority of benthic animals in the deep sea produce offspring in the form of larvae, which disperse in the water column via ocean currents, until they settle on the seafloor and further develop into adults. Thus, an ecosystem-based approach of seafloor management needs to consider the interactions and links of both abiotic and biotic processes of the seafloor with the water column above it.

2.1 *Abyssal Plains with Polymetallic Nodules*

Polymetallic nodules – potato-sized mineral accretions – lie just in or on top of sediments at depths of 4,000 to 6,000 metres below the sea surface, and typically span large and continuous areas on abyssal plains (Figure 9.1). Since they are small-sized structures spread horizontally throughout the seafloor, nodules form a two-dimensional deposit on the surface of deep-sea sediments.⁹ The richest known polymetallic nodule deposits are located in the Clarion-Clipperton Zone (CCZ) in the middle of the East Pacific Ocean in ABNJ.¹⁰ The CCZ is approximately 6 million km² (the size of the European Union is 4.2 million km²), and to date 17 exploration contracts, each of a (maximum) size of 75,000 km² (roughly the size of Panama), have been issued by the ISA for this region. Two more exploration contracts for polymetallic nodules have been granted by the

7 DOSI, “Ecological Connectivity: Implications for Ocean Governance” (2020) *Deep Ocean Stewardship Initiative Policy Brief*, available at <<https://www.dosi-project.org/wp-content/uploads/DOSI-Ecological-Connectivity-ISA-Submission.pdf>> accessed 12 July 2024.

8 P. W. Boyd and T. W. Trull, “Understanding the Export of Biogenic Particles in Oceanic Waters: Is There Consensus?” (2007) 72(4) *Progress in Oceanography* 276–312; C. R. Smith et al, “Abyssal Food Limitation, Ecosystem Structure and Climate Change” (2008) 23 *Trends in Ecology & Evolution* 518–528.

9 T. Kuhn and C. Rühlemann, “Exploration of Polymetallic Nodules and Resource Assessment: A Case Study from the German Contract Area in the Clarion-Clipperton Zone of the Tropical Northeast Pacific” (2021) 11(6) *Minerals* 618.

10 J. R. Hein et al, “Deep-Ocean Polymetallic Nodules as a Resource for Critical Materials” (2020) 1(3) *Nature Reviews Earth & Environment* 158–169.

ISA for the Indian Ocean and the Western Pacific Ocean.¹¹ In addition, polymetallic nodules within national jurisdiction are of interest for several Pacific island States. It is expected that applications for the first commercial exploitation licenses will be for areas within the CCZ.

Environmental processes on abyssal plains with polymetallic nodules are very slow and stable, with little natural disturbance events occurring. The nodules form and grow on geological timescales, growing at rates of a few millimetres per million years. The natural rate at which sediments from surface waters reach the seafloor and accumulate on the seafloor is also very slow (a few millimetres per thousand years) when compared with those rates in coastal waters, resulting in crystal clear waters.¹² This latter fact is important for various reasons, most importantly because the deep pelagic and benthic communities have adapted to these conditions. For example, clear waters likely have played a significant role in the evolution and use of bioluminescence for communication between individuals (eg prey luring, predator startling, mate recognition).¹³ This is because particles in the water scatter light, meaning that light is not an efficient communication method in turbid conditions, but in crystal clear waters it suddenly becomes a useful mechanism in a dark environment. Further, deep pelagic animals are fragile, and large amounts of particles could harm them. As a last example, many animals that capture the sinking food particles have special adaptations to capture the low numbers of food particles in these waters efficiently. They likely lack adaptations to cope with increases in non-food particles (eg sediment particles from mining plumes) that would clog their filter-feeding apparatus (somehow comparable to a mechanical dust-filter that clogs more quickly when more dust is in the air). Likewise, biological processes that determine the resilience of the deep benthic ecosystems to disturbance events, such as growth, respiration, movement or colonisation, are also relatively slow when compared with other realms, due to conditions like the relatively low food availability and low temperatures.¹⁴ The pelagic

11 ISA, "Exploration Contracts", available at <<https://www.isa.org.jm/exploration-contracts/>> accessed 23 July 2024.

12 Hein et al (n 10).

13 S. H. Haddock et al, "Bioluminescence in the Sea" (2010) 2 *Ann Rev Mar Sci* 443–493; E. A. Widder, "Bioluminescence in the Ocean: Origins of Biological, Chemical, and Ecological Diversity" (2010) 328(5979) *Science* 704–708.

14 D. S. W. de Jonge et al, "Abyssal Food-Web Model Indicates Faunal Carbon Flow Recovery and Impaired Microbial Loop 26 Years after a Sediment Disturbance Experiment" (2020) 189 *Progress in Oceanography* 102446; C. R. McClain et al, "Energetics of Life on the Deep Seafloor" (2012) 109(38) *Proceedings of the National Academy of Sciences* 15366–15371; Smith et al (n 8).

ecosystem above polymetallic nodule regions often contain a layer of very low oxygen concentration (Oxygen Minimum Zone, often between 400 and 800 metres depth, depending on local conditions), which determines the distribution and behaviour of the pelagic faunas. At the same time, dynamic meso-scale eddies (circulating ocean currents) travel through the pelagic zone and can reach down to the seafloor, influencing and altering the benthic and pelagic conditions.¹⁵

Species-level biodiversity information is key for understanding ecosystems and tracking environmental impacts and effects. Biodiversity on and in the seafloor is very high in the CCZ, with many thousands of species in size classes ranging from microbes to megafauna (eg sponges, anemones, fishes),¹⁶ that dwell on the nodules, inside the nodules, on the sediment surface and within (Figure 9.1). To date, more than 5,000 animal species have been recorded in the CCZ, 90% of which are currently undescribed.¹⁷ Typically, animals are classified according to their size classes including meiofauna (>32 micrometres, <1 millimetre), macrofauna (>300 micrometres or >1 millimetre) and megafauna (visible with naked eye or >10 centimetres). Animal species can be identified based on their looks (classical morphology) and/or by their genetic code. For example, more than 600 morphotypes of invertebrate megafauna have been identified from images in the Western CCZ¹⁸ and within the macrofaunal size, also more than 600 species have been sampled.¹⁹ With environmental DNA (eDNA) techniques more than 1200 molecular taxonomic units (MOTUS) of meiofauna have been documented.²⁰ In addition, more than 6000 MOTUS

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- 15 J. N. Perelman et al, "Eddies and Fronts Influence Pelagic Communities Across the Eastern Pacific Ocean" (2023) 211 *Progress in Oceanography* 102967.
 - 16 M. Rabone et al, "How Many Metazoan Species Live in the World's Largest Mineral Exploration Region?" (2023) 33(12) *Current Biology* 2383–2396.e238; C. R. Smith et al, "Editorial: Biodiversity, Connectivity and Ecosystem Function Across the Clarion-Clipperton Zone: A Regional Synthesis for an Area Targeted for Nodule Mining" (2021) 8 *Frontiers in Marine Science*.
 - 17 Rabone et al (n 16).
 - 18 J. M. Durden et al, "Megafaunal Ecology of the Western Clarion Clipperton Zone" (2021) 8 *Frontiers in Marine Science* 671062.
 - 19 T. W. Washburn et al, "Patterns of Macrofaunal Biodiversity across the Clarion-Clipperton Zone: An Area Targeted for Seabed Mining" (2021) 8 *Frontiers in Marine Science* 626571.
 - 20 O. Laroche et al, "From Sea Surface to Seafloor: A Benthic Allochthonous eDNA Survey for the Abyssal Ocean" (2020) 7 *Frontiers in Marine Science* 682; F. Lejzerowicz et al, "Eukaryotic Biodiversity and Spatial Patterns in the Clarion-Clipperton Zone and Other Abyssal Regions: Insights from Sediment DNA and RNA Metabarcoding" (2021) 8 *Frontiers in Marine Science* 671033.

from foraminifera (amoeba-like, single celled protists) are known from this area.²¹ It is important to note that these high levels of biodiversity indicate that there can be high amounts of genetic resources, that is genetic information with potential for present and future research in for example pharmaceutical or material innovation.²²

However, biodiversity on and in the seafloor sediments still remains incompletely sampled at any given site, and it is estimated that potentially >8000 animal species exist in the CCZ.²³ In addition, species richness alone does not provide a sufficient basis for impact assessments, and factors such as biomass, abundance, and community composition remain understudied for most areas, especially in terms of natural variation in communities across space and time within the CCZ. Further, no information is available on how many non-animal species (ie microbes, viruses and others) may occur in the region, even though it is known that these organisms can play key roles in the functioning of the ecosystem.²⁴ In addition, genetic studies show that what is identified on photos or videos as one species it not necessarily a single species in reality. For example, brittle stars – one of the most common groups of megafauna in the CCZ – have been collected during several scientific expeditions from six exploration license areas and from one Area of Particular Environmental Interest (APEI) in the CCZ. Genetic analyses showed unexpected high brittle star diversity, with 43 detected ‘hidden’ species. More importantly, the majority of brittle star species had very limited distributions (that is, only found in one contract area) and none of the species occurred throughout all studied places in the CCZ.²⁵ The same patterns of a restricted geographic distribution within the CCZ hold true for smaller species, like macrofauna or foraminifera that often have been found only at single sites, and often have been collected only as single individuals.²⁶ This is critical for conservation, because species with low population abundances and restricted distribution ranges are particularly sensitive to extinction.

21 A. J. Gooday et al, “The Biodiversity and Distribution of Abyssal Benthic Foraminifera and Their Possible Ecological Roles: A Synthesis Across the Clarion-Clipperton Zone” (2021) 8 *Frontiers in Marine Science* 634726.

22 H. Harden-Davies, “Deep-sea genetic resources: New frontiers for science and stewardship in areas beyond national jurisdiction” (2017) 137 *Deep Sea Research Part II: Topical Studies in Oceanography* 504–513.

23 Rabone et al (n 16).

24 Gooday et al (n 21).

25 M. Christodoulou et al, “Unexpected High Abyssal Ophiuroid Diversity in Polymetallic Nodule Fields of the Northeast Pacific Ocean and Implications for Conservation” (2020) 17 *Biogeosciences* 1845–1876.

26 Gooday et al (n 21); Washburn et al (n 19).

The water column of the high seas in general, and in particular in the CCZ, has been scarcely studied.²⁷ Acoustic data from the CCZ suggest that daily vertical migration dynamics from micronekton (small fishes, small squids, crustaceans between 2 and 20 centimetres in size) are variable throughout the CCZ, influenced by the presence of the eastern Pacific Oxygen Minimum Zone and meso-scale eddies.²⁸ This can imply that pelagic micronekton communities are variable across space, as, for example, animals require specific adaptations to survive in low-oxygen conditions. There exist only a handful of data from the mesopelagic zone (200 to 1,000 metres depth) for the CCZ.²⁹ In 2021, The Metals Company was the first contractor to conduct pelagic baseline environmental studies, collecting data across the water column, ranging from physical and chemical variables to biological variables (microbes, zooplankton, and micronekton). These data have not been published yet and are expected to become available in 2025. Additional data from other areas within the CCZ are urgently needed to understand the density and diversity patterns in the CCZ water column. Similar efforts need to be replicated for other polymetallic nodule-rich areas, too.

2.2 *Hydrothermal Vents with Polymetallic Sulphides*

Other benthic ecosystems with rich mineral deposits are hydrothermal vents with polymetallic sulphides, also called seafloor massive sulphides, and, after polymetallic nodule resources, these have received the most interest for potential mining activities. In contrast to the polymetallic nodule fields, which span large and continuous areas on abyssal plains, the polymetallic sulphides are punctually located along mid-ocean ridges, back-arc basins (geologic basins found at some tectonic plate boundaries) and volcanic arcs, where hot and mineral-rich water is expelled from black smokers. Polymetallic sulphide deposits are therefore three-dimensional resources that can reach deep into the Earth's crust. At these active vent fields, that have roughly the size of a few football fields, polymetallic sulphide deposits form continuously until a vent

27 T. J. Webb et al, "Biodiversity's Big Wet Secret: The Global Distribution of Marine Biological Records Reveals Chronic Under-Exploration of the Deep Pelagic Ocean" (2010) 5 *PLOS ONE* e10223.

28 J. N. Perelman et al, "Mesopelagic Scattering Layer Behaviors Across the Clarion-Clipper-ton Zone: Implications for Deep-Sea Mining" (2021) 8 *Frontiers in Marine Science* 632764; Perelman et al (n 15).

29 V. J. Loeb, "Vertical Distribution and Composition of Ichthyoplankton and Invertebrate Zooplankton Assemblages in the Eastern Tropical Pacific" (1984) 13 *Biología Pesquera* 39–66; K. F. Wishner et al, "Ocean Deoxygenation and Zooplankton: Very Small Oxygen Differences Matter" (2018) 4(12) *Science Advances* eaau5180.

field becomes inactive (dormant) or extinct.³⁰ Within active vent fields, active and inactive sulphide mounds can be located.³¹ Currently, seven contracts for polymetallic sulphide exploration, each with a size of 10,000 km², broken up in 100 km² blocks, are issued in ABNJ.³² In addition, polymetallic sulphides are under exploration in areas within national jurisdiction, such as for example in Norway.³³

Ecological and geological processes at active hydrothermal vents are generally well known. In 1977, scientists discovered the existence of hydrothermal vents that forever changed our understanding of life on planet Earth.³⁴ The active vent environment is considered extreme, as the vent fluids, which exit through the Earth's crusts, can be very hot (ranging from 3° Celsius to over 400° Celsius), acidic, rich in toxic sulphide and poor in oxygen levels.³⁵ Depending on the geographic location, active vent fields can be very unstable, with natural disturbance events such as volcanic eruptions every few years, but others can be also stable with continuous and uninterrupted vent fluid emissions for thousands of years.³⁶ Vent fields that accumulated many minerals, as the ones currently explored for minerals on the Mid-Atlantic Ridge, are typically stable.

At active hydrothermal vents, many unique forms of life are thriving that are found nowhere else on our planet (Figure 9.1), providing numerous ecosystem functions that, in turn, offer a wealth of ecosystem services.³⁷ The vent

30 J. W. Jamieson and A. Gartman, "Defining Active, Inactive, and Extinct Seafloor Massive Sulfide Deposits" (2020) 117 *Marine Policy* 103926.

31 *ibid*; P.A. Rona, "TAG Hydrothermal Field: A Key to Modern and Ancient Seafloor Hydrothermal VMS Ore-Forming Systems" in *Mineral Deposit Research: Meeting the Global Challenge: Proceedings of the Eighth Biennial SGA Meeting Beijing, China, 18–21 August 2005* (Springer 2005) 687–690.

32 ISA (n 11).

33 V. Klesty, "Norway Parliament Votes in Favour of Seabed Mining, as Expected" (*Reuters*, 9 January 2024), available at <<https://www.reuters.com/business/environment/norway-parliament-votes-favour-seabed-mining-expected-2024-01-09/>> accessed 12 July 2024.

34 J. B. Corliss et al, "Submarine Thermal Springs on the Galapagos Rift" (1979) 203 *Science* 1073–1083.

35 C. L. Van Dover, *The Ecology of Deep-Sea Hydrothermal Vents* (Princeton University Press 2000).

36 D. J. Fornari et al, "East Pacific Rise Between 9°N and 10°N: Twenty-Five Years of Integrated, Multidisciplinary Oceanic Spreading Center Studies" (2012) 25(1) *Oceanography* 18–43; J. W. Jamieson, C. Galley, N. McNeil, and D. Sánchez Mora, "Evaluating Episodicity of High-Temperature Venting within Seafloor Hydrothermal Vent Fields" (2023) 606 *Earth and Planetary Science Letters* 118051.

37 DOSI, "Hydrothermal Vent Ecosystems" (2023) *Information Sheet*, available at <<https://www.dosi-project.org/wp-content/uploads/vents-ecosystems-info-sheet.pdf>> accessed 12 July 2024; Van Dover (n 35).

endemic organisms depend on chemical processes that result from the interaction of seawater and magma associated with underwater volcanoes for food provisioning. These animals are thus not primarily dependent on food production via photosynthesis, but their food-web is based on microorganisms that can use chemical energy from the vent fluids to live, grow and reproduce, in a process called chemosynthesis. These microorganisms can live independently of any other organisms (free-living), but can also occur in symbiosis with large animals such as unique tubeworms, mussels, snails or shrimp.³⁸ Such megafauna have developed special adaptations to survive and thrive at the extreme vent environment, and are a source of great evolutionary novelty, which may help us solve contemporary challenges. For example, the giant vent tubeworm blood has haemoglobin with exceptionally high oxygen affinity that is a potential template for artificial human blood, or the iron scales of vent snails provide bio-inspiration for stronger materials for airplanes, cars, and military equipment.³⁹ Some vent megafauna species can grow up to more than a metre in height, and provide structure and living-space for other highly abundant macro- and meiofauna.⁴⁰ Vent biodiversity is typically well known at well-studied active vents,⁴¹ and is site-specific with every vent field being unique.⁴²

Whilst in early years of vent research it was thought that active vents are isolated systems, now it is known that active vents influence the surrounding

38 Van Dover (n 35).

39 DOSI (n 37); C. L. Van Dover et al, "Scientific Rationale and International Obligations for Protection of Active Hydrothermal Vent Ecosystems from Deep-Sea Mining" (2018) 90 *Marine Policy* 20–28.

40 D. Desbruyères, M. Segonzac and M. Bright, *Handbook of Deep-Sea Hydrothermal Vent Fauna* (2nd ed, Denisia 2006); S. Gollner, B. Govenar, C. R. Fisher, and M. Bright, "Size Matters at Deep-Sea Hydrothermal Vents: Different Diversity and Habitat Fidelity Patterns of Meio- and Macrofauna" (2015) 520 *Marine Ecology Progress Series* 57–66.

41 D. Cuvelier et al, "Community Dynamics over 14 Years at the Eiffel Tower Hydrothermal Edifice on the Mid-Atlantic Ridge" (2011) 56 *Limnology and Oceanography* 1624–1640; C. Du Preez and C. R. Fisher, "Long-Term Stability of Back-Arc Basin Hydrothermal Vents" (2018) 5 *Frontiers in Marine Science* 54; S. Gollner et al, "Animal Community Dynamics at Senescent and Active Vents at the 9°N East Pacific Rise after a Volcanic Eruption" (2020) 6 *Frontiers in Marine Science* 832; L. Van Audenhaege et al, "Long-Term Monitoring Reveals Unprecedented Stability of a Vent Mussel Assemblage on the Mid-Atlantic Ridge" (2022) 204 *Progress in Oceanography* 102791.

42 S. Gollner et al, "Application of Scientific Criteria for Identifying Hydrothermal Ecosystems in Need of Protection" (2021) 132 *Marine Policy* 104641; N. van der Most et al, "Active Hydrothermal Vent Ecosystems in the Indian Ocean Are in Need of Protection" (2023) 9 *Frontiers in Marine Science* 1067912; Van Dover (n 37).

areas.⁴³ The fluids expelled by active vents and injected in the water column form what is called ‘vent plumes’. The species composition in the sediments surrounding active vents is highly influenced by the hydrothermal vent plume’s fall out.⁴⁴ The influence of vent plumes on the water column biodiversity is not well understood; although microbial communities in vent plumes generally differ from those in the surrounding waters and sediments, they can contain similar species.⁴⁵ These shared species suggest that matter and energy produced from chemosynthesis may be transferred to the pelagic food web.⁴⁶ Hydrothermal vent plumes can be small in volume,⁴⁷ but some plumes can extend hundreds of kilometres.⁴⁸ The crucial role of iron input by vents into the ocean is well recognised and includes direct links to photosynthetic primary production.⁴⁹ In addition, the pelagic environment plays an important role in connectivity between vents via the larval dispersal phases of various benthic species.⁵⁰

The inactive (dormant) vent structures located within active vents fields received until recently very little attention by scientists, and the biota and ecology are largely unknown.⁵¹ Inactive and dormant vent fields remain unexplored.

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- 43 L. Levin et al, “Hydrothermal Vents and Methane Seeps: Rethinking the Sphere of Influence” (2016) 3 *Frontiers in Marine Science* 72.
 - 44 L. Klunder et al, “A Molecular Approach to Explore the Background Benthic Fauna Around a Hydrothermal Vent and Their Larvae: Implications for Future Mining of Deep-Sea SMS Deposits” (2020) 7 *Frontiers in Marine Science* 134.
 - 45 G. J. Dick et al, “The Microbiology of Deep-Sea Hydrothermal Vent Plumes: Ecological and Biogeographic Linkages to Seafloor and Water Column Habitats” (2013) 4 *Frontiers in Microbiology* 124; S. Haalboom et al, “Patterns of (Trace) Metals and Microorganisms in the Rainbow Hydrothermal Vent Plume at the Mid-Atlantic Ridge” (2020) 17(9) *Biogeosciences* 2499–2519.
 - 46 B. T. Phillips, “Beyond the Vent: New Perspectives on Hydrothermal Plumes and Pelagic Biology” (2017) 137 *Deep Sea Research Part 11: Topical Studies in Oceanography* 480–485.
 - 47 *ibid.*
 - 48 N. R. Cohen et al, “Hydrothermal Trace Metal Release and Microbial Metabolism in the Northeastern Lau Basin of the South Pacific Ocean” (2021) 18(19) *Biogeosciences* 5397–5422.
 - 49 M. Ardyna et al, “Hydrothermal Vents Trigger Massive Phytoplankton Blooms in the Southern Ocean” (2019) 10(1) *Nature Communications* 2451; V. Chinni and S. K. Singh, “Dissolved Iron Cycling in the Arabian Sea and Sub-Tropical Gyre Region of the Indian Ocean” (2022) 317 *Geochimica et Cosmochimica Acta* 325–348.
 - 50 L. S. Mullineaux et al, “Exploring the Ecology of Deep-Sea Hydrothermal Vents in a Meta-community Framework” (2018) 5 *Frontiers in Marine Science* 49.
 - 51 C. L. Van Dover, “Inactive Sulfide Ecosystems in the Deep Sea: A Review” (2019) 6 *Frontiers in Marine Science* 461; C. L. Van Dover et al, “Research is Needed to Inform Environmental Management of Hydrothermally Inactive and Extinct Polymetallic Sulfide (PMS) Deposits” (2020) 121 *Marine Policy* 104183.

2.3 Seamounts with Cobalt-Rich Ferromanganese Crusts

The third ecosystem with mineral rich deposits are seamounts (mountains in the ocean) with cobalt-rich ferromanganese crusts.⁵² Currently five contracts for cobalt-rich crusts, each with a size of 3000 km², have been issued by the ISA and they are located in the West Pacific Ocean.⁵³ This resource deposit has, however, received far less attention than the other two deposit types, and we thus keep the section in this chapter short.

Like terrestrial mountains, seamounts exhibit a range of shapes and sizes. The three-dimensional structure of the seamounts accelerates water currents around them, generates upwelling of nutrients, and creates conditions for the retention of water masses, thereby increasing local productivity and external flow of organic matter.⁵⁴ Seamounts are diversity hotspots, and abundant and long-lived benthic filter feeders such as coral and sponges flank the mountains (Figure 9.1), and high biomasses of fishes are found in the surrounding water masses.⁵⁵ Only a small percentage of globally occurring seamounts have been sampled to date, and typically studies focus on seafloor megafaunal organisms, with little information available on seafloor macro- and meiofauna.⁵⁶ Owing to a paucity of data, it remains uncertain whether fauna associated with crusts differs from similar non-crust areas.⁵⁷

Seamounts are often hotspots for pelagic biodiversity, meaning that higher species richness and biomass can be found near and around seamounts, and this 'seamount effect' can extent 30 to 40 kilometres away from the seamount summit.⁵⁸ Seamounts may be areas of special interest with regards to

52 Gollner et al (n 6).

53 ISA (n 11).

54 M. R. Clark et al, "The Ecology of Seamounts: Structure, Function, and Human Impacts" (2010) 2 *Annual Review of Marine Science* 253–278; J. C. Drazen et al, "Near-Island Enhancement in Mesopelagic Micronekton Assemblages off Hawai'i" (2023) 199 *Deep Sea Research Part 1: Oceanographic Research Papers* 104107; A. B. Leitner, A. B. Neuheimer and J. C. Drazen, "Evidence for Long-Term Seamount-Induced Chlorophyll Enhancements" (2020) 10 *Scientific Reports* 12729.

55 Clark et al (n 54); T. Morato et al, "Seamounts Are Hotspots of Pelagic Biodiversity in the Open Ocean" (2010) 107 *Proceedings of the National Academy of Sciences* 9707–9711.

56 K. H. George, "Faunistic Research on Metazoan Meiofauna from Seamounts – A Review" (2013) 20 *Meiofauna Marina* 1–32; D. Zeppilli et al, "Changes in Nematode Communities in Different Physiographic Sites of the Condor Seamount (North-East Atlantic Ocean) and Adjacent Sediments" (2014) 9(12) *PLOS ONE* e115601.

57 T. A. Schlacher et al, "Seamount Benthos in a Cobalt-Rich Crust Region of the Central Pacific: Conservation Challenges for Future Seabed Mining" (2014) 20(5) *Diversity and Distributions* 491–502.

58 Morato et al (n 55).

management of large pelagic predators, including tunas and sharks.⁵⁹ For example, highly migratory species, such as tunas, may use seamounts during their long-distance migration as navigational aids.⁶⁰

3 Mining Impacts to the Marine Environment

Mining-tests and environmental impact studies have been performed for polymetallic sulphides⁶¹ and polymetallic nodules,⁶² and once for cobalt-rich crusts.⁶³ Because the study of the possible impacts of mining seamounts is still in a very preliminary stage, the following discussion will focus on sulphide and nodule mining impacts. Mining activities would produce a range of different types of impacts and effects to the environment, many of which are shared amongst the three deposit types (Figure 9.1). First, collector vehicles would cause mortality and removal of organisms living on the mined substrata. Second, the removal of the substrata and modification of other substrates surrounding it, such as the soft sediment, by the action of the collectors would mean the loss, fragmentation or modification (ie change of metal and sediment composition, topography, chemical regimes) of suitable habitats for many species. Third, sound and electromagnetic radiation produced by mining instruments would likely affect behaviour, feeding and reproductive habits of species. Last, impacts would also comprise the formation of sediment plumes (that is, 'clouds' of sediment that travel through the water column) by the activity of collector vehicles, other seabed installations and the riser system (to transport collected materials from collector vehicles to support vessels) and/or processed material

59 *ibid.*

60 K. N. Holland and R. D. Grubbs, "Fish Visitors to Seamounts: Tunas and Billfish at Seamounts" in T. J. Pitcher et al (eds), *Seamounts: Ecology, Fisheries & Conservation* (Blackwell Publishing 2007) 189–201.

61 T. W. Washburn et al, "Impacts of the First Deep-Sea Seafloor Massive Sulfide Mining Excavation Tests on Benthic Communities" (2023) 712 *Marine Ecology Progress Series* 1–19.

62 D. O. B. Jones et al, "Biological Responses to Disturbance from Simulated Deep-Sea Polymetallic Nodule Mining" (2017) 12(2) *PLOS ONE* e0171750; C. Muñoz-Royo et al, "An In Situ Study of Abyssal Turbidity-Current Sediment Plumes Generated by a Deep Seabed Polymetallic Nodule Mining Preprototype Collector Vehicle" (2022) 8(38) *Science Advances* eabn1219; E. Simon-Lledó et al, "Biological Effects 26 Years After Simulated Deep-Sea Mining" (2019) 9(1) *Scientific Reports* 8040; ISA, "Environmental Impact Assessments", available at <<https://www.isa.org.jm/protection-of-the-marine-environment/environmental-impact-assessments/>> accessed 1 January 2025.

63 T. Washburn et al, "Seamount Mining Test Provides Evidence of Ecological Impacts Beyond Deposition" (2023) 33 *Current Biology*.

discharged from the ship (return or discharge plume).⁶⁴ The sediment plumes released in the water column may also have an increased metal concentration from metals leaking out of broken ore, and can therefore be toxic. Further, the water properties from the discharge plume will likely be different in chemistry properties (eg temperature, pH, oxygen concentration) compared to the water layer in which it is discharged to, which can potentially influence pelagic communities.⁶⁵ Depending on the depth of release, the impacts from metal-laden sediment plumes in the water column on organism (eg changes in feeding, growth, reproductive and survival rates, as well as behavioural effects including via changes in diurnal vertical migration) may be extended to surface waters and may affect even commercially important species such as tunas.⁶⁶ Eventually, the sediment and other substances in the plume would sink down to the seafloor and deposit over the benthic species affecting the benthic environment.

3.1 *Mining Impacts: Polymetallic Nodules*

Recently, polymetallic nodule mining-tests have been carried out in the CCZ, in 2021 by the DEME-GSR company, and in 2022 by The Metals Company.⁶⁷ The majority of the biological data from these tests still needs to be made available, ideally via scientific peer-reviewed articles. Initial findings based on collector plume dynamics (based on plumes that were generated for only few hours) indicate that this type of plume does not extend very high into the water column (up to a few metres), and behaves as a turbidity current, meaning that the spread of most of the plume is determined by its own weight rather than background current dynamics.⁶⁸ Such behaviour encourages flocculation, meaning that sediment particles stick together and sink, which can limit plume

64 J. C. Drazen et al, “Midwater Ecosystems Must Be Considered When Evaluating Environmental Risks of Deep-Sea Mining” (2020) 117(30) *PNAS* 17455–17460; Gollner et al (n 6); H. U. Oebius et al, “Parametrisation and Evaluation of Marine Environmental Impacts Produced by Deep-Sea Manganese Nodule Mining” (2001) 48(17–18) *Deep Sea Research Part 11: Topical Studies in Oceanography* 3453–3467; C. L. Van Dover, “Impacts of Anthropogenic Disturbances at Deep-Sea Hydrothermal Vent Ecosystems: A Review” (2014) 102 *Marine Environmental Research* 59–72.

65 K. W. Bruland, R. Middag and M. C. Lohan, “8.2 – Controls of Trace Metals in Seawater” in H. D. Holland and K. K. Turekian (eds), *Treatise on Geochemistry* (2nd ed, Elsevier 2013) 19–51; S. Fuchida et al, “Onboard Experiment Investigating Metal Leaching of Fresh Hydrothermal Sulfide Cores into Seawater” (2018) 19 *Geochemical Transactions* 15.

66 Drazen et al (n 64).

67 ISA (N 62).

68 Muñoz-Royo et al (n 62).

spread.⁶⁹ It is important to note that roughly 10% of the plume does not settle which can still represent tens to hundreds times increase in particle concentrations compared to natural background conditions,⁷⁰ and which can still imply serious risk to deep-sea organisms.⁷¹ Further, predicting plume spread (and thus impact on organisms) under the assumption of full-scale mining operations (24 hours, every day per year, multiple vehicles on the seafloor, different seafloor morphology and mining-pattern) is currently impossible (NORI-D Environment Program Update, pers. comm., 21.11.2023).

Benthic impact experiments that simulated mining have been conducted in the CCZ and in other regions since the late 1970s and provide valuable insights considering the timescale of impacts.⁷² Impacts are often severe directly after a disturbance on the sediment, with a reduction in density and diversity in most benthic faunal groups. Most of the studies show some recovery of density and diversity, especially for the smaller fauna (meiofauna) and mobile megafauna, but biological impacts in many groups of organisms remain after at least two decades.⁷³ In terms of ecosystem functions, studies show that the food-web functioning and the microbial loop had not recovered 26 years after impact.⁷⁴ One mining test generated an artificial discharge plume, but did not collect any data on biological effects, and thus understanding pelagic impacts remains a major data gap. Effects from sediment plumes on deep pelagic organisms is lacking,⁷⁵ and only one peer-reviewed study has been published on a deep pelagic organismal response to sediment plumes.⁷⁶

69 *ibid.*

70 W. D. Gardner, M. J. Richardson and A. V. Mishonov, "Global assessment of benthic nepheloid layers and linkage with upper ocean dynamics" (2018) 482 *Earth and Planetary Science Letters* 126–134.

71 J. M. A. van der Grient and J. C. Drazen, "Evaluating Deep-Sea Communities" Susceptibility to Mining Plumes Using Shallow-Water Data" (2022) 852 *Science of The Total Environment* 158162.

72 De Jonge et al (n 14); Jones et al (n 62).

73 J. C. Drazen et al, "Observations of Deep-Sea Fishes and Mobile Scavengers from the Abyssal DISCOL Experimental Mining Area" (2019) 16(16) *Biogeosciences* 3133–3146; Gollner et al (n 6); Jones et al (n 62).

74 De Jonge et al (n 14); T. Stratmann et al, "Abyssal Plain Faunal Carbon Flows Remain Depressed 26 Years After a Simulated Deep-Sea Mining Disturbance" (2018) 15(13) *Biogeosciences* 4131–4145.

75 van der Grient and Drazen (n 71).

76 V. I. Stenvers et al, "Experimental Mining Plumes and Ocean Warming Trigger Stress in a Deep Pelagic Jellyfish" (2023) 14(1) *Nature Communications* 7352.

After mining, the duration of the effects on the fauna and ecosystem functions associated with the nodules can be expected to remain for million years, since that is the growth rate of polymetallic nodules.⁷⁷ This includes not only loss of nodule-specific microbial communities,⁷⁸ nodule-dependent epifauna such as sponges, corals and anemones,⁷⁹ but also the faunas living in the nodule's crevices.⁸⁰ Effects of nodule removal will extend beyond the nodule dependent organisms, as for example sponges or corals provide essential links in the food web.⁸¹ Thus, a polymetallic nodule field that is mined would experience a shift to a different ecosystem devoid of nodules and nodule-associated biodiversity and functions on geological timescales.⁸²

The area of impact on the seafloor will be large in geographic extent with potentially tens to hundred thousands of km². The nodule contract areas are large themselves and, as explained above, nodules are a 2-dimensional resources requiring large areas to be mined.⁸³ Further, the spread of sediment plumes will extend the area of impact, but by how much is still unclear. Tests based on short-term (hours) mining activities show the spread may be up to a few kilometres, but whether this will be true also for longer activities (weeks, months) and larger areas where turbidity currents may affect each other, is not known.⁸⁴ Mining plumes in the pelagic environment via discharges will be larger, and possibly hundreds of km in length.⁸⁵

77 Gollner et al (n 6).

78 M. Molari et al, "The Contribution of Microbial Communities in Polymetallic Nodules to the Diversity of the Deep-Sea Microbiome of the Peru Basin (4130–4198 m Depth)" (2020) 17(12) *Biogeosciences* 3203–3222.

79 A. Vanreusel et al, "Threatened by Mining, Polymetallic Nodules are Required to Preserve Abyssal Epifauna" (2016) 6 *Scientific Reports* 26808.

80 E. Pape et al, "Potential Impacts of Polymetallic Nodule Removal on Deep-Sea Meiofauna" (2021) 11 *Scientific Reports* 19996.

81 T. Stratmann et al, "Polymetallic Nodules Are Essential for Food-Web Integrity of a Prospective Deep-Seabed Mining Area in Pacific Abyssal Plains" (2021) 11 *Scientific Reports* 12238.

82 Gollner et al (n 6).

83 C. R. Smith et al, "Deep-Sea Misconceptions Cause Underestimation of Seabed-Mining Impacts" (2020) 35(10) *Trends in Ecology & Evolution* 853–857.

84 Muñoz-Royo et al (n 62).

85 C. Muñoz-Royo et al, "Extent of Impact of Deep-Sea Nodule Mining Midwater Plumes Is Influenced by Sediment Loading, Turbulence and Thresholds" (2021) 2(1) *Communications Earth & Environment* 148.

3.2 Mining Impacts: Polymetallic Sulphides

Test-mining on polymetallic sulphides was only carried out in national waters of Japan,⁸⁶ and was planned at Solwarai in national waters of Papua New Guinea. For the latter, the company Nautilus Minerals published an Environmental Impact Assessment in 2008,⁸⁷ which was criticised for its incompleteness, and the project failed before the extraction phase could commence but testing was revived in 2024.⁸⁸ In Okinawa, small scale test-mining at an inactive sulphide mound revealed that, after three years, mining impacts persisted, especially for the larger macrofauna.⁸⁹ No water column data on biological effects were collected. Given the effect of vent plumes on the wider community, and mining plume effects, this represents a major data gap.

Scientific drilling operations can provide information on potential mining impacts as, similar to the potential future mining operations, deposits are removed. Vent bivalve fields in the Okinawa through were monitored for three years after drilling had started nearby at a site called 'C0014'. Directly after drilling, the bivalve fields were buried with drilling deposits. Several months after drilling new high-temperature hydrothermal fluid began to discharge from the sedimentary seafloor in the area of over 20 metres from the drill holes, 'artificially' creating a new hydrothermal vent habitat, as the fluid pathways had been permanently changed by drilling. Major changes in faunal communities were observed, and the ecosystem was altered long-term.⁹⁰

86 N. Okamoto, "World's First Lifting Test for Seafloor Massive Sulphides in the Okinawa Trough in the EEZ of Japan" (2019) *The 29th International Ocean and Polar Engineering Conference*, ISOPE-I-19-655.

87 Nautilus Minerals Niugini Limited, "Environmental Impact Statement: Solwarai Project" (2008) DSM Observer, available at <<https://dsmobserver.com/wp-content/uploads/2017/05/Environmental-Impact-Statement-Executive-Summary-English-1.pdf>> accessed 1 January 2025

88 R. Steiner, "Independent Review of the Environmental Impact Statement for the Proposed Nautilus Minerals Solwarai Project" (2009), available at <oceanfdn.org/sites/default/files/Independent%20Review%20of%20the%20Environmental%20Impact%20Statement%20for%20the%20proposed%20Nautilus%20Mineral%20Solwarai%201%20Seabed%20Mining%20Project%20Papua%20New%20Guinea.pdf> accessed 1 January 2025; *Solwarai Project Update*, available at <<https://sms.je>> accessed 1 January 2025.

89 Washburn et al (n 61).

90 R. Nakajima et al, "Post-Drilling Changes in Seabed Landscape and Megabenthos in a Deep-Sea Hydrothermal System, the Iheya North Field, Okinawa Trough" (2015) 10(4) *PLOS ONE* e0123095.

4 Why Are Non-use Measures Needed for Deep-Seabed Mineral Exploitation?

The scientific information as described above forms the basis for environmental management of deep-seabed mining,⁹¹ including the definition and adoption of non-use measures or no-mining zones. Current non-use measures are developed through Regional Environmental Management Plans (REMPs) by the ISA, and are discussed by Menini et al in chapter 11. We here provide a short overview on the scientific rationale for the need of non-use measures.

4.1 *Non-use at Polymetallic Nodule Fields*

From a science perspective, there is currently not sufficient environmental knowledge to enable evidence-based decision-making regarding environmental management, including whether to proceed with mining of polymetallic nodules.⁹² In other words, we currently know too little about the deep-sea environment to evaluate if all nodule fields globally would need protection, what measures would enable protection of biodiversity and ecosystem functions and services, or how to apply any measures effectively. However, there is scientific evidence that (1) at the mined location the ecosystem would undergo changes in biodiversity and ecosystem functions for potentially millions of years and permanent species losses and (2) that nodules are required to preserve nodule associated fauna.⁹³

Underlying reasons for this ‘too little’ knowledge lie in the complexity of the polymetallic nodule ecosystem. Polymetallic nodule fields provide home for hyper-diverse communities, with the large majority of species yet undescribed, and with many ecosystem functions unknown, resulting in high uncertainty regarding impacts and recovery. Nodule fields cover rather large areas in specific regions, but there is increasing evidence that these nodule fields are not uniform but instead diversity differs on small geographic scale.⁹⁴ How the

91 Amon et al (n 1).

92 *ibid.*

93 Gollner et al (n 6); H. J. Niner et al, “Deep-Sea Mining with No Net Loss of Biodiversity – An Impossible Aim” (2018) 5 *Frontiers in Marine Science* 53; C. L. Van Dover et al, “Biodiversity Loss from Deep-Sea Mining” (2017) 10 *Nature Geoscience* 464–465; Vanreusel et al (n 79).

94 P. Bonifácio, P. Martinez Arbizu and L. Menot, “Alpha and Beta Diversity Patterns of Polychaete Assemblages across the Nodule Province of the Clarion-Clipperton Fracture Zone (Equatorial Pacific)” (2020) *Biogeosciences Discussions* 1–38; Christodoulou et al (n 25); K. Uhlenkott et al, “Meiofauna in a Potential Deep-Sea Mining Area – Influence of Temporal and Spatial Variability on Small-Scale Abundance Models” (2020) 13(1) *Diversity* 3.

spatial and temporal biodiversity variability translates to ecosystem functions is not known, but knowledge of both is necessary to accurately assess environmental impacts and effects and develop conservation tools. It is worth noting that environmental benthic baseline data collected by Contractors under exploration licenses have provided the necessary information to show the high spatial variability, yet within each studied Contract Area there remains high uncertainty regarding natural temporal variability in benthic biological communities. The same efforts have not been applied to the pelagic ecosystem, and this region remains largely unknown with regards to spatial and temporal variability.

Ecological processes at polymetallic nodule fields, including recovery, are very slow. Nodule removal implies loss of all nodule-associated organisms and functions on million-year time scales. There is currently no scientific evidence that restoration is possible in the deep sea, and the evaluation of the first restoration experiments are expected to take decades.⁹⁵ Whilst impacts at mined locations can be classified as permanent and thus severe, it is much more challenging to evaluate how small-scale local loss of biodiversity, communities and functions translates to the regional scale. There are currently no developed thresholds for impacts related to nodule removal, and thus no basis to determine what would be the geographical extent required of non-use measures. It remains to be determined what size of area mined would already represent significant harm, or if mining larger areas would be in accordance with the requirement to protect the marine environment posed by Article 145 of UNCLOS. Such evaluation needs to consider not only the direct impacts of nodule removal, but also impacts in the benthic and pelagic environment through, potentially toxic, sediment plumes, and sound and light pollution. Mining plume thresholds for sediment particle concentrations will likely be low given the naturally low particle concentrations in the deep-sea environments.⁹⁶ Studies on regional scale biodiversity, ecosystem function and mining impacts are necessary to conclude on the needed extent of non-use measures.⁹⁷

It has become evident that the current non-use measures in the form of APEIs⁹⁸ in the CCZ are not sufficient to ensure the effective protection of the marine environment. Due to the lack of knowledge available on biodiversity and ecosystems, the APEIs were defined based on environmental proxies.

95 D. Cuvelier et al, "Potential Mitigation and Restoration Actions in Ecosystems Impacted by Seabed Mining" (2018) 5 *Frontiers In Marine Science* 467; S. Gollner et al, "Restoration Experiments in Polymetallic Nodule Areas" (2022) 18(3) *Integrated Environmental Assessment and Management* 682–696.

96 van der Grient and Drazen (n 71).

97 Amon et al (n 1).

98 See also Menini et al in chapter 11.

However, more recently the few existing studies have shown that the APEIS are only partly representative of benthic communities found in exploration areas⁹⁹ and thus do not meet the purpose of preserving the biodiversity and ecosystem function of the adjacent contract areas or the CCZ as a whole.¹⁰⁰ Further, because of the strong influence of the Eastern Tropical Pacific Oxygen Minimum Zone across the CCZ on the dynamics of mesopelagic animals, it is likely that pelagic communities differ across the CCZ, too.¹⁰¹ Finally, the current lack of non-use measures within exploration contract areas is problematic, as recent research showed that species may have very limited distribution and thus could be at extinction risk even within a contract area.

4.2 *Non-use at Vents*

From a science perspective, we know enough to proceed with the protection of active hydrothermal vent fields, and to call for global non-use measures.¹⁰² Active vents require protection as they are unique, vulnerable and have many non-extractive values, which could be dramatically altered or lost in case mining is allowed.¹⁰³

Scientific assessment on field-by-field basis showed that all active vent fields that are currently under polymetallic sulphide exploration in the area meet criteria for vulnerability, sensitivity, ecological and biological significance,¹⁰⁴ which is an argument to protect vent ecosystems. The applied criteria have been developed by the Food and Agriculture Organization for Vulnerable Marine Ecosystems, by the Convention on Biological Diversity for Ecologically or Biologically Significant Areas, and by the International Maritime Organization for Particularly Sensitive Sea Areas, and include (1) uniqueness and rarity, (2) functional significance, (3) fragility, (4) life history traits that make recovery difficult, (5) structural complexity, (6) biological diversity, (7) biological productivity, (8) naturalness, and a new derived criterion on (9) ecosystem services. In short, hydrothermal vent fields globally share fundamental ecological characters relevant to these criteria. Vent-fields host small, island-like ecosystems where the highly adapted vent-endemic organisms live in high densities.

99 D. O. B. Jones et al, "Environment, Ecology, and Potential Effectiveness of an Area Protected from Deep-Sea Mining (Clarion Clipperton Zone, Abyssal Pacific)" (2021) 197 *Progress in Oceanography* 102653.

100 C. Blanchard and S. Gollner, "Area-Based Management Tools to Protect Unique Hydrothermal Vents from Harmful Effects from Deep-Sea Mining: A Review of Ongoing Developments" (2022) 4 *Frontiers in Political Science*. See further Menini et al in chapter 11.

101 Perelman et al (n 28).

102 Van Dover et al (n 39).

103 *ibid.*

104 Gollner et al (n 42); van der Most et al (n 42).

All active vents support primary production by microorganisms and offer abundant food in an otherwise rather food-depleted deep sea. Active vents are fragile, since they are geographically isolated and discrete, hosting animals that rely on dispersal through the pelagic zone. Active vents are structurally complex with complex gradients of geological, geochemical and thermal conditions that correlate with zonation of microbes and animals. The biodiversity of microbes is very rich, and vent-endemic animal species contribute to most relevant, novel diversity discoveries.¹⁰⁵

The ecosystem services at active vents are extraordinary.¹⁰⁶ Vents regulate and support carbon sequestration by the biological pump or by microbial oxidation of the greenhouse gas methane.¹⁰⁷ The fluids inject major sources of iron into our ocean, a trace element that controls marine productivity in the global ocean.¹⁰⁸ The living resources, animals and microbes, offer provisioning services such as rich marine genetic resources, bioprospecting or bioinspired materials.¹⁰⁹ These values, which could be dramatically altered or lost in case mining is allowed, call for the global protection of active vent fields.¹¹⁰

5 Conclusion

The biodiversity in both the mineral-rich deep-sea polymetallic nodule fields and vent ecosystems stands out for its uniqueness, rarity and high level of specialisation. While the data available to evaluate the potential risk in terms of biodiversity loss for each type of ecosystem differs, it is highly likely that there cannot be mineral exploitation without a significant loss of species, because of the restricted distribution of animal species populations, their very specific environmental requirements and/or the fragility of the ecosystems. This conclusion is well supported by the available data on vent ecosystems, while for the nodule fields it is the lack of data that underlines the necessity for a precautionary approach. This is augmented by the knowledge of the plethora of

¹⁰⁵ Gollner et al (n 42).

¹⁰⁶ DOSI (n 37).

¹⁰⁷ C. Cathalot et al, "Hydrothermal Plumes as Hotspots for Deep-Ocean Heterotrophic Microbial Biomass Production" (2021) 12(1) *Nature Communications* 6861; G. J. Dick, "The microbiomes of deep-sea hydrothermal vents: Distributed globally, shaped locally" 2019 17(5) *Nature Reviews Microbiology* 271–283; N. Le Bris et al, "Hydrothermal energy transfer and organic carbon production at the deep seafloor" (2019) 5 *Frontiers in Marine Science* 531.

¹⁰⁸ M. Ardyna, "Hydrothermal vents trigger massive phytoplankton blooms in the southern ocean" (2019) 10(1) *Nature Communications* 2451; Cohen et al (n 48).

¹⁰⁹ Van Dover et al (n 39).

¹¹⁰ *ibid.*

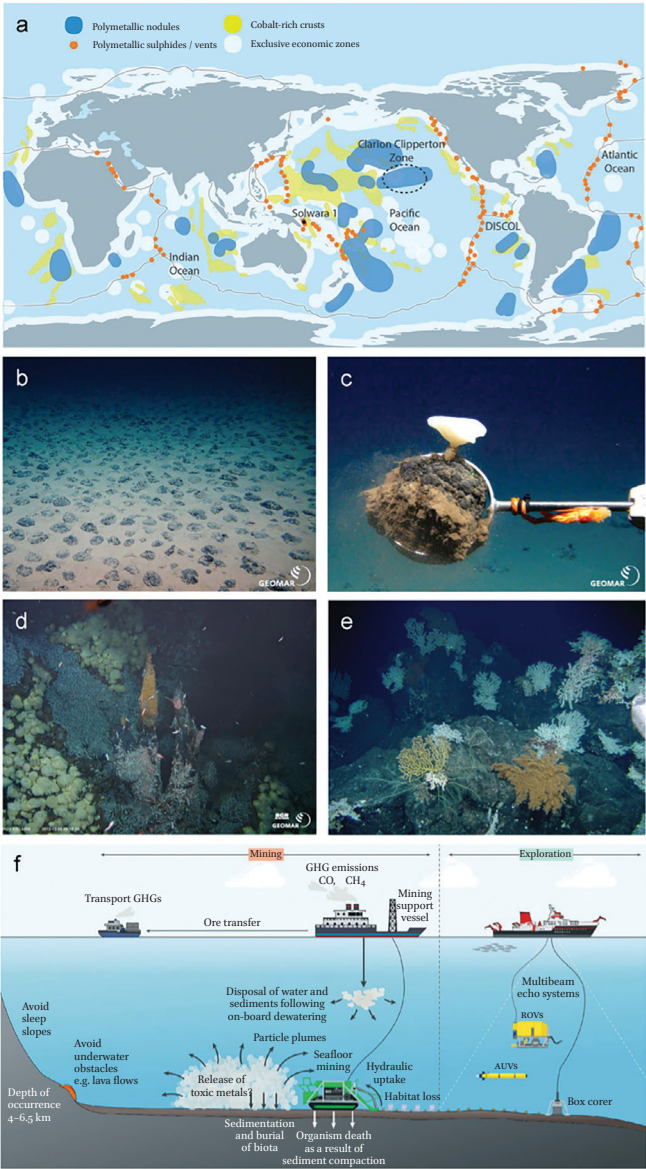


FIGURE 9.1 (a) A global map of areas of the seabed with known regions of mineral resources. (b) Polymetallic nodule field in the CCZ. (c) Nodule with associated sponge (ROV manipulator holding the nodule). (d) Active hydrothermal vent (Kairei, Indian Ocean) colonized by shrimp, anemones and mussels. (e) Seamount with corals (near Menez Gwen, Atlantic Ocean). (f) Components of a polymetallic-nodule-mining project and environmental mining impacts

USE LICENSES: (A) MILLER ET AL. 2018 DOI.ORG/10.3389/FMARS.2017.00418 (CC-BY); (B), (C), (D) AND (E): GOLLNER ET AL (N 6) (CCC 5857000335168); (F) HEIN ET AL (N 10) (CCC 5857020266635)

ecosystem services essential for life on Earth provided by these ecosystems, including the high likelihood that microbial and animal species in nodule fields, seamounts and vents yield an enormous number of genetic resources with the potential to improve human quality of life. Because of this, any “biodiversity loss in the deep-sea requires public, transparent, and well-informed consideration, as well as wide agreement”.¹¹¹ Therefore, implementing non-use measures that protect deep-sea biodiversity is crucial to ensure that the ecosystem services provided by this biodiversity are maintained for current and future generations in support of equitable use of our oceans.¹¹²

Acknowledgements

This work received financial support from the UU-NIOZ project Protecting deep seabed hydrothermal vent fields through area-based management tools (to Sabine Gollner and Erik Molenaar) and from the DEEP REST project that was funded through the 2020–2021 Biodiversa and Water JPI joint call for research projects, under the BiodivRestore ERA-NET Cofund (GA N°101003777), with the EU and the following funding organisations: Agence Nationale de la Recherche (ANR-21-BIRE-0003), France, Ministry of Agriculture, Nature and Food Quality (LNV), Netherlands, Research Foundation – Flanders (FWO), Belgium, German Federal Ministry of Research (BMBF) through VDI/VDE-IT, Germany, Environmental Protection Agency (EPA), Ireland, Fundação para a Ciência e a Tecnologia (FCT), Portugal, Fundo Regional para a Ciência e Tecnologia (FRCT), Portugal-Azores and State Research Agency (AEI), Spain.

¹¹¹ Niner et al (n 93).

¹¹² A. Jaeckel et al, “Deep seabed mining lacks social legitimacy” 2023 2(1) *Ocean Sustainability* 1.

Non-use Measures for Deep-Seabed Mining in the Area

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1 Introduction

Deep-seabed mining (DSM) has become a contested topic. While a handful of companies and States are keen to start extracting minerals, such as copper, nickel, and cobalt, from the bottom of the deep ocean, the voices calling instead for a moratorium on seabed mining are becoming louder. As of 1 November 2024, some 32 States have called for a moratorium or pause on DSM¹ and they are joined by parliamentarians,² scientists,³ Indigenous elders,⁴ financial institutions and major companies,⁵ fisheries organisations,⁶ and civil society organisations.⁷ Additionally, some international bodies have also called for a DSM moratorium, including the UN Human Rights Commissioner,⁸ the

1 For a list actors calling for a moratorium on DSM, see: Deep Sea Conservation Coalition, “Momentum for a Moratorium”, available at <<https://deep-sea-conservation.org/solutions/no-deep-sea-mining/momentum-for-a-moratorium/>> accessed 24 July 2024.

2 *ibid.*

3 See European Academies Science Advisory Council Deep-Sea Mining, “Assessing Evidence on Future Needs and Environmental Impacts” (June 2023), available at <https://easac.eu/fileadmin/user_upload/EASAC_Deep_Sea_Mining_Web_publication_.pdf> accessed 24 July 2024; Deep-Sea Mining Science Statement, “Marine Expert Statement Calling for a Pause to Deep-Sea Mining” (*Deep-Sea Mining Science Statement*), available at <<https://seabedmining.sciencestatement.org/>> accessed 24 July 2024.

4 Blue Climate Initiative, “Indigenous Voices for a Ban on Deep Sea Mining”, available at <<https://www.blueclimateinitiative.org/say-no-to-deep-sea-mining>> accessed 24 July 2024.

5 Deep Sea Conservation Coalition, “Voices Calling for a Moratorium: Companies and Finance”, available at <<https://deep-sea-conservation.org/solutions/no-deep-sea-mining/momentum-for-a-moratorium/companies-and-finance/>> accessed 24 July 2024.

6 Deep Sea Conservation Coalition, “Voices Calling for a Moratorium: Ocean Users”, available at <<https://deep-sea-conservation.org/solutions/no-deep-sea-mining/momentum-for-a-moratorium/ocean-users/>> accessed 24 July 2024.

7 Deep Sea Conservation Coalition, “Voices Calling for a Moratorium: NGOs and Community Groups”, available at <<https://deep-sea-conservation.org/solutions/no-deep-sea-mining/momentum-for-a-moratorium/ngos-and-community-groups/>> accessed 24 July 2024.

8 See eg V. Turk, “Tweet content” (*Twitter*, 10 July 2023), available at <https://x.com/volker_turk/status/1678411484076953603> accessed 28 July 2024; United Nations Office of the

Conference of the Parties to the Convention on Biological Diversity (CBD)⁹ and the Convention on Migratory Species (CMS),¹⁰ as well as the International Union for Conservation of Nature (IUCN) Congress.¹¹ The terminology used by those opposed to DSM is inconsistent and ranges from a 'precautionary pause' to a moratorium or ban. The nuances among these non-use measures are explored in section 3.1 below.

Those opposed to DSM are chiefly concerned about the potentially serious impacts seabed mining could have on the marine environment. While other concerns, such as effective governance, including monitoring and enforcement, do play a role,¹² the environmental risks appear to be the most commonly stated concern. A growing body of scientific literature highlights the risks of deep-seabed mining for biodiversity,¹³ ecosystem services,¹⁴ fisheries,¹⁵ and marine ecosystems in general.¹⁶

High Commissioner for Human Rights, "Key Human Rights Considerations on the Impact of Seabed Mining" (*United Nations Human Rights* 2023), available at <<https://www.ohchr.org/sites/default/files/documents/issues/climatechange/information-materials/ohchr-seabed-mining-10-july.pdf>> accessed 4 April 2024.

- 9 CBD COP, "Decision 15/24 – Conservation and Sustainable Use of Marine and Coastal Biodiversity" (19 December 2022) CBD/COP/DEC/15/24 para 16.
- 10 CMS COP, "Deep-Seabed Mineral Exploitation Activities and Migratory Species" (February 2024) UNEP/CMS/Resolution 146.
- 11 IUCN, "Resolution 122 – Protection of Deep-Ocean Ecosystems and Biodiversity through a Moratorium on Seabed Mining" (22 September 2021) WCC-2020-Res-122-EN.
- 12 P. A. Singh, A. Jaeckel and J. A. Ardron, "A pause or moratorium for deep-seabed mining in the Area? The legal basis, potential pathways, and possible policy implications" (2025) 56 *Ocean Development & International Law* 18.
- 13 H. J. Niner et al, "Deep-Sea Mining With No Net Loss of Biodiversity – An Impossible Aim" (2018) 5 *Frontiers in Marine Science* 53.
- 14 L. Brander and V. G. Goni, "Report on the Value of Ecosystem Services and Natural Capital of the Area" (2023) *ISA Consultant Report*, available at <<https://www.isa.org.jm/wp-content/uploads/2023/06/Report-on-Valuation-of-ecosystem-services.pdf>> accessed 12 June 2023; J. T. Le, L. A. Levin and R. T. Carson, "Incorporating Ecosystem Services into Environmental Management of Deep-Seabed Mining" (2017) 137 *Deep-Sea Research Part 11: Topical Studies in Oceanography* 486; B. N. Orcutt et al, "Impacts of Deep-Sea Mining on Microbial Ecosystem Services" 2018 *BioRxiv* 463992.
- 15 J. C. Drazen et al, "Midwater Ecosystems Must Be Considered When Evaluating Environmental Risks of Deep-Sea Mining" (2020) 117 *Proceedings of the National Academy of Sciences of the United States of America* 17455; B. Christiansen, A. Denda and S. Christiansen, "Potential Effects of Deep Seabed Mining on Pelagic and Benthopelagic Biota" (2020) 114 *Marine Policy* 103442.
- 16 L. A. Levin, D. J. Amon and H. Lily, "Challenges to the Sustainability of Deep-Seabed Mining" (2020) 3 *Nature Sustainability* 784; T. W. Washburn et al, "Ecological Risk Assessment for Deep-Sea Mining" (2019) 176 *Ocean and Coastal Management* 24.

Any future seabed mining on the seafloor beyond national jurisdiction, designated as the 'Area' by the United Nations Convention on the Law of the Sea (UNCLOS),¹⁷ will be subject to the governance regime established by Part XI of UNCLOS, under which the International Seabed Authority (ISA) has exclusive jurisdiction over mineral exploration and exploitation in the Area. While exploration activities have been ongoing for some years now, the rules, regulations and procedures that would apply to future exploitation activities are currently being negotiated at the ISA. As discussed in a parallel publication, there is sufficient legal basis for the ISA to establish a moratorium on DSM, and several pathways are available for it to enact such a non-use measure, such as through an ISA Assembly or Council decision or pausing the adoption of the exploitation regulations until the impacts of DSM are better understood.¹⁸

This chapter discusses a potential non-use measure for deep-seabed mining in the Area in the context of other non-use measures presented in this book. In so doing, the chapter starts by offering an overview of the state of DSM and the ISA as the regulatory authority (section 2). The chapter then analyses the types of non-use measures available for DSM, their aims, timing, and scope (section 3) before analysing how and by whom an ISA non-use measure could be enforced (section 4). This is followed by a discussion on the potential policy implications of a DSM non-use measure in section 5 and concluding thoughts (section 6). This chapter touches upon several questions put forward by the editors, in particular by identifying the aims and the characteristics of a potential non-use measure, discussing the implications of such measures for third States, as well as analysing some challenges to successful implementation and enforcement.

This chapter discusses non-use measures for DSM in general, not limiting the analysis to particular mineral deposits. However, the chapter is limited in scope to DSM in the Area, thus excluding mining under national jurisdiction from the analysis. We also refrain from discussing regional closures for DSM, such as the ISA's Areas of Particular Environmental Interest, as these are covered by Menini, Blanchard and Rovere in chapter 11 of this book. We note, though, that the extent and nature of regional closures, and other restrictive measures, could affect the political appetite for or against a more broadly applied non-use measure.

17 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397, art 1(1)(1).

18 Singh et al (n 12).

2 Deep-Seabed Mining and the ISA

The Area and its mineral resources are the ‘common heritage of [hu]mankind’.¹⁹ This legal status was agreed in the 1970s when States were faced with the question as to who would be allowed to mine minerals that lie beyond the jurisdiction of any State. In an act of multilateralism, States decided to manage the Area and its minerals collectively, through the ISA, which in turn was established through UNCLOS. All parties to UNCLOS are ipso facto members of the ISA. No mineral exploration or exploitation in the Area is allowed without a contract from the ISA.²⁰ Any mining-related activities in the Area must be carried out for the benefit of humankind as a whole, including present and future generations.²¹

The ISA’s overarching mandate is to act on behalf of humankind and to administer the mineral resources of the Area.²² To do so, the ISA has broad powers to regulate DSM, ensure compliance, and promote marine scientific research.²³ In addition, the ISA is entrusted with numerous responsibilities, including to ensure the effective protection of the marine environment from harmful effects that may arise from DSM and develop a mechanism to equitably share any benefits received – financial and non-financial.²⁴

Using its regulatory powers, the ISA has adopted rules, regulations, and procedures for prospecting and exploration of three types of mineral deposits, namely polymetallic nodules,²⁵ polymetallic sulphides,²⁶ and ferromanganese crusts.²⁷ Since 2014, the ISA has been working to develop mineral exploitation regulations for the commercial-scale mining phase. This is an exceptionally complex task, complicated further by the fact that the legal framework set out in UNCLOS was negotiated between the 1970s and 90s, when there was genuine

19 UNCLOS, art 136.

20 *ibid* art 137(2).

21 *ibid* art 140.

22 *ibid* arts 137, 157(1).

23 See eg *ibid* arts 139, 143, 153, 157(2). For a detailed discussion of the ISA’s mandate, see A. Jaeckel, *The International Seabed Authority and the Precautionary Principle* (Brill Nijhoff 2017) chs 3.3, 4, 5.

24 See eg UNCLOS, arts 140, 145; D. Wilde et al, “Equitable Sharing of Deep-Sea Mining Benefits: More Questions than Answers” (2023) 151 *Marine Policy* 105572.

25 Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (22 July 2013) ISBA/19/C/17.

26 Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area (15 November 2010) ISBA/16/A/12/REV.1.

27 Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area (27 July 2012) ISBA/18/A/11.

ignorance as to the extent of the risks that DSM presents to the fragile and bio-diverse ecosystems in the deep ocean. Moreover, the environmental risks were overshadowed by excitement that DSM could be imminent and immensely profitable,²⁸ assumptions which turned out to be incorrect to date. Nonetheless, States included a strong environmental mandate for the ISA in UNCLOS²⁹ and the subsequent 1994 Agreement relating to the Implementation of Part XI of UNCLOS.³⁰ In the intervening decades, science has demonstrated the deep ocean to be highly biodiverse and susceptible to the impacts of DSM³¹ (though much remains to be studied).³² States will need to agree on exploitation regulations that meet all obligations and criteria enshrined in UNCLOS, while tackling challenges that have come to light as a result of research and experiences over the past forty years.

Although Part XI of UNCLOS in its original form was seen as too restrictive by industrialised States interested in DSM, and was consequently renegotiated in 1994, neither the 1994 Agreement nor UNCLOS provide a 'right to mine'.³³ Rather, the Convention prohibits any exercise of sovereignty or sovereign rights in the Area and clearly subjects any future mining to the approval of States, through the multilateral processes of the ISA.³⁴ Thus, while UNCLOS and the 1994 Agreement were negotiated with mining in mind, DSM is

28 R. A. Frank, "Environmental Aspects of Deepsea Mining" (1975) 15 *Virginia Journal of International Law* 815.

29 For a detailed discussion on the ISA's environmental mandate, see Jaeckel (n 23) ch 4.

30 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 (1994 Agreement) (adopted 16 November 1994, entered into force 28 July 1996) 1836 UNTS 3 Annex section 1(5). Interestingly, environmental concerns were not seen as an obstacle for states ratifying UNCLOS. In Anderson's words, "there was general agreement that environmental considerations were of utmost importance and that the Convention already imposed high standards which would be further elaborated by the Authority. This question was not seen to be one which represented an obstacle in the way of ensuring universal participation". D. Anderson, *Modern Law of the Sea* (Martinus Nijhoff Publishers 2008) 310.

31 R. Williams et al, "Noise from Deep-Sea Mining May Span Vast Ocean Areas" (2022) 377 *Science* 157; T. W. Washburn et al, "Patterns of Macrofaunal Biodiversity Across the Clarion-Clipperton Zone: An Area Targeted for Seabed Mining" (2021) 8 *Frontiers in Marine Science* 1.

32 D. J. Amon et al, "Assessment of Scientific Gaps Related to the Effective Environmental Management of Deep-Seabed Mining" (2022) 138 *Marine Policy* 105006.

33 Z. Douglas et al, "Legal Opinion in the Matter of a Proposed Moratorium or Precautionary Pause on Deep-Sea Mining beyond National Jurisdiction" (2023) *PEW Charitable Trusts*, available at <<https://www.pewtrusts.org/-/media/assets/2023/03/deep-sea-mining-moratorium.pdf>> accessed 24 July 2024.

34 UNCLOS, art 137.

nonetheless subject to limitations, including the ISA's environmental obligations, benefit sharing, as well as compensation to developing and land-based mining States.³⁵

With the environmental impacts of DSM now understood to be potentially significant, the ISA is facing the difficult decision of whether, and if so under what conditions, to permit DSM in the Area. This discussion was further complicated when, in mid-2021, Nauru triggered the so-called two-year rule under the 1994 Implementing Agreement, which required the ISA to finalise the exploitation regulations within two years.³⁶ This obscure rule was designed to circumvent deadlock in case draft regulations were effectively finished but their adoption was being blocked.³⁷ Given there remained numerous undecided matters to be addressed before the draft exploitation regulations could be adopted,³⁸ and States were negotiating with diligence, Nauru was criticised for its action. Unsurprisingly, the ISA was unable to finalise the regulations in 2023, which created the possibility that an application for exploitation may be submitted, considered, and even provisionally approved in the absence of applicable rules, regulations and procedures. This perceived regulatory loop-hole has led to a growing number of States and actors to call for a pause or moratorium on DSM in the Area, as discussed in the following section.

3 Deep-Seabed Mining and Non-use Measures

As noted by a group of lawyers in 2023, “the language of ‘moratorium’ or ‘pre-cautionary pause’ obscures more than it reveals.”³⁹ This section offers a discussion about the terminology, parameters, and aims of a potential non-use measure.

35 See UNCLOS, arts 140, 145, and 151(1).

36 1994 Implementing Agreement, Annex section 1(15).

37 P. A. Singh, “What If’ Revisited: Open Legal Questions in Light of the Two-Year Rule at the International Seabed Authority” (2023) RIFS Discussion Paper 7, available at <https://publications.rifs-potsdam.de/rest/items/item_6002727_2/component/file_6002728/content> accessed 14 September 2024.

38 C. Pickens et al, “From What-If to What-Now: Status of the Deep-Sea Mining Regulations and Underlying Drivers for Outstanding Issues” (2024) *Marine Policy* 105967.

39 Douglas et al (n 33) 13.

3.1 *Types of Non-use Measures*

Those opposed to DSM employ differing terminologies, which requires unpacking. There are at least five types of non-use measures the ISA could take, in addition to measures that others might take, such as consumer boycotts of seabed minerals⁴⁰ or a self-imposed decision by an individual State to refrain from conducting or sponsoring DSM.⁴¹

Seasonal or Regional Closure of DSM: A very limited non-use measure, as currently used in fisheries management, would be seasonal restrictions on DSM, for example during breeding times of specific species. Similarly, the ISA has already restricted mineral exploration in Areas of Particular Environmental Interest, as a spatial management measure that is discussed in detail in chapter 11 of this book. These measures are not examined in this chapter, as we focus on the possibility of a widespread, general non-use measure for DSM in the Area.

De Facto Moratorium: A de facto moratorium would be an understanding amongst ISA Member States that mineral exploitation can only be approved once certain prerequisites are met, such as a specific level of scientific baseline knowledge to allow for robust environmental impact assessments. A de facto moratorium does not require a formal ISA decision, hence some might argue that it reflects the current status quo. Indeed, the ISA Council has expressed a firm view that no exploitation should occur without exploitation regulations in place, thereby sending a political message to anyone potentially seeking to apply for an exploitation contract while the regulations remain absent under the abovementioned two-year rule.⁴²

Precautionary Pause: Several States, including Brazil, Chile, and Germany, have formally called for a precautionary pause.⁴³ They contend that more time is needed for marine scientific research to better understand the potential risks of DSM, before any mining can be considered. A precautionary pause can be either a political understanding or encapsulated in a formal ISA decision. Unlike a de jure moratorium

40 A. Jaeckel et al, "Deep Seabed Mining Lacks Social Legitimacy" (2023) 2 *npj Ocean Sustainability* 1.

41 Singh et al (n 12).

42 ISA, "Decision of the Council" (21 July 2023) ISBA/28/C/24.

43 Deep Sea Conservation Coalition, "Voices Calling for a Moratorium: Governments and parliamentarians", available at <<https://savethehighseas.org/voices-calling-for-a-moratorium-governments-and-parliamentarians/>> accessed 24 July 2024.

that would be dependent on formal conditions or reviews to be lifted, a precautionary pause may only require political agreement to come to an end. Importantly, a precautionary pause does not predict what might happen once the outstanding issues are resolved. It leaves the door open for the ISA to allow mining in the future, once the knowledge gaps, and any other outstanding issues, have been addressed to the satisfaction of Member States. Equally, once more scientific knowledge is available, States may feel compelled to more strongly restrict or prohibit DSM based on the principle of prevention.

De Jure Moratorium: A *de jure* moratorium involves a formal decision by the ISA (Council or Assembly) stating specific conditions and/or a timeframe for the moratorium to be reviewed and potentially lifted. Any such lifting would follow a pre-agreed procedure, as is the case for the 50-year moratorium on mining in Antarctica.⁴⁴

Ban: As the strictest non-use measure, an indefinite or permanent ban can be instated through a formal ISA decision, without necessarily having any pre-conditions specified for its lifting. However, like any other ISA decision, it could be overturned in the future by a two-thirds majority.⁴⁵

This chapter analyses the aim, scope, implications, and enforcement of a precautionary pause, moratorium (*de facto* and *de jure*), and a formal ban on DSM. Unless otherwise demarcated, we use the term ‘moratorium’ here as a catch-all to include a *de facto* and *de jure* moratorium as well as a precautionary pause, given that all three measures would result in a temporary delay of DSM.

3.2 *Non-use Measures for Seabed Mining*

As examined by Guggisberg in chapter 2, the non-use measures discussed in this book can be described through a certain typology. Mining minerals on the seafloor is an extractive use, which removes matter from the environment and in that process can cause significant environmental harm.⁴⁶

A non-use measure for DSM can be distinguished from other non-use measures on a number of grounds. Mineral mining is by definition unsustainable as minerals are a non-renewable and exhaustible resource, which, once extracted, do not replenish (except in geological time scales). As such, a non-use measure for mineral mining addresses a fundamentally different concern to that of many other non-use measures: once mining has occurred, the harm

44 See the discussion conducted by Kempf in chapter 14 of this volume.

45 1994 Agreement, Annex section 3.

46 European Academies Science Advisory Council (n 3).

can usually not be readily reversed, and the resource cannot be replenished. For example, seabed nodule mining would likely cause irreversible loss of biodiversity⁴⁷ and habitat destruction on a scale ranging from decades to centuries (for some species)⁴⁸ to millions of years (for hard substrate nodule habitat to return). In contrast, fisheries can, to some extent, recover from overfishing, for example, and marine ecosystems may recover from anthropogenic ocean noise once that noise pollution ceases.

The governance dimension of a potential non-use measure for DSM in the Area also warrants mention. Unlike many non-use measures in international law, a DSM moratorium or ban would not be solely implemented and managed by individual States but instead also by the ISA, which is an independent inter-governmental organisation.

3.3 *Aims of a Ban or Moratorium for DSM*

A moratorium or ban on DSM would achieve several aims, some of which overlap with the reasons that have been put forward to justify a DSM moratorium. We discuss these reasons in a parallel publication⁴⁹ while this section focuses on the aims that a moratorium or ban could achieve.

The aim of a permanent ban on DSM would be three-fold. First, it would preserve the Area, its minerals, and marine ecosystems and, thus, meet environmental objectives. Second, banning DSM would help enable other uses of the Area, such as bioprospecting for marine genetic resources, which can occur on or around seabed minerals, including hydrothermal vents. Third, refraining from mining the Area and thereby preserving its ecosystems would also preserve cultural connections to the Area and deep ocean as well as the rights of Indigenous Peoples and local communities to their intangible cultural heritage.⁵⁰

47 Niner et al (n 13); C. L. Van Dover et al, "Biodiversity Loss from Deep-Sea Mining" (2017) 10 *Nature Geoscience* 464.

48 M. Haeckel et al, "Environmental Impacts of Deep Seabed Mining" in T. Heidar (ed), *New Knowledge and Changing Circumstances in the Law of the Sea* (Brill Nijhoff 2020).

49 Singh et al (n 12).

50 E. G. Jiménez, "An Old Dilemma in Deep Seabed Mining: Free, Prior, and Informed Consent of Indigenous Peoples in Areas Beyond National Jurisdiction" (2024) 118 *American Journal of International Law Unbound* 83; S. Ranganathan, "The Participatory Scope of the Common Heritage Principle" (2024) 118 *American Journal of International Law Unbound* 88; E. Morgera, "Participation of Indigenous Peoples in Decision Making Over Deep-Seabed Mining" (2024) 118 *American Journal of International Law Unbound* 93; L. Lixinski, "Integrating Culture, Heritage, and Identity in Deep Seabed Mining Regulation" (2024) 118 *American Journal of International Law Unbound* 78.

A DSM moratorium or pause, not being permanent in nature, may temporarily meet the aforementioned three aims but focus more specifically on the following aims four to seven. Fourth, it would allow time to fill the numerous remaining scientific knowledge gaps⁵¹ and thus place decision-makers in a better position to make a more informed choice about DSM. This would be fully consistent with the precautionary approach⁵² and indeed that was one of the factors behind the mining moratorium in Antarctica.⁵³

Fifth, a delay in the onset of DSM would provide time to develop the necessary institutional and governance structures as well as capabilities at the ISA to not only regulate DSM but to monitor compliance, take enforcement action and develop mechanisms for the sharing of benefits, as required by UNCLOS.⁵⁴ As documented in the literature,⁵⁵ including a Technical Study commissioned by the ISA itself,⁵⁶ the ISA is currently lacking the needed governance structures and expertise to fully discharge its mandate under UNCLOS. Indeed, numerous outstanding issues remain to be negotiated before the ISA would be in a position to properly entertain an application for mineral exploitation.⁵⁷

Sixth, postponing DSM would enable future generations to decide whether and how to use the minerals in the Area. This would be in line with the Area and its minerals being the common heritage of humankind, a concept with a strong element of intergenerational equity.⁵⁸ Of course, how long into the future a delay would need to last to enjoy such intergenerational benefits is open to debate, but it is reasonable to assume that, in general, a ban would benefit more distant generations, whereas a moratorium/pause would allow

51 Amon et al (n 32).

52 R. Makgill, A. Jaeckel and K. MacMaster, "Implementing the Precautionary Approach for Seabed Mining: A Review of State Practice" in V. Tassin Campanella (ed), *Routledge Handbook of Seabed Mining and the Law of the Sea* (Routledge 2023).

53 See eg 1991 Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol) (adopted 4 October 1991, entered into force 14 January 1998) 2941 UNTS 5778, art 3(2).

54 See eg UNCLOS, arts 139, 140, 153(4), 153(5), 162(2)(a), 165(2)(h).

55 R. Collins and D. French, "A Guardian of Universal Interest or Increasingly Out of its Depth?" (2019) 1 *Intl Organizations L Rev* 31; D. Bosco, A. Jaeckel and P. Singh, *Ready to Regulate? The International Seabed Authority on the Brink of Commercial Mining* (Ostrom Workshop 2023), available at <<https://dlc.dlib.indiana.edu/dlc/handle/10535/10897>> accessed 24 April 2023.

56 A. L. Clark, J. Cook Clark and S. Pintz, "Towards the Development of a Regulatory Framework for Polymetallic Nodule Exploitation in the Area" (2013) *ISA Technical Study No 11*, available at <<https://www.isa.org.jm/wp-content/uploads/2022/06/tstudy11.pdf>> accessed 14 September 2024.

57 Pickens et al (n 38).

58 Ranganathan (n 50).

for the more thoughtful potential extraction of minerals benefiting some of the younger generations already alive. The concepts of sustainable development and common heritage of humankind are deliberately vague and particularly difficult to apply to non-renewable resources, such as minerals.

Lastly, a moratorium can assist States in meeting their obligations under UNCLOS, including the obligation to protect and preserve the marine environment and to equitably share any benefits derived from the Area.⁵⁹ Indeed, in 2023, a group of lawyers argued that “a moratorium or precautionary pause is not only consistent with UNCLOS, but is actually required by it”.⁶⁰ They reasoned that:

it is a core obligation of States Parties to protect and preserve the marine environment; it would be a violation of that obligation to enable the commencement of exploitation of the Area at a time when scientific understanding of the deep sea, the existing regulatory arrangements, and the ISA’s institutional capacity are insufficient to ensure that outcome.⁶¹

In addition to helping States meet their obligations under UNCLOS, a DSM moratorium would also address the fact that at present, seabed mining in the Area would conflict with international human rights law and international environmental law.⁶² As highlighted by UN officials⁶³ and detailed in the literature,⁶⁴ DSM could affect the right to a clean, healthy and sustainable environment, the right to food, as well as cultural rights, amongst others. In addition, DSM would undermine existing environmental obligations, such as relating to biodiversity

59 UNCLOS, arts 140, 145.

60 Douglas et al (n 33) 13.

61 *ibid.*

62 J. Arato, A. Jaeckel and L. Lixinski, “On the Cultural Stakes of Deep Seabed Mining” (2024) 118 *American Journal of International Law Unbound* 67.

63 United Nations Office of the High Commissioner for Human Rights (n 8); Working Group on the issue of human rights and transnational corporations and other business enterprises, Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes and Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, “Open Letter to the International Seabed Authority” (United Nations Human Rights Special Procedures 15 March 2024), available at <<https://www.ohchr.org/sites/default/files/documents/issues/business/activities/2024-03-15-open-letter-to-isa.pdf>> accessed 4 April 2024.

64 G. J. Hamley, “The Implications of Seabed Mining in the Area for the Human Right to Health” (2022) 31 *Review of European, Comparative & International Environmental Law* 389; N. J. Bennett, E. Morgera and D. Boyd, “The Human Right to a Clean, Healthy and Sustainable Ocean” (2024) 3 *npj Ocean Sustainability* 1; Morgera (n 50).

protection, and undermine a host of political commitments to restore ocean health.⁶⁵

In sum, while a permanent ban on DSM would serve three long-term aims, a temporary delay in DSM would meet four shorter-term aims while also temporarily supporting aims one to three, as summarised in Table 10.1.

TABLE 10.1 Potential aims of a moratorium or ban on DSM in the Area

Aims of a ban	1	Ensure environmental conservation
	2	Enable other uses, such as bioprospecting
	3	Protect cultural heritage
Aims of a pause or moratorium	4	Fill (scientific) knowledge gaps
	5	Develop governance structures and enforcement capacity
	6	Enable more responsible and thoughtful extraction of the minerals in the foreseeable future
	7	Meet obligations under UNCLOS and international law more broadly

TABLE PREPARED BY THE AUTHORS

3.4 *Timing, as well as Substantive and Geographical Scope of a DSM Moratorium or Ban*

While a ban on DSM would be permanent (until reversed), the duration of a moratorium or pause remains unclear, though some States have called for 15 years, for example.⁶⁶ The expiry of the latter categories of non-use measures would likely be contingent on the resolution of certain issues, such as the availability of scientific information to establish robust environmental baselines; the development of next generation mining technology that reduces

65 For detailed discussion, see P. Singh and A. Jaeckel, “Undermining by Mining? Deep Seabed Mining in Light of International Marine Environmental Law” (2024) 118 *American Journal of International Law Unbound* 72.

66 Reuters, “Not worth the risk: Palau, Fiji call for deep-sea mining moratorium” (*Reuters*, 28 June 2022), available at <<https://www.reuters.com/business/environment/not-worth-risk-palau-fiji-call-deep-sea-mining-moratorium-2022-06-27/>> accessed 24 July 2024.

the footprint, sediment light and noise pollution of DSM; and/or the establishment of agreed mechanisms for compliance and enforcement of the ISA's rules, regulations, and procedures.

The scope of a non-use measure may include all types of mineral deposits, including polymetallic nodules, polymetallic sulphides, and ferromanganese crusts, or be limited to just some. The technology for mining each type of deposit varies greatly, with differing levels of maturity, as does the environmental footprint and indeed the level of scientific understanding about the impacts on the associated ecosystems (on this, see the discussion by Gollner, Esquete and van der Grient in chapter 9). Therefore, it is quite logical that separate non-use measures could be applied to each resource type, each with their own (similar) criteria for being lifted. Politically, however, a one-size-fits-all approach might be more palatable for those generally opposed to DSM in its current form.

Whether a non-use measure would only apply to the commercial-scale exploitation of minerals or also comprise the current exploration phase is also unclear, though the former may be more likely. Exploration for seabed minerals has occurred for decades and the environmental risks are better known and more containable than for exploitation. That said, the exploration phase can include test mining, the environmental harms of which are not yet well characterised. Notably, the abovementioned IUCN Congress resolution on DSM calling for a moratorium seeks to cover the renewal of existing exploration contracts and the issuance of new exploration contracts, in addition to future exploitation contracts.⁶⁷

The geographical extent of a non-use measure could be either universal, meaning applying to the entire Area, or regional (eg an ocean basin) where more baseline data are required, or just focused on particular types of sites viewed as particularly vulnerable, such as hydrothermal vents.⁶⁸ It is also conceivable that a non-use measure could be applied only adjacent to exclusive economic zones, as a form of buffer zone, to lessen the risk of trans-boundary harms to areas under national jurisdiction.

Ultimately, the rationale behind the non-use measure would dictate its scope. For example, universal deficits in knowledge may support a broad

67 IUCN (n 11).

68 See the discussion in chapter 11 of this volume; E. Menini et al, "Towards a Global Strategy for the Conservation of Deep-Sea Active Hydrothermal Vents" (2023) 2 *npj Ocean Sustainability* 1; C. L. Van Dover et al, "Scientific Rationale and International Obligations for Protection of Active Hydrothermal Vent Ecosystems from Deep-Sea Mining" (2018) 90 *Marine Policy* 20.

moratorium, whereas particular gaps in knowledge about specific places can be addressed through a more targeted non-use measure. Where a moratorium ends and a spatial closure begins is admittedly somewhat vague, but a moratorium can be seen as spatially larger, with broader, more enduring regulatory provisions and underlying rationale, than a closure. In fisheries management, for example, spatial closures are lifted regularly and often, whereas a moratorium (eg the Atlantic cod moratorium in eastern Canada⁶⁹) can last for decades.

Regardless of the scope of a potential moratorium or ban, a key challenge will be to enforce the non-use measure, which is the focus of the next section.

4 Enforcing a Non-use Measure for DSM

While establishing a non-use measure for DSM will likely be a lengthy political process, thought must also be given to how and by whom such a non-use measure can be enforced. Before discussing enforcement options, this section provides a brief overview of the types of breaches that may occur, and the range of actors potentially involved.

4.1 *Types of Breaches and Actors Involved in Enforcing Non-use Measures*

Breaching a moratorium or ban for DSM can take different forms, depending on the scope of the non-use measure. If the non-use measure includes a whole-sale prohibition of mineral exploitation in the Area, then any mining in the Area would constitute a breach. If, however, the non-use measure is limited to a seasonal closure or particular spatial area, then mining during closure periods or within prohibited areas can be a breach, despite the fact that the mining entity might hold an exploitation contract with the ISA.⁷⁰

DSM in the Area is regulated and controlled by the ISA but can be carried out by a Member State, private company, or the Enterprise, which is set to become

69 J. A. Hutchings and R. A. Myers. "What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhua*, of Newfoundland and Labrador" (1994) 51(9) *Canadian Journal of Fisheries and Aquatic Sciences* 2126.

70 However, as seen from previous practice, the ISA has systematically placed spatial closures in areas that were not overlapping with existing exploration contracts in order to appease commercial interests. See S. Christiansen et al, "Towards an Ecosystem Approach to Management in Areas Beyond National Jurisdiction: REMPs for Deep Seabed Mining and the Proposed BBNJ Instrument" (2022) 9 *Frontiers in Marine Science* 720146.

the commercial arm of the ISA.⁷¹ Any State entity or private actor must be sponsored by a State who can be held responsible under international law for wrongdoing of the contractor, including breaching a non-use measure.⁷² The responsibility of the sponsoring State is of a due diligence nature and involves taking appropriate domestic legal and administrative measures to ensure that the sponsored contractor complies with the ISA contract and the obligations under UNCLOS and related instruments.⁷³ In addition, the sponsoring State has direct obligations, such as applying a precautionary approach and providing recourse for compensation.⁷⁴ Given this array of actors, a breach of a non-use measure could be committed by at least five actors: an ISA contractor, a private third party, an ISA Member State who may or may not be a sponsoring State, a non-Member State, or the Enterprise. Which of those actors commits the breach dictates who can take enforcement action. Before analysing this point in detail below, this section first discusses the legal ramifications of a potential ISA non-use measure.

When considering who would be bound by an ISA moratorium or ban, it is important to note that UNCLOS outlaws any exercise of sovereignty or sovereign rights in the Area⁷⁵ and determines that any activities in the Area can only occur with the approval of the ISA.⁷⁶ Indeed, Article 137(1) goes further and establishes a duty to not recognise any claim or exercise of sovereignty or sovereign rights over the Area or its minerals.⁷⁷ If any minerals in the Area were mined without approval from the ISA, “no such claim, acquisition or exercise of such rights shall be recognized”.⁷⁸ This, in effect, prohibits States from trading minerals obtained in contravention of an ISA non-use measure,

71 UNCLOS, arts 158(2), 170; 1994 Agreement, Annex section 2. For details on the Enterprise, see M. Remaoun, “The International Seabed Authority and the Enterprise: How Africa Is Reinvigorating the Principle of the Common Heritage of Mankind” (2021) 1 *Journal of Ocean Governance in Africa* 1; K. Willaert, “The Enterprise: State of Affairs, Challenges and Way Forward” (2021) 131 *Marine Policy* 104590.

72 UNCLOS, art 153(2).

73 Seabed Disputes Chamber of the International Tribunal for the Law of the Sea, *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, Advisory Opinion, ITLOS Case 17, 2011.

74 *ibid* 125–135 and 139–140.

75 UNCLOS, art 137(1).

76 *ibid* art 137(2).

77 *ibid* art 137(1).

78 *ibid* art 137(3).

which in turn would render any breach of an ISA non-use measure economically unattractive.⁷⁹

Article 137 establishes the core elements of the common heritage of mankind principle, which applies to the Area and its mineral resources.⁸⁰ Importantly, the common heritage principle, in its application to the Area, forms part of customary international law,⁸¹ meaning it is binding on all States, including those not party to UNCLOS.⁸²

Indeed, Judge Wolfrum has likened Article 137 to a *jus cogens* rule,⁸³ not least because of the aforementioned duty to not recognise any claim to, or appropriation of, the resources in contravention of Article 137. Moreover, Article 311(6) of UNCLOS prohibits any amendments to, or derogation from, the common heritage principle, further demonstrating its fundamental nature.

In practice, this means that if the ISA were to declare a ban or moratorium on DSM, that would effectively prevent all States, arguably including ISA Non-Member States, from mining in the Area because customary international law (and UNCLOS) requires States to only conduct activities in the Area with the approval of the ISA. If no such approval is granted because of a non-use measure, then any State who would mine in breach of that measure would violate both customary international law and treaty law. Thus, while an ISA non-use measure would formally only bind ISA Member States, in practice it should affect all States, as no State would be able to mine the Area without approval of the ISA.

Given the universal acceptance of the ISA as the competent body to decide who is allowed to mine minerals in the Area, any State trying to undertake DSM in the Area without ISA approval would not only violate international law but also risk serious political resistance. Indeed, in the 1980s, when UNCLOS had been adopted but was not yet in force, several States, including France, Germany, Italy, Japan, the UK, and the US started establishing a so-called Reciprocating States Regime (RSR) as an alternative to the ISA regime. This system was to be divorced from UNCLOS and provide for unilateral legislation

79 S. Voeneky and A. Hoefelmeier, "Article 137 – Legal Status of the Area and its Resources" in A. Proelss (ed), *United Nations Convention on the Law of the Sea: A Commentary* (Nomos Verlagsgesellschaft 2017) 962 para 11.

80 UNCLOS, art 136.

81 R. Wolfrum, "Common Heritage of Mankind" in *Max Planck Encyclopedia of Public International Law* (OUP 2012) 452–458.

82 As confirmed in Vienna Convention on the Law of Treaties (adopted 23 May 1969, entered into force 27 January 1980) 1155 UNTS 331, art 38, a treaty rule can become binding on third States as a customary international law.

83 Wolfrum (n 81) 13.

and mutual recognition of mining claims.⁸⁴ The RSR was heavily criticised, including by the Preparatory Commission for the ISA, who viewed it as illegal and contrary to the object and purpose of UNCLOS, which sought to promote multilateralism via an international regime.⁸⁵ With the 1994 Agreement and the widespread ratification of UNCLOS and its acceptance as the constitution for the ocean, the RSR was abandoned and all parties to that earlier arrangement, barring the US, are now member of the ISA. This historical case study offers an example of the political backlash any attempt to circumvent an ISA non-use measure might engender. In general, any attempt by third States to challenge the ISA regime would likely move beyond the ISA and escalate into diplomatic rows.

Currently, the only Non-Member State of UNCLOS that may have a stake in DSM in the Area is the US, which still claims mining rights over two sites in the Clarion-Clipperton Zone through its domestic legislation dating back to the RSR years. However, the US has not for decades voiced mining ambitions in the Area. Moreover, the US has been actively participating at the ISA, including in the development of the draft exploitation regulations. Until recently, a US company, Lockheed Martin, held two ISA exploration contracts, via its UK subsidiary UK Seabed Resources Ltd., sponsored by the UK.⁸⁶ In 2023, UK Seabed Resources was purchased by a Norwegian company in a move that saw Lockheed Martin abandon its DSM ambitions.⁸⁷

Other ISA Member States which have expressed interest in DSM would, as members of the ISA, be expected to act in a manner consistent with ISA decision-making – in which they have a voice. In short, it is politically unlikely that any state, including non-ISA Member States would attempt to breach a non-use measure for DSM if the ISA decided to establish such a measure. Any such breach would violate international law, including customary international law.

Of course, instead of states conducting DSM, illegal mining operations in the Area could be carried out by private actors without an ISA contract. In that case, a strong reaction from the ISA and its Member States (and perhaps

84 Y. Tanaka, *The International Law of the Sea* (3rd edn, CUP 2019) 227–228.

85 “Declaration adopted by the Preparatory Commission on 30 August 1985” (2 September 1985) LOSC/PCN/72, 2.

86 For information on the contracts, see ISA, “UK Seabed Resources Ltd.”, available at <<https://www.isa.org.jm/contractor/uk-seabed-resources-ltd/>> accessed 24 July; and ISA, “Loke CCZ (formerly UK Seabed Resources Ltd)”, available at <<https://www.isa.org.jm/contractor/uk-seabed-resources-ltd-2/>> accessed 24 July 2024.

87 IISD, “Summary of the 28th Annual Session of the International Seabed Authority (First Part)” (2023) 25(251) *Earth Negotiation Bulletin*, available at <<https://enb.iisd.org/international-seabed-authority-isa-council-28>> accessed 4 April 2023.

non-members) could be expected. Since States share responsibility to ensure that activities in the Area are carried out in accordance with UNCLOS and the rules, regulations and procedures of the ISA, member states would be compelled to subject such actors to their domestic legal systems. However, given the need of private actors to attract investors, develop mining technologies, and later sell their minerals on the international market, it is highly unlikely that any attempt to go rogue would survive economically. Perhaps more likely is that private (and State) actors in the Area might breach their contractual terms, such as carrying out commercial mining under the guise of ‘test mining’ under an exploration contract or breaching a temporally or spatially restrictive ISA moratorium by mining outside the permitted times or areas. The possibility of such breaches underlines the necessity of robust ISA monitoring and enforcement mechanisms as currently under negotiation.⁸⁸

In sum, breaching a DSM non-use measure could take various forms, from mining without a contract to mining with an ISA contract but outside the permitted area or times. Moreover, a breach could be committed by different actors, which in turn affects who has enforcement jurisdiction, as the following section discusses.

4.2 *Enforcement Jurisdiction*

An ISA non-use measure for DSM could be breached by an ISA contractor, a private third party, the Enterprise, an ISA Member State, or a Non-Member State. Who commits the breach affects who has jurisdiction and power to take enforcement action. The actors involved in enforcement action can include the ISA, sponsoring States, flag States, port States, and judicial bodies. This section analyses jurisdictional roles and powers to enforce a non-use measure, depending on who commits the breach, with a summary provided in Table 10.2.

ISA Contractors: The most likely scenario may be a contractor, whether that be an exploration or exploitation contractor, breaching an ISA non-use measure by exceeding the terms of their contract. Contractors are directly bound by the terms of their contract as well as sponsorship agreement with their sponsoring State. As such, when a contractor breaches an ISA non-use measure, both the ISA and sponsoring states have enforcement jurisdiction⁸⁹ and may be supported by the relevant port State.

The ISA not only has powers to regulate DSM in the Area and decide who receives rights to explore or exploit minerals via an ISA contract, but it has

88 K. Willaert, “All Eyes on Deep Sea Mining: Monitoring and Inspection of Activities in the Area” (2021) 27(5) *Journal of International Maritime Law* 302.

89 UNCLOS, arts 139(2), 153(4).

TABLE 10.2 Enforcement jurisdiction depending on who commits a breach of an ISA non-use measure

		Entity committing the breach				
		ISA contractor	Private third party	Enterprise	ISA member State	Non-member State
Enforcement jurisdiction by	ISA	Major role	Support role	Major role	Major role	Support role
	Sponsoring State	Major role	/	/	/	/
	Flag State	Support role	Major role	Support role	Support role	Major role
	Port State	Support role	Support role	Support role	Support role	Support role

TABLE PREPARED BY THE AUTHORS

also far-reaching enforcement powers. Specifically, the ISA can “take at any time any measures provided for under [Part XI] to ensure compliance with its provisions”.⁹⁰ It is also mandated to “exercise such control over activities in the Area as is necessary for the purpose of securing compliance” with UNCLOS, the ISA’s Mining Code, and any exploration or exploitation contract.⁹¹ The current draft exploitation regulations foresee a range of enforcement measures, which the ISA can deploy, from compliance notices, through to suspension or termination of a contract as well as the power to impose monetary penalties proportionate to the seriousness of the violation.⁹² However, measures other than compliance notices are subject to the contractor having exhausted the judicial remedies available.⁹³ Given its relatively limited financial and human

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UNCLOS, art 153(5).

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ibid art 153(4).

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ISA, “Draft regulations on exploitation of Mineral resources in the Area. Consolidated text” (2024) ISBA/29/C/CRP.1, reg 103.

93

UNCLOS, Annex III art 18(3).

resources, the capacity of the ISA to effectively monitor and control activities in the Area to enforce a non-use measure could become an issue. Cooperation with other actors engaged in monitoring areas beyond national jurisdiction (ABNJ) could be necessary.

The sponsoring State has a due diligence obligation to ensure that the contractor carries out all activities in conformity with UNCLOS, the ISA's Mining Code, and the terms of its contract.⁹⁴ In case of a contractor breaching an ISA non-use measure, the sponsoring State, thus, has an obligation to ensure enforcement measures are taken to regain compliance. This may include accessing domestic judicial avenues to hold the contractor to account. In addition, the sponsoring state has direct obligations, such as assisting the ISA "by taking all measures necessary to ensure compliance".⁹⁵ In other words, the sponsoring State has ample powers and duties to help enforce a DSM non-use measure against a non-compliant contractor. However, the demarcation of roles and responsibilities between the ISA and the sponsoring State remains unclear, which may lead to inconsistent conduct between different sponsoring States.⁹⁶

The flag State of a mining vessel may also play a role in enforcing a non-use measure against an ISA contractor. All vessels on the high seas are subject to the jurisdiction of their flag State in respect to "administrative, technical and social matters concerning the ship".⁹⁷ This may include jurisdiction over environmental pollution caused by the regular operation of the vessel,⁹⁸ though it does not include jurisdiction over ensuring the vessel complies with the ISA's Mining Code.⁹⁹ Again, the precise demarcation of jurisdiction remains somewhat unclear¹⁰⁰ and can create issues if, for example, mine tailing are released together with operational discharged from a vessel as the former falls under

94 *ibid* art 139, Annex III art 4; Seabed Disputes Chamber of the International Tribunal for the Law of the Sea (n 73).

95 UNCLOS, art 153(4).

96 H. Lily, "Enforcement of Deep-Sea Mining Regulations at Sea, Ninth Report of the Code Project" (2024) *PEW Charitable Trusts* 5, available at <<https://www.pewtrusts.org/-/media/assets/2024/03/code-project---enforcement-of-deep-sea-mining-regulations-at-sea.pdf>> accessed 24 July.

97 UNCLOS, art 94(2)(b).

98 *ibid* art 94(4)(c).

99 *ibid* art 215; Lily (n 96); see also ISA, "Competencies of the International Seabed Authority and the International Maritime Organization in the context of activities in the Area" (2021) *ISA Technical Study No 25*, available at <<https://www.isa.org.jm/wp-content/uploads/2022/06/Technical-Study-25.pdf>> accessed 24 July.

100 E. Røsæg, "Framework Legislation for Commercial Activities in the Area" in C. Banet (ed), *The Law of the Seabed* (Brill Nijhoff 2020).

the jurisdiction of the sponsoring State whereas the latter is the responsibility of the flag state.¹⁰¹ However, for the purposes of enforcing a non-use measure which prohibits DSM either in the entire Area or in particular zones or at particular times, the jurisdictional divide may be beside the point, as it is not concerned with whether or not the operator complies with all ISA environmental standards but rather with whether minerals are being removed in contravention of a non-use measure.

Lastly, enforcing a non-use measure for DSM could be supported by port States, to ensure visiting vessels do not unload illegally mined seabed minerals. Port States may investigate, and where necessary institute proceedings against, a vessel that is voluntarily using the State's port.¹⁰² Port States can act as a safety net for identifying non-compliance, particularly where that is not achieved through the flag State, and have performed that role in relation to fisheries, safety, and pollution. While UNCLOS does not specifically provide for port State jurisdiction with respect to activities in the Area, it does provide for such jurisdiction in respect to vessel discharge that occurred in ABNJ.¹⁰³ Given that DSM will likely involve return water and tailings, this limitation may not be a hindrance to the role port States could assume.

Private Third Parties: Where a non-use measure is breached by a private company or other non-governmental actor without an ISA contract, the ISA has no direct jurisdiction, but nonetheless has a legal interest as the body entrusted by UNCLOS as a trustee over the resources of the Area representing humankind as a whole. However, the flag State of the relevant vessel has primary jurisdiction and would need to lead enforcement actions against the vessel, including through domestic proceedings.¹⁰⁴ The flag State's enforcement powers extend to pollution control measures and apply irrespective of where the non-compliance occurs.¹⁰⁵ Port States may be able to support enforcement measures, in line with the above discussion.

Enterprise: The Enterprise is envisaged in UNCLOS as the commercial arm of the ISA. Following extensive renegotiations of the funding and operation of the Enterprise, its future remains somewhat unclear.¹⁰⁶ However, when the Enterprise becomes fully operational, it will be able to hold exploration or

101 Lily (n 96).

102 UNCLOS, art 218(1).

103 *ibid* art 218.

104 *ibid* art 217.

105 *ibid* art 94.

106 A. Jaeckel, "The Area and the Role of the International Seabed Authority" in V. Tassin Campanella (ed), *Routledge Handbook of Seabed Mining and the Law of the Sea* (Routledge 2023) 166–168; Willaert (n 71); Remaoun (n 71).

exploitation contracts in its own right or in joint venture with another entity.¹⁰⁷ As such, the Enterprise might breach an ISA non-use measure, particularly where such measure may be a spatially or temporally restricted non-use measure. In such event, the ISA would have enforcement jurisdiction in the same way it does over other contractors, while the flag and port states may assume support roles similar to what is outlined for contractors above.

ISA Member States: If an ISA Member State was to breach a non-use measure, eg through government-operated DSM, the ISA would be able to assume a significant role in enforcing the non-use measure. Aside from political pressure, the ISA can suspend membership of a State where the Seabed Disputes Chamber (SDC), the ISA's dispute settlement body, finds a state has 'grossly and persistently violated' Part XI of UNCLOS.¹⁰⁸ Given that the obligation to not conduct activities in the Area without consent from the ISA is a core provision of Part XI, as discussed above, it may be argued that breach of an ISA non-use measure falls within this provision. Where the flag State and port states are different to the State breaching the non-use measure, they may also support enforcement measures, in line with the powers discussed above.

Non-Member States: As the ISA has no direct jurisdiction over non-parties, enforcing a non-use measure against a non-member State, such as the US, would largely fall to the flag State of the DSM vessel, in cooperation with the ISA and potentially with support from port States. If the flag State is not party to UNCLOS (or has caused the breach), however, then the success of this modality is less likely. Nonetheless, ISA Member States could, collectively or individually, also decide to take action in political or even legal terms. As discussed above, it is arguable that Non-Member States are still required, as a matter of customary international law, to ensure that no DSM occurs in the Area without consent from the ISA. This legal obligation could, therefore, be enforced through judicial means.

Lastly, judicial bodies would likely play an important role in enforcing a DSM non-use measure, regardless of who committed the breach. The SDC of the International Tribunal for the Law of the Sea (ITLOS) has jurisdiction to entertain disputes concerning activities in the Area involving the ISA, Member States, the Enterprise, contractors, and even prospective contractors.¹⁰⁹ SDC

¹⁰⁷ 1994 Agreement, Annex section 2(2).

¹⁰⁸ UNCLOS, arts 162(2)(t), 185.

¹⁰⁹ *ibid* art 187.

proceedings can result in binding decisions against the contractor, which are enforceable through domestic courts.¹¹⁰

5 Policy Considerations for Non-use Measures for the Area

Reaching agreement on a non-use measure can be difficult but has in fact been achieved in relation to numerous non-use measures for marine resources. Some of these measures were temporary but many remain in place – testaments to the lasting relevance of these difficult decisions. For example, in ABNJs, notable bans include the 1989 and 1991 driftnet resolutions adopted by the United Nations General Assembly (UNGA) recommending termination of all high seas deployment of large pelagic driftnets, implemented to protect marine biodiversity (though not without some disagreement¹¹¹).¹¹² In 1982, the International Whaling Commission (IWC) decided on ‘a pause’ in commercial whaling from the 1985/1986 season onwards, often referred to as the commercial whaling ‘moratorium’, which remains in place today¹¹³ (again, not without controversy¹¹⁴). Additionally, as mentioned above, Article 7 of the 1991 Protocol on Environmental Protection prohibits mineral resource activities, including deep-seabed mining, in Antarctica.¹¹⁵

In each of the above examples the available scientific evidence suggested that there were sufficient grounds to take a precautionary approach and instate a moratorium on the use of natural resources. The same might be true for DSM. States alongside an array of actors have increasingly voiced concern for, inter alia, the safety of deep-sea ecosystems and the need to protect cultural heritage and the common heritage of humankind. Given the concerns that have emerged over the past decades, and especially recently, the ISA, contractors and sponsoring States should no longer assume that DSM in the near future

110 J. Harrison, *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (OUP 2017) 241.

111 W. T. Burke, M. Freeberg and E. L. Miles, “United Nations resolutions on driftnet fishing: An unsustainable precedent for high seas and coastal fisheries management” (1994) 25(2) *Ocean Development & International Law* 127.

112 UNGA Res 44/225 (1990) GAOR 44th Sess, Supp 49; UNGA Res 46/215 (1992) 46th Sess, Supp 49.

113 International Whaling Commission, “Commercial Whaling”, available at <<https://iwc.int/management-and-conservation/whaling/commercial>> accessed February 2024.

114 L. Kobayashi, “Lifting the International Whaling Commission’s moratorium on commercial whaling as the most effective global regulation of whaling” (2005) 29 *Environmental Law and Policy Journal* 177.

115 Environmental Protocol, art 7.

is assured. One or more non-use measures, including a pause, moratorium, or ban, may be warranted.

When considering non-use measures, the ISA will be faced with balancing a complex variety of largely unanswered questions that should be addressed before a decision to mine the Area is made. These questions are briefly discussed here.

Environmental Impacts: Given the centrality of this concern in most arguments in favour of a moratorium, it behooves the ISA to better understand the potential ecological damage that would be caused by DSM,¹¹⁶ were it to proceed using existing technologies.

Economic Implications: A commonly raised concern by those opposed to non-use measures is the need for an assessment of the economic impact of a moratorium on States and companies that have invested in deep-seabed mining technology and exploration. Such assessment is warranted, including any benefits that developing States might accrue through royalties and capacity-building arrangements. Similarly, a clearer understanding of the potential negative economic effects of DSM on land-based mineral producing developing states is needed, alongside agreed measures to compensate these States, as required by international law.¹¹⁷

Socio-Economic Equity and Benefit Sharing: Central to the implementation of UNCLOS and the 1994 Agreement are equity and benefit sharing. Discussion is needed on whether a non-use measure would help or hinder future equitable access to the Area's mineral resources by developing States. Similarly, discussion is needed on what benefits may be derived from the Area, how these might be shared, and how a non-use measure might facilitate some of those benefits, including the preservation of natural capital and ecosystem services and access to marine genetic resources.¹¹⁸

Scientific Research: The possibility of DSM has catalysed a marked increase in deep-sea research, and scientific cooperation with industry. The differing potential impacts on research caused by a pause, moratorium, or ban needs to be openly discussed. Discussion may also be warranted about the role of the ISA during a non-use measure, and whether

¹¹⁶ Amon et al (n 32).

¹¹⁷ UNCLOS, arts 150(h), 164.

¹¹⁸ A. Jaeckel, "Benefitting from the Common Heritage of Humankind: From Expectation to Reality" (2020) 35 *The International Journal of Marine and Coastal Law* 1.

a focus on coordinating marine scientific research may be beneficial for humankind, similar to the shift in focus the International Whaling Commission underwent once the whaling moratorium was established.

Technology Development: DSM has already generated some technological developments. The effects on technology development of a ban, moratorium, or pause are likely to be different, and as per scientific research, above, need to be openly discussed.

Regulatory Development: Whether a moratorium or ban would help or hinder the development of the ISA's Mining Code should be considered. One might assume that more time would be beneficial for the more careful development of regulations, but it is plausible that a ban may stall regulatory development. At the moment, however, all states that have called for a moratorium or ban remain actively involved in the development of the Mining Code.

International Cooperation: The work of the ISA can affect the desire of states to cooperate in the management of common heritage but also ocean governance more broadly. Discussion would be warranted on how a non-use measure may affect cooperation, how cooperation can be encouraged despite a non-use measure, and how such a measure would sit alongside other ocean governance processes and commitments.

Public Participation: A wide range of stakeholders should be involved in the ISA's decision-making process, including cultural knowledge holders and Indigenous Peoples, civil society groups, the scientific community, and underrepresented groups, such as youth. Discussion is warranted on whether a non-use measure would align with the views of these stakeholders¹¹⁹ and indeed whether a delay in DSM may offer time to improve public participation in ISA governance.¹²⁰

Surveillance, Compliance and Enforcement: Institutions, procedures, and tools will need to be developed to either monitor compliance of DSM activities or a moratorium. Presumably, ensuring compliance with the moratorium would be easier than surveillance and enforcement of multiple active operations, but technical and financial resources will still need to be secured for either option.

Sustainable Alternatives and Innovation: Whether a moratorium would indeed encourage research and investment into sustainable

119 Ranganathan (n 50).

120 E. Morgera and H. Lily, "Public Participation at the International Seabed Authority: An International Human Rights Law Analysis" (2022) 31(3) *Review of European, Comparative & International Environmental Law* 374–388, 374.

alternatives to DSM, such as recycling and new battery technologies, is an oft-stated position by those in favour of a moratorium, which deserves further critical analysis.

DSM in Areas Under National Jurisdiction: A further point of discussion could be the effect any non-use measures in the Area might have on DSM in areas under national jurisdiction. On the one hand, a non-use measure for DSM in the Area may increase the likelihood of DSM in areas under national jurisdiction. Any lessons learned from national jurisdiction may inform future regulation of DSM in the Area. On the other hand, an embargo, a supply chain or consumer boycott or continuing lack of social license of DSM which may accompany a non-use measure for DSM in the Area may decrease the likelihood of DSM anywhere.

6 Conclusion

Recent discussions, both within and outside of the ISA, on the possibility of a DSM moratorium have led to the unearthing of a broad range of issues, as outlined in this chapter. A potential non-use measure for DSM may be temporary or permanent and encompass the whole Area or focus only particular areas or seasonal closures. As this chapter has demonstrated, enforcing a non-use measure could involve a broad range of actors. In deciding for or against a non-use measure, the ISA will need to grapple with complex policy considerations that it has hitherto largely avoided. Indeed, Member States are cautious and careful in their deliberations at the ISA, often electing to take decisions by consensus and in the spirit of compromise in order to avoid political repercussions. Whatever course is chosen by the ISA Member States, it is clear that the decisions will be difficult, possibly protracted, and likely contentious. The recent pressure that is being applied to the ISA by a handful of parties keen to mine in the short-term will need to be tempered by the requirement that these common heritage mineral resources are managed over a much longer term for the collective benefit of humankind as a whole.

Non-use Measures for the Protection of the Marine Environment in the Area

Regional Environmental Management Plans at the International Seabed Authority

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1 Introduction

Deep-seabed mining is a growing industry concerned with extracting minerals from the ocean floor at depths greater than 200 meters below sea level. Different mining areas, known as mineral provinces, have unique geological and geochemical conditions that lead to the formation of mineral deposits such as polymetallic nodules, polymetallic sulphides, and cobalt-rich ferromanganese crusts. These deposits contain commercially valuable elements like copper, manganese, nickel, cobalt, precious metals, and rare earth elements. However, these mineral resources are non-renewable and mining them can permanently alter deep-sea habitats, raising significant environmental concerns across civil society groups, academia, and policy makers. In the seabed beyond national jurisdiction, referred to as 'the Area', these resources are considered the common heritage of humankind and are under the responsibility of the International Seabed Authority (ISA or Authority).¹

The ISA is an autonomous international organisation established under the United Nations Convention on the Law of the Sea (UNCLOS).² It became operational in 1996, after the entry into force of UNCLOS and the 1994 Agreement relating to the Implementation of Part XI of UNCLOS, which amended some provisions related to economic aspects of deep-seabed mining. The primary mandate of the ISA is to organise and control deep-seabed mining activities in the Area for the benefit of humankind as a whole.³ It is tasked with developing

* The views expressed in this chapter derive exclusively from my former affiliation as Assistant Professor of Public International Law, Utrecht University (The Netherlands) and are not endorsed by nor represent the views of my current employer.

1 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397, art 136.

2 *ibid* art 156.

3 *ibid* art 157.

and establishing rules, regulations, and procedures in relation to prospecting, exploration, and exploitation of mineral resources of the Area, while ensuring the protection of the marine environment from the harmful effects arising from activities in the Area.⁴ Indeed, according to Article 145 of UNCLOS, the Authority is responsible for “the protection and conservation of the natural resources of the Area and the prevention of damage to flora and fauna of the marine environment”.

Since its establishment, the ISA has approved 31 contracts⁵ for mineral exploration in four different mineral provinces of the Area. Each province is characterised by the presence of one or more types of resources and environments. The Clarion-Clipperton Fracture Zone (CCZ) in the Central Pacific Ocean and the Northern Mid-Atlantic Ridge (N-MAR) in the Atlantic Ocean are characterised respectively by polymetallic nodules and sulphide deposits, while the Indian Ocean and the Northwest Pacific Ocean host a mix of mineral resource types.

To ensure environmental protection, the ISA is developing policies and procedures, such as Environmental Impact Assessments (EIAs), Environmental Management and Monitoring Plans (EMMPs), and Regional Environmental Management Plans (REMPs).⁶ While the first two procedures are under the contractors’ responsibility with the ISA overseeing the results, REMPs are designed and developed by the ISA. REMPs are environmental policy tools in which spatial and “other management tools to support informed decision-making

4 *ibid* arts 1, 2, 3, 145; L. M. Wedding et al, “Managing Mining of the Deep Seabed” (2015) 349 *Science* 144; M. Lodge et al, “Seabed Mining: International Seabed Authority Environmental Management Plan for the Clarion-Clipperton Zone. A Partnership Approach” (2014) 49 *Marine Policy* 66.

5 The cobalt-rich ferromanganese crusts exploration contract sponsored by Brazil in the South Atlantic Ocean has been voluntarily terminated in 2022. However, on 26 July 2024, the Council approved a plan of work for exploration for polymetallic sulphide by the Earth System Science Organization-Ministry of Earth Sciences of the Government of India on the Area of the Indian Ocean (ISBA/29/C/23), leaving the current number (as of September 2024) of active contracts to 31, see ISA, “Exploration Contracts”, available at <<https://www.isa.org.jm/exploration-contracts/>> accessed 15 September 2024.

6 ISA Council, “Preliminary strategy for the development of regional environmental management plans for the Area” (2018) ISBA/24/C/3; ISA Council, “Statement by the President of the Council on the work of the Council during the first part of the twenty-fourth session” (2018) ISBA/24/C/8, para 9. Some forms of environmental assessment and monitoring procedures are already established under the exploration regulations (Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (22 July 2013) ISBA/19/C/17; Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area (15 November 2010) ISBA/16/A/12/REV.1; Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area (27 July 2012) ISBA/18/A/11) but specific EIAs and EMMPs for exploitation activities are currently being negotiated by the Council.

processes that balance resource development with conservation”⁷ can be adopted, established, and enforced by the ISA. REMPs are established before the start of any exploitation activity in the Area and reviewed every 5 years.⁸ The primary tools found within the REMPs for protecting the environment and its biodiversity are spatial measures, or area-based management tools (ABMTs), in which all mining activities are prohibited.

The characterisation of those ABMTs as non-use measures is in agreement with the definition of the term ‘non-use’ used by Guggisberg in Chapter 2 of this volume, ie ‘the absence of use’ of one or more natural resources in a given geographical space. The ABMTs prohibiting use that are included in the REMPs are hereafter referred to as ‘non-use measures’ or ‘non-mining measures’. The nature of these non-use measures remains sectoral towards deep-seabed mining activities only, since they are implemented to prevent the extraction of non-renewable mineral resources from the deep seabed.

REMP development is taking place in the four mineral provinces where exploration licenses have been granted. Currently, the only adopted REMP is in the CCZ in the Pacific Ocean.⁹ Three others REMPs are at different stages of development, with the most advanced in the N-MAR, followed by the North-west Pacific Ocean and the Indian Ocean. Despite being an ongoing strategy for the protection of the marine environment, a REMP standardised development

7 ISA, “Regional Environmental Management Plans”, available at <<https://www.isa.org.jm/protection-of-the-marine-environment/regional-environmental-management-plans/>> accessed 15 September 2024.

8 REMPs are part of the ISA policy agenda for environmental management and occupy a central role among the strategic actions toward protecting the marine environment, as reflected in the Strategic Plan of the Authority for the year 2019–2023 and on its High-level action plan. REMPs are part of the instruments to contribute to the achievement of the 2030 Agenda for Sustainable Development, see ISA Assembly, “Decision of the Assembly of the International Seabed Authority to the strategic plan of the Authority for the period 2019–2023” (2018) ISBA/24/A/10, Strategic direction 3.2. Note the Strategic Plan of the Authority has been extended until 2025, and the High-level action plan is under review to accommodate the extension, see ISA Assembly, “Consideration, with a view to adoption, of the extended high-level action plan of the International Seabed Authority for the period 2019–2025” (2024) ISBA/29/A/8. See also ISA, “The Contribution of the International Seabed Authority to the Achievement of the 2030 Agenda for Sustainable Development” (2021), available at <https://www.isa.org.jm/wp-content/uploads/2021/02/ISA_Contribution_to_the_SDGs_2021.pdf> accessed 15 September 2024; ISA, “Draft regulations on exploitation of Mineral resources in the Area. Consolidated text” (2024) ISBA/29/C/CRP.1, reg 44bis.

9 ISA Council, “Decision of the Council of the International Seabed Authority relating to the review of the environmental management plan for the Clarion-Clipperton Zone” (2021) ISBA/26/C/58.

procedure is still under discussion between the ISA member States.¹⁰ The unique and complex REMP development procedure is the subject of the analysis conducted in this chapter.

The chapter starts with a brief overview of deep-seabed mining governance, through a discussion of the structure and organs of the ISA and their role in the development of non-use measures, as well as a presentation of REMPs and the non-use measures found therein (section 2). Section 3 then focuses on the timeline of events that led to the creation and implementation by the ISA of 'non-use measures' within the context of REMPs, as well as the conditions under which these non-use measures have been adopted or are to be adopted. To do so, we discuss and compare the process for the development of the CCZ REMP that led to the adoption of areas of particular environmental interest (APEIS) as non-mining measures and the process for the development of the N-MAR REMP that proposed sites in need of protection (SiNPs) and areas in need of protection (AiNPs).

2 Deep-Seabed Mining Governance

2.1 *The International Seabed Authority*

UNCLOS mandates the ISA to oversee seabed mining activities in the Area (prospecting, exploration, and exploitation of mineral resources),¹¹ on behalf of humankind,¹² and to take the necessary measures to ensure the effective protection of the marine environment.¹³ To fulfil its mandate, the ISA is developing the 'Mining Code', a legal and technical framework for deep-seabed mining, which includes rules, regulations, and procedures for mining activities in the Area, and which covers, amongst other things, marine environmental protection.¹⁴ While regulations on prospecting and exploration of minerals have

10 ISA Council, "Decision of the Council of the International Seabed Authority relating to the reports of the Chair of the Legal and Technical Commission" (2024) ISBA/29/C/24, para 12.

11 UNCLOS, art 157.

12 *ibid* art 160(1)(f)(i)-(g).

13 *ibid* art 145.

14 C. Blanchard, E. Harrould-Kolieb, E. Jones and M. L. Taylor, "The current status of deep-sea mining governance at the International Seabed Authority" (2023) 147 *Marine Policy* 105396.

been completed and adopted,¹⁵ the ISA is still in the process of developing the regulations for the exploitation of minerals (Draft Regulations).¹⁶

The ISA has three active principal organs: the Secretariat, the Assembly, and the Council,¹⁷ with its subsidiary organ: the Legal and Technical Commission (hereafter the Commission).¹⁸ The Secretariat is the ISA's administrative organ and consists of four offices with technical, legal, political, and administrative functions. It supports the other organs of the ISA, organising the annual sessions, workshops, and technical meetings. The Assembly, the plenary organ formed by all member States, has the final decision-making competence.¹⁹ The Council has legislative and executive authority on the Mining Code and environmental directives based on the recommendations from the Commission.²⁰ The Commission, now bringing together 41 experts in scientific disciplines as well as law, plays a central role in the formulation of rules and policy, including for environmental protection, and it has access to proprietary information acquired by the contractors to the ISA.²¹

Decision-making involves the Commission and the Council, with the Assembly having the final say in approving new measures and instruments. According to Article 165 of UNCLOS, recommendations from the Commission are reviewed and adopted by the Council or returned for further review.²² Both the Assembly and the Council have so far adopted decisions by consensus, but complex voting mechanisms are in place if needed.²³

Exploration contracts with the ISA are approved through a multi-step process starting with the Commission reviewing and making recommendations

15 Exploration regulations (n 6).

16 The need for initializing the regulations for exploitation dates back to the 17th session of the Authority in 2011, when the delegate of Fiji asked the President of the Council of the ISA to include the topic on the agenda of the following session. The current reference draft of the Exploitation regulations is the Consolidated text released on 16 February 2024 (n 8).

17 UNCLOS, art 158(1).

18 *ibid* arts 158(3), 163(1); Blanchard et al (n 14).

19 UNCLOS, arts 166–169; ISA, “The Secretariat”, available at <<https://www.isa.org.jm/organs/the-secretariat/>> accessed 15 September 2024.

20 UNCLOS, arts 161(1), 162.

21 *ibid* arts 163(2)–(3), 165 (e); ISA Council, “Decision of the Council of the International Seabed Authority relating to the election of members of the Legal and Technical Commission” (2022) ISBA/27/C/41.

22 UNCLOS, arts 160 (1)–(2) (f)(1) and (11).

23 *ibid* art 159(7)–(8); ISA Council, “Council rules of procedure” (1996) ISBA/C/12, art. 56(2), as per the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 (1994 Agreement) (adopted 16 November 1994, entered into force 28 July 1996) 1836 UNTS 3, which has amended the relevant provisions of UNCLOS, art 161(8).

about the applications. Then, following the recommendations of the Commission, if the Council approves the applications, the contract is granted, typically for 15 years.²⁴ As required by the Mining Code, contractors must meet work, financial, and environmental standards for the exploration phase. Before applying for the approval of their plan of work for the exploitation of the minerals on the seabed, contractors have to go through a relinquishment process which requires them to periodically renounce portions of their exploration area (eg 50% and 75% of the original area after eight and ten years respectively).²⁵

2.2 REMPS and Non-use Measures

REMPs are policy instruments developed by the ISA aimed at effectively managing and protecting the marine environment, including through non-use measures in regions targeted for deep-seabed mining. Simply speaking, REMPs include areas where mining is not allowed. Originating from the need to implement the precautionary approach mandated *ante litteram* by Article 145 of UNCLOS, REMPs are viewed as necessary to ensure the effective protection of the environment.²⁶

As will be examined in detail in section 3, REMP development involves various stakeholders and an expert-driven phase to identify and develop measures to preserve critical habitats, species, and ecosystem functions. Following recommendations by the Commission, REMPs are adopted by the Council and presented to the Assembly through a report of the Secretary General.²⁷ Concerns about inconsistent REMP development procedures have led to efforts to standardise the approach, as proposed by Germany, the Netherlands, and Costa Rica.²⁸ A first version of the standardised procedure was put forward in 2022²⁹ and the latest version to date was presented during the 29th session of

24 UNCLOS, art 162(2)(j).

25 Exploration regulations for polymetallic nodules (n 6) reg 27; Exploration regulations for crusts (n 6) reg 27.

26 ISA Council, "Guidance to facilitate the development of regional environmental management plans. Report and recommendations by the Legal and Technical Commission" (2022) ISBA/27/C/37.

27 ISA Assembly, "Report of the Secretary-General of the International Seabed Authority under article 166, paragraph 4, of the United Nations Convention on the Law of the Sea" (2013) ISBA/19/A/2, para 49.

28 ISA Council, "Procedure for the development, approval and review of regional environmental management plans. Submitted by the delegations of Germany and the Netherlands, with co-sponsorship by Costa Rica" (2020) ISBA/26/C/6; ISA Council, "Proposal for a template with minimum requirements for regional environmental management plans: a proposal for a standardized approach Submitted by the delegations of Germany and the Netherlands, with co-sponsorship by Costa Rica" (2020) ISBA/26/C/7.

29 ISBA/27/C/37 (n 26).

the ISA in July 2024.³⁰ Despite these efforts, the Council has not yet reached consensus on any of the proposed versions.³¹

As of September 2024, only the CCZ REMP has been adopted, with APEIs as non-mining measures.³² APEIs are very large square areas of 400 km of length per side, with an internal zoning: a core area of 200 × 200 km surrounded by a 100 km buffer zone. The core zone functions as full protection from direct and indirect impact of mining activities, while, in the buffer, indirect effects, such as the tail of a mining plume, are acceptable.

The N-MAR REMP is next in line, with SiNPs and AiNPs as proposed non-use measures.³³ SiNPs are 11 confirmed active hydrothermal vents within existing exploration contract areas. They are defined as individual fine-scale sites identified to preserve the integrity of ecosystems and communities, including their structure, function, and associated features, from the direct and indirect impacts of mineral resource exploitation. SiNPs will be safeguarded from such impacts through a customised zoning system, tailored to local oceanographic conditions, site-specific geography and also to the effects of mineral extraction technology.³⁴ AiNPs are three fracture zones described with the same

30 ISA Council, "Draft revised standardized procedure for the development, establishment and review of regional environmental management plans" (2024) ISBA/29/C/10; ISA LTC, "Recommendations on technical guidance for the development of Regional Environmental Management Plans in support of the Standardised Procedure and Template. Issued by the Legal and Technical Commission" (2024) ISBA/29/LTC/8.

31 ISBA/29/C/24 (n 10) para 12.

32 L. M. Wedding et al, "From Principles to Practice: A Spatial Approach to Systematic Conservation Planning in the Deep Sea" (2013) 280 *Proceedings of the Royal Society B: Biological Sciences* 20131684.

33 The N-MAR REMP proposal also includes Site and Areas in Need of *Precaution* (our emphasis). These are inferred hydrothermal vents sites and areas suitable for deep-sea corals that, based on remote measurements or habitat suitability models, could have an ecosystem significance and need protection. However, since these are site and areas yet to be identified as "in need of protection", and currently have no proposed management measures of non-use, they are not considered in the present analysis. It is worth noting that, in the latest REMP standardized procedure and guidance documents presented by the Commission to the Council during the 29th session in July 2024, SiNPs and AiNPs were no longer included as non-use measures. Site of Particular Environmental Interest (SPEIs) is the new terminology introduced in the new documentation, and this type of non-use measure seems to technically correspond with SiNPs. While the term SPEIs provides coherence with the APEIs of the CCZ REMP, the relation between SPEIs, AiNPs and Sites in Need of Precaution is still unclear. Since the Council has, as of September 2024, yet to formally approve these documents and the new terminology, the focus of the present chapter remains on the non-use measures that have been developed in detail and discussed so far, ie AiNPs and SiNPs.

34 ISA Council, "Regional environmental management plan for the Area of the northern Mid-Atlantic Ridge with a focus on polymetallic sulphide deposits" (2022) ISBA/27/C/38 (N-MAR REMP), paras 41–44.

criteria as SiNPs. However, they are large-scale areas. AiNPs are aimed at protecting regional-scale ecosystem features of ecological standing owing to their uniqueness and/or biodiversity, important in terms of basin-scale water mass exchange, biogeographical zonation and transition, connectivity and ecosystem function.³⁵ To safeguard these areas from mining impacts, management measures will have to include the design of zoning schemes with core protection zones and buffer zones. Currently, SiNPs and AiNPs are not enclosed in a defined spatial measure. The effective spatial measures and zoning to be adopted around SiNPs and AiNPs will need further assessment based on the local and regional environmental characteristics.³⁶

It is very important to keep in mind that APEIs and the proposed SiNPs and AiNPs represent very different approaches to non-use measures because their design is based on the environmental characteristics of the respective mineral provinces and the scientific knowledge available, as well as on different conservation criteria.

2.3 *Criteria for Non-use Measures Site Selection*

At the same time as the ISA was taking its first steps towards REMP development, criteria for the protection of open ocean and deep-sea habitats were established by other international organisations and entities such as the Food and Agriculture Organization (FAO) and the Conference of the Parties of the Convention of Biological Diversity (CBD). The FAO established criteria to identify Vulnerable Marine Ecosystems (VMEs),³⁷ and the CBD to identify Ecologically or Biologically Significant Marine Areas (EBSAs), and to design a representative network of marine protected areas (MPAs) in open ocean and deep-sea environments (henceforth network criteria) (Table 11.1).³⁸

During the CCZ REMP development process, the ISA recognised that the key design elements of APEIs resonated with the VME and network criteria,

35 *ibid* paras 37–40

36 *ibid* paras 39(c), 43(b).

37 VMEs are fisheries management areas established under the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas ((2008), available at <<https://openknowledge.fao.org/items/c552376c-a207-46a1-a49a-91a79c213989>> accessed 15 September 2024), to prevent adverse impact of bottom fisheries on vulnerable species, communities, or habitat in the high seas.

38 CBD COP, “Marine and Coastal Biodiversity, Convention of Biological Diversity” (2008) CBD COP 9 Decision IX/20, see Annex I “Scientific criteria for identifying ecologically or biologically significant marine areas (EBSA) in need of protection in open-ocean waters and deep-sea habitats” and Annex II “Criteria for the scientific guidance for selecting areas to establish a representative network of marine protected areas, including in open ocean waters and deep-sea habitats”.

but not with the EBSA criteria.³⁹ While different, these sets of criteria remain complementary to each other. Indeed, VME and EBSA criteria are normally used to identify a specific region, site or feature of ecological value (eg sea-mounts, hydrothermal vents, or coral reefs),⁴⁰ while network criteria are used to identify different ecologically valuable areas that are necessary for the maintenance of the marine environment function and ecosystems in a wider region (Table 11.1).

TABLE 11.1 Scientific criteria for VME (FAO), EBSA, and network of MPAs (CBD)

Sources	Scientific criteria
Vulnerable Marine Ecosystem (VME) Criteria from the International Guidelines for the Management of Deep-sea Fisheries in the High Seas ^a	Uniqueness or rarity; Functional significance of the habitat, fragility; Life-history traits of component species that make recovery difficult; Structural complexity
Scientific criteria for identifying ecologically or biologically significant marine areas (EBSA) in need of protection in open-ocean waters and deep-sea habitats ^b	Uniqueness or rarity; Special importance for life-history stages of species; Importance for threatened, endangered or declining species and/or habitats; Vulnerability, fragility, sensitivity, or slow recovery; Biological productivity; Naturalness
Scientific guidance for selecting areas to establish a representative network of marine protected areas, including in open ocean waters and deep-sea habitats ^c	EBSA criteria (see above); Representativity; Connectivity; Replicated ecological features; Adequate and viable sites

a FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas (n 37)

b CBD COP 9 Decision IX/20 (n 38) annex I

c *ibid* annex II

TABLE PREPARED BY ELISABETTA MENINI

39 ISA LTC, “Environmental Management Plan for the Clarion Clipperton Zone” (2011) ISBA/17/LTC/7 (CCZ REMP), para 27. Unfortunately, the document does not explain why EBSA criteria are not relied upon, see para 29.

40 EBSA criteria have been used by themselves to describe non-management areas in the ocean that are ecologically and biologically significant regardless of their inclusion in a network of areas. EBSAs are described through a scientific process and adopted by the CBD COP, see CBD COP Decision IX/20 (n 38).

In the CCZ REMP, nine initial APEIs⁴¹ were designed to protect 30 to 50 per cent of the total management area, maintaining the representativity of a full range of habitats, and minimum viable populations, while avoiding overlaps with explorations areas to avoid environmental impacts.⁴² The criteria were hence similar to the CBD network criteria, which also include representativity and viability (which inform the size of the area to protect). To decide where the APEIs would be located and with the limited data available at the time of the first draft of the management plan, the Commission focused on the biophysical gradients affecting the faunal distribution and biodiversity in the CCZ.

In contrast, in the N-MAR REMP, the identification of SiNPs and AiNPs did not follow the network criteria. Instead, it focused on renown ecologically important features in the deep Atlantic Ocean, namely hydrothermal vents and fracture zones described through VME and EBSA criteria.⁴³

2.4 *Legal Nature of REMPs and Non-use Measures*

Being environmental policy instruments, REMPs could be seen as devoid of legally binding effects. In fact, even before the CCZ REMP was first approved, challenges arose, with opinions fluctuating between characterising REMPs as legally binding instruments and limiting their function to an advisory one.⁴⁴ It was even debated whether establishing such instruments fell under the mandate of the ISA. This issue was solved by arguing that REMPs are recommended by the Commission, and then adopted by the Council in line with its powers under Articles 145, 162, and 165 of UNCLOS. Article 145 provides that adopting the necessary and appropriate measures to guarantee the protection of the marine environment from the harmful effects generated by activities in the Area falls under the Authority's mandate. Further, being the executive organ of the ISA, the Council has the power to establish the specific policies to be pursued by the Authority on any question or matter within the competence of the Authority;⁴⁵ this therefore includes REMPs and their non-use measures.⁴⁶

41 Four additional APEIs were designed during the CCZ REMP revision in 2021, further explained in section 3.1 below.

42 CCZ REMP (n 39).

43 N-MAR REMP (n 34) Annex IV.

44 C. Blanchard and S. Gollner, "Area-based management tools to protect unique hydrothermal vents from harmful effects from deep-sea mining: A review of ongoing developments" (2022) 4 *Frontiers in Political Science*.

45 UNCLOS, arts 1, 162.

46 M. Lodge, "International Seabed Authority" (2011) 26(3) *International Journal of Marine and Coastal Law* 468.

Although not legally binding per se, REMPs are important conservation and management tools with a central role in the Draft Regulations.⁴⁷ Indeed, regulation 44bis provides that “[t]he Commission shall [only] consider an application for a Plan of Work [if a] Regional Environmental Management Plan [has been adopted] by the Council for the particular area and type of resource concerned”, and that “[i]n the event that an application for a Plan of Work is submitted for an area where no such Regional Environmental Management Plan exists, the drafting of a Regional Environmental Management Plan applicable to the area in concern shall be prioritised”.⁴⁸ The recognition, in what is intended to become a legally binding instrument (ie the Draft Regulations), of the necessity for a REMP to be in place before exploitation starts and to prioritise their development reiterates the importance of these instruments and of the non-use measures found therein as conservation and management tools, despite their non-legally binding nature.

3 REMP Development and Reviews

Current REMPs’ procedures differ by mineral province, but they include similar key stages and actors. They start with an initial stage where scientific information and environmental data are compiled and synthesised into a Regional Environmental Assessment (REA) which describes the environmental knowledge and a Data Report which includes all usable data for spatial analysis.⁴⁹ These products are compiled by or in collaboration with contractors and scientific experts.⁵⁰ This is followed by an expert- and stakeholder-driven phase where information is analysed, during a series of technical workshops, to identify important areas for ecosystem preservation, guided by conservation principles and criteria, and facilitated by the Secretariat and Commission.⁵¹

47 ISA Council, “Relationship between the draft regulations on exploitation of mineral resources in the Area and regional environmental management plans. Note by the Secretariat” (2018) ISBA/25/C/4, para 6; Consolidated text (n 8) regs 44, 44bis, 44ter. The remaining brackets in the text indicating a lack of consensus.

48 Consolidated text (n 8) regs 44, 44bis.

49 ISBA/27/C/37 (n 26). According to the latest REMP standardised procedure (ISBA/29/C/10), REA are now referred to as Regional Environmental Characterization (REC).

50 P. P. E. Weaver et al, “Regional Environmental Assessment of the Northern Mid-Atlantic Ridge” (2019) *ISA Technical Study No 28*; J. Cleary et al, “Data Report: Workshop on the Regional Environmental Management Plan for the Area of the Northern MidAtlantic Ridge” (2019) *Atlantic REMP Project*.

51 ISA, “Report of the workshop on the Regional Environmental Management Plan for the area of the Northern Mid-Atlantic ridge” (2020), available at <<https://www.isa.org.jm>

At that stage, the experts identify areas where mining activities should be prohibited, and they propose non-use measures. After the workshops, the Commission drafts the REMP proposal and submits it to the Council for adoption.

In this section, a thorough description and comparative analysis of the development and decision-making processes that led to the adoption of the CCZ REMP (3.1) and the N-MAR REMP (3.2) serve as the foundation for examining how these processes have influenced the nature and content of the non-use measures (3.3), and the crucial roles played by scientific data in those processes (3.4).

3.1 *REMP for the Clarion-Clipperton Fracture Zone*

Since it was first explored, the CCZ has garnered attention as the most promising mineral province for its polymetallic nodule's abundance and ore grade.⁵² The CCZ is a seabed region between Hawaii and Mexico in the eastern Pacific Ocean.⁵³ Its extent in km² is bigger than Europe. Its environment is heterogeneous, with a prevalence of large abyssal plains, sparse seamounts and abyssal hills, and channels along the fracture zones.⁵⁴

The recognition of the need to intervene with an environmental management plan in the CCZ arose from the growing number of exploration contracts granted by the ISA within that region, going from six exploration contracts in the CCZ in 2001 to 17 at present.⁵⁵

The process that led to the adoption of the CCZ REMP started in 2007 with the results of a collaborative project between the ISA, mining contractors, and scientists, to improve the knowledge of biodiversity distribution across the CCZ region, named the Kaplan Project.⁵⁶ It proposed the establishment of a

/publications/report-of-the-workshop-on-the-regional-environmental-management-plan-for-the-area-of-the-northern-mid-atlantic-ridge/> accessed 15 September 2024.

52 E. N. Shor, *Scripps Institution of Oceanography: probing the oceans 1936 to 1976* (Tofua Press 1978) 373–438.

53 P. Halbach, G. Friedrich and U. von Stackelberg (eds), *The manganese nodule belt of the Pacific Ocean: geological environment, nodule formation, and mining aspects* (Enke 1988).

54 S. Kaiser, C. R. Smith, and P. M. Arbizu, "Editorial: Biodiversity of the Clarion Clipperton Fracture Zone" (2017) 47 *Marine Biodiversity* 259.

55 ISA, "Minerals: Polymetallic Nodules" (2023), available at <<https://www.isa.org.jm/exploration-contracts/polymetallic-nodules/>> accessed 15 September 2024. As of September 2024, there were still 17 existing exploration contracts for nodules in the CCZ.

56 The Kaplan Project ran from 2002 to 2007 and concluded with a workshop funded by The Pew Charitable Trusts: "Design Marine Protected Areas for Seamounts and the Abyssal Nodule Province in Pacific High Seas" (23–26 October 2007). More information can be found on the Kaplan Project at ISA, "The KAPLAN Project: Biodiversity, species ranges, and gene flow in the abyssal Pacific nodule province, predicting and managing

representative network of MPAs in order to protect the biodiversity structure and ecosystem functioning of the CCZ from the potential impact of human activities. At the same time, the United Nations General Assembly highlighted, with resolution 63/111,⁵⁷ the urgency for international organisations to consider ways to improve the management of marine biodiversity in specific deep-sea habitats, such as seamounts and hydrothermal vent sites, based on available scientific information and the precautionary approach.

Following the outcomes of the Kaplan project,⁵⁸ the Commission presented, in 2008, recommendations for the “general design and guidelines for a system of preservation reference areas in the CCZ”.⁵⁹ The recommendations also included a set of scientific and practical guidelines for the design, positioning and size of non-mining areas based on the scientific data and knowledge available at the time.⁶⁰ The CCZ area was divided in nine sectors based on nutrients intake gradient, bathymetry, topography, and larval dispersal studies.⁶¹ This guided the positioning of the nine non-mining areas, in order to protect the full range of habitats and biodiversity across the CCZ. This first proposal had non-mining areas overlapping, however minimally, with existing mining claims.⁶²

Taking into consideration the potential conflicts with the tenure over areas allocated for exploration, these non-mining areas, from this point called APEIS, were then moved completely outside of the exploration contracts in the CCZ

the impacts of deep seabed mining” (2012), available at <<https://www.isa.org.jm/kaplan-project-biodiversity-species-ranges-and-gene-flow-abyssal-pacific-nodule/>> accessed 15 September 2024.

57 UNGA Res A/63/111 (2008) GAOR 63rd Sess, Supp 49, para 132.

58 Kaplan project (n 56); C. R. Smith et al, “Preservation reference areas for nodule mining in the Clarion-Clipperton zone: rationale and recommendations to the International Seabed Authority” (2008) Report of the workshop to Design Marine Protected Areas for Seamounts and the Abyssal Nodule Province in Pacific High Seas, 23–26 October 2007, University of Hawaii at Manoa, available at <http://www.soest.hawaii.edu/oceanography/faculty/csmith/MPA_webpage/documents/Smith%20et%20al.%20-%20Recommendations%20to%20the%20ISA%20for%20design%20of%20PRA%20in%20the%20CCZ%20-%202002-2008.pdf> accessed 15 September 2024.

59 ISA LTC, “Rationale and Recommendations for the Establishment of Preservation Reference Areas for Nodule Mining in the Clarion-Clipperton Zone. Summary outcomes of a workshop to design marine protected areas for seamounts and the abyssal nodule province in Pacific high seas, held at the University of Hawaii at Manoa, Hawaii, United States of America, from 23 to 26 October 2007” (2008) ISBA/14/LTC/2; CCZ REMP (n 39).

60 Smith et al (n 58).

61 ISBA/14/LTC/2 (n 59).

62 For other options, see Figure 3 in Wedding et al (n 32).

REMP draft.⁶³ The relocation of APEIS, implemented to recognise the rights of exploration contracts' holding entities, reduced the innovativeness of the first proposal, which was bent to the exploratory logic in force instead of following an ecosystem-based approach.⁶⁴

Finally, the CCZ REMF was adopted on 26 July 2012, as a 'living' document, meaning that the size, location, and number of APEIS would be reconsidered when new scientific information became available. Acknowledging the flexible nature of the REMF and the need for regular reviews every five years, the Council decided to adopt the plan without substantial modifications. The Council operationalised the CCZ REMF by approving its implementation, including the designation, on a provisional basis, of the nine APEIS' network, over an initial three-year period.⁶⁵ It also decided that, for a period of five years or until further review by the Commission or the Council, no application for approval of a plan of work for exploration or exploitation should be granted in areas overlapping with APEIS.⁶⁶

Following the Council's decision, the REMF update was scheduled to be undertaken before the end of the APEI three-year designation period in 2016.⁶⁷ However, research expeditions took place slightly before and around the deadline,⁶⁸ so the Commission decided to postpone the review.⁶⁹ The new data from contractors shared with the Commission was presented at a 2018 workshop, together with other public data available.⁷⁰ In 2020, new studies identified an increased number of different habitats based on environmental characteristics as well as size, density, and distribution of polymetallic nodules.⁷¹ Finally, in June 2021, the Commission confirmed the nine already established

63 CCZ REMF (n 39).

64 A. Jaeckel, "The International Seabed Authority and the Seabed Mining Regime" in *The International Seabed Authority and the Precautionary Principle* (Brill Nijhoff 2017).

65 ISA Council, "Decision of the Council relating to an environmental management plan for the Clarion Clipperton Zone" (2012) ISBA/18/C/22, para 1.

66 *ibid* para 6.

67 ISA LTC, "Review of the implementation of the environmental management plan for the Clarion-Clipperton Fracture Zone Prepared by the secretariat" (2016) ISBA/22/LTC/12.

68 The Abyssline baseline Project (2013–2017) research cruises ABO1 and ABO2 were carried out in one license area; and the JPI Oceans Mining Impact project (2015–2017) research expedition SO239 was conducted in several license areas as well as in APEIS 3 and 6.

69 ISBA/26/C/58 (n 9).

70 ISA Council, "Review of the implementation of the Environmental Management Plan for the Clarion-Clipperton Zone Report and recommendations of the Legal and Technical Commission" (2021) ISBA/26/C/43.

71 K. A. McQuaid et al, "Using Habitat Classification to Assess Representativity of a Protected Area Network in a Large, Data-Poor Area Targeted for Deep-Sea Mining" (2020) 7 *Frontiers in Marine Science* 1066; K. Uhlenkott et al, "Investigating the Benthic Megafauna in the Eastern Clarion Clipperton Fracture Zone (North-East Pacific) Based on

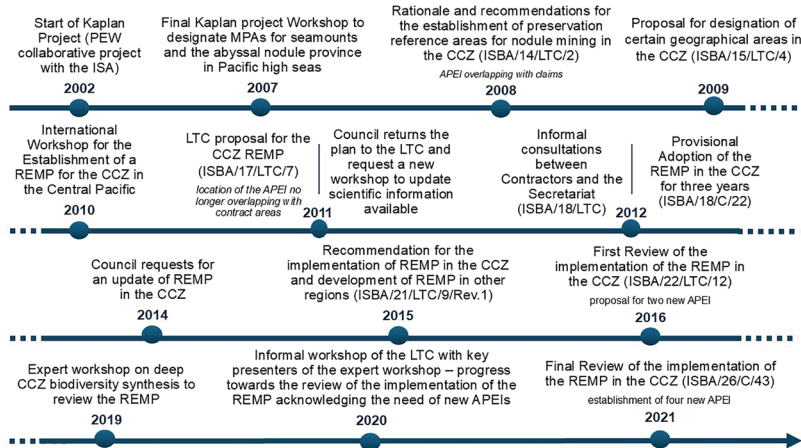


FIGURE 11.1 Events shaping the development of the Regional Environmental Management Plan for the Clarion-Clipperton Fracture Zone

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APEIs and identified four additional ones that were ultimately included in the review of the REMP.⁷² Data availability affected the timing of the REMP review. The delay of the Commission in making the recommendation about the new APEIs was also due to one particular case. APEI 13, the APEI now located in the centre of the CCZ province, overlaps with an area set aside for exploration by the American company Lockheed Martin Cfr.⁷³ The license was one of the four granted under the US Deep Sea Hard Mineral Resources Act, an interim domestic legal regime established for deep-seabed mining in the high seas in anticipation of the possible ratification of UNCLOS by the USA.⁷⁴ After the relinquishment of two of the licenses in 1999, two remained in the CCZ. Notwithstanding the existence of the US domestic legal regime, the company never undertook any activities in the Area, citing unfavourable economic conditions to tackle exploration.⁷⁵ In light of this, and because the license is

Distribution Models Predicted with Random Forest" (2022) 12 *Scientific Reports* 8229. See also the discussion in chapter 9 of this volume.

72 ISBA/26/C/58 (n 9).

73 US Department of Commerce and National Oceanic & Administration, "Deep Seabed Mining: Approval of Exploration License Extensions" (2022) 87(166) *Federal Register* 52743.

74 Seabed Hard Mineral Resources Act (2002) 30 U.S.C. §§1401–1473.

75 C. Keating-Bitonti, "U.S. Interest in Seabed Mining in Areas Beyond National Jurisdiction: Brief Background and Recent Developments" (2024) *Congressional Research Service In Focus* IF12608, available at <<https://crsreports.congress.gov/product/pdf/IF/IF12608>> accessed 15 September 2024.

not internationally recognised, the Commission decided that the overlap was not an impediment to the designation of APEI 13, which aimed at including different habitat types present in the central area of the CCZ and improving the overall network.⁷⁶ In summary, following the 2021 review, the CCZ REMP contains a network of 13 APEIs (non-mining areas) dedicated to the protection of the ecosystem, where scientific research is the only activity allowed.

3.2 *Draft REMP for the Mid-Atlantic Ridge*

The minerals of interest in the N-MAR are massive sulphide deposits associated with active, inactive or extinct hydrothermal vents along the mid-ocean ridge or other marine volcanic edifices.⁷⁷ Hydrothermal vents are deep-sea ecosystems of great scientific interest because they are like oases for biological communities composed of vent-obligated species. Therefore, the attention of scientific experts in preserving hydrothermal vents is exceptionally high.

Along the N-MAR, three contracts of exploration for polymetallic sulphide deposits were signed between 2012 and 2018, with Russia, France, and Poland.⁷⁸ The contract areas are distributed along the length of the ridge for approximately 370 km, and all the known active hydrothermal vents in the region fall within contract blocks, therefore putting the vent ecosystems at risk of harm.⁷⁹ As polymetallic sulphide deposits can develop over and under the seabed, their exploitation would leave scars along seamounts and ocean ridges, changing the substrate's properties and causing significant habitat loss.⁸⁰

The scientific knowledge associated with the N-MAR is more site-specific than in other mineral provinces.⁸¹ The large amount of scientific information

⁷⁶ ISBA/26/C/43 (n 70) para 15, Annex.

⁷⁷ R. E. Boschen et al, "Mining of Deep-Sea Seafloor Massive Sulphides: A Review of the Deposits, Their Benthic Communities, Impacts from Mining, Regulatory Frameworks and Management Strategies" (2013) 84 *Ocean Coastal Management* 54.

⁷⁸ ISA, "Minerals: Polymetallic Sulphides" (2023), available at <<https://www.isa.org.jm/exploration-contracts/polymetallic-sulphides/>> accessed 15 September 2024.

⁷⁹ G. Ardito, G. Andreone and M. Rovere, "Overlapping and fragmentation in the protection and conservation of the marine environment in areas beyond national jurisdiction" (2023) 9 *Frontiers in Marine Science* 1094266.

⁸⁰ B. J. Murton et al, "Geological fate of seafloor massive sulphides at the TAG hydrothermal field (Mid-Atlantic Ridge)" (2019) 107 *Ore Geology Reviews* 903–925; P. E. Weaver and D. Billett, "Environmental impacts of nodule, crust and sulphide mining: an overview" in Rahul Sharma (ed), *Environmental issues of deep-sea mining: Impacts, consequences and policy perspectives* (Springer 2019) 27–62.

⁸¹ A. D. Thaler and D. Amon, "262 Voyages Beneath the Sea: a global assessment of macro- and megafaunal biodiversity and research effort at deep-sea hydrothermal vents" (2019) *PeerJ* e7397.

has been acquired through several scientific expeditions and well-established international collaborations between governmental and academic institutions.⁸²

In 2004, the ISA initiated a technical study on managing polymetallic sulphide mining, conducting various scientific workshops with experts to develop guidelines and identify research priorities.⁸³ The technical study recommendations included the newly developed VME, EBSA, and network criteria to determine non-mining areas encompassing hydrothermal vents.

Subsequent to the ISA's work, a multi-year project involving numerous experts operating in the North Atlantic Ocean collected environmental data to establish a roadmap for the development of a Strategic Environmental Management Plan for Mining in the Mid-Atlantic (SEMPIA). A final workshop was organised in 2015 with the support of the European Commission and other organisations,⁸⁴ inviting representatives of the ISA, who however could not participate for budgetary constraints but welcomed the external initiatives by the scientific community.⁸⁵ The workshop gathered numerous stakeholders, including scientists and experts of the region in different disciplines, contractors, and representatives from intergovernmental organisations.⁸⁶ The report showed that most of the information available regarding the N-MAR was related to hydrothermal vents, while the rest of the benthic environment remained poorly known, an

82 R. E. Boschen-Rose and A. Colaco, "Northern Mid-Atlantic Ridge Hydrothermal Habitats: A Systematic Review of Knowledge Status for Environmental Management" (2021) 8 *Frontiers in Marine Science* 657358.

83 C. L. Van Dover et al, "Environmental management of deep-sea chemosynthetic ecosystems: justification of and consideration for a spatially-based approach" (2011) *ISA Technical Study No 9*.

84 The SEMPIA Workshops were supported by funding from the European Union Seventh Framework Programme (FP7/2007–2013) under the Managing Impacts of Deep-Sea Resource Exploitation (MIDAS) Project (grant agreement no 603418), Direção Regional dos Assuntos do Mar, Governo Regional dos Açores, the Deep-Sea Conservation Coalition, the PEW Charitable Trusts, the Deep Sea Conservation Coalition, the Kaplan Fund, and Oceans 5.

85 ISA LTC, "Implementation of the environmental management plan for the Clarion-Clipperton Fracture Zone and development of other environmental management plans in the Area. Note by the secretariat" (2015) ISBA/21/LTC/9/REV.1, para 10; ISA Council, "Report of the Chair of the Legal and Technical Commission on the work of the Commission during the twenty-first session of the International Seabed Authority" (2015) ISBA/21/C/16.

86 For the list of participants and their affiliation, see in D. C. Dunn et al, "A Strategy for the Conservation of Biodiversity on Mid-Ocean Ridges from Deep-Sea Mining" (2018) 4 *Science Advances* eaar4313.

impediment to understanding the impact of mining at the regional level.⁸⁷ Following the results of the 2015 SEMPIA workshop, some of the participants addressed this regional knowledge gap by modelling a set of environmental data to assess network performance.⁸⁸ This was in line with the scientific conservation goals and network design standards used to create APEIS, but did not consider the legal and socioeconomic factors associated with existing exploration contracts and commitments.⁸⁹ As some of the experimental APEIS' scenarios partially overlapped with the licenses, they were not used during the N-MAR REMP development procedure, but the information collected was incorporated within the Data Report as background information.⁹⁰

All the information collected through the ISA technical study,⁹¹ the REA by the Atlantic REMP project funded by the European Commission in support of the ISA, and a Data Report drafted by the Marine Geospatial Ecology Lab of Duke University, was brought into the REMP development procedure as supportive documentation.⁹² The development of the N-MAR REMP by the ISA took place through three workshops curated by the Office of Environmental Management and Mineral Resources of the ISA's Secretariat and followed the process schematised in Figure 11.2.⁹³ The first two workshops (Szczecin-Poland 2018 and Evora-Portugal 2019) focused on the scientific assessment of the region, while the third one (online 2020) was dedicated to management approaches.⁹⁴ Through a call for nomination, participants were selected by the ISA based on their level of scientific expertise in this region.⁹⁵ Numerous participants attended all three REMP workshops, and participated to the previous technical study and SEMPIA project, which ensured continuity in terms of

87 T. Morato et al, "Towards Development of a Strategic Environmental Management Plan for Deep Seabed Mineral Exploitation in the Atlantic Basin (Pre-Workshop Data Report)" (2015), available at <http://www.eu-midas.net/sites/default/files/Workshops/SEMPIA/SEMPIA_Data_Report_lowres.pdf> accessed 15 September 2024.

88 Dunn et al (n 86).

89 *ibid.*

90 Weaver et al (n 50); Cleary et al (n 50).

91 Van Dover et al (n 83).

92 ISA, "Workshop on the Regional Environmental Plan for the Area of the Northern Mid Atlantic Ridge" (2019), available at <<https://www.isa.org.jm/events/workshop-on-the-regional-environmental-plan-for-the-area-of-the-northern-mid-atlantic-ridge/>> accessed 15 September 2024.

93 For responsibility of the Office of Environmental Management and Mineral Resources, see ISA (n 19); ISBA/27/C/37 (n 26) Table at 4.

94 Workshop on the Development of a REMP for the Area of the Northern Mid-Atlantic Ridge with a Focus on Polymetallic Sulphides Deposits (Virtual Meeting, 23 November 2020-4 December 2020).

95 ISA Workshop 2019 (n 92).

institutional knowledge of the REMP procedure as well as scientific knowledge of the available data and gaps.

It was during the Evora workshop in 2019 that non-use measures for the N-MAR were first discussed. The workshop participants suggested the creation of two types of non-use measures based on the morphological structure and size of individual locations known to be ecologically important in the area: the 11 active vent systems were described as SiNPs, and the three fracture zones in the region as AiNPs using VME and EBSA criteria.

After the third expert management-focused workshop, which happened virtually in 2020, the Draft N-MAR REMP was released in April 2022 for a public stakeholder consultation period of 50 days. This was the first public consultation in the history of REMPs.⁹⁶ Delegations, observers, and scientists made numerous submissions, some of which were incorporated in the August 2022 version and still remain in the current draft.⁹⁷

Two main challenges were highlighted in the submissions made by stakeholders during the public consultation.⁹⁸ The first challenge is related to the absence of ABMTs enclosing SiNPs and AiNPs. The draft specifies that the definition of discrete ABMTs with core and buffer zones to protect SiNPs and AiNPs will require location-specific measures based on the information that the contractors will deliver to the Commission.⁹⁹ The second challenge is the lack of application of network criteria in the Draft N-MAR REMP.¹⁰⁰ While central to the CCZ REMP design, network criteria were only discussed, but not applied during the N-MAR REMP development, because workshop participants decided to prioritise well-known individual sites and proposed them as

96 ISA, "Draft regional environmental management plan for the northern Mid-Atlantic Ridge open for consultation until 3 June" (14 April 2022), available at <<https://www.isa.org.jm/news/draft-regional-environmental-management-plan-northern-mid-atlantic-ridge-open-consultation/>> accessed 15 September 2024.

97 N-MAR REMP (n 34).

98 ISA, "Draft REMP for the northern Mid-Atlantic Ridge – Submissions" (2022), available at <<https://www.isa.org.jm/protection-of-the-marine-environment/regional-environmental-management-plans/northern-mar/#1678465863103-ffb8b3c-c39b>> accessed 15 September 2024.

99 N-MAR REMP (n 34) paras 39(c), 43(b).

100 ISA, "Report of the Workshop on the Regional Environmental Management Plan for the Area of the Northern Mid-Atlantic Ridge. 25–29 November 2019, Evora, Portugal" (2020) 79 para 5, available at <https://www.isa.org.jm/wp-content/uploads/2022/06/evora_workshop.pdf> accessed 15 September 2024; ISA, "Report of the Workshop on the development of a Regional Environmental Management Plan for the area of the Northern Mid-Atlantic Ridge with a focus on polymetallic sulphides deposits. 23 November–4 December 2020" (2020), available at <https://www.isa.org.jm/wp-content/uploads/2022/12/Final_Draft_workshop_report-nMAR_REMP.pdf> accessed 15 September 2024.

SiNP and AiNPs.¹⁰¹ In fact, the consensus reached by the participants of the workshops and by the ISA Council was that these network criteria should be integrated in the N-MAR REMP through future revisions.¹⁰²

However, the inclusion of network criteria in the N-MAR REMP, and additional work on the N-MAR REMP more generally, is currently hampered by the ongoing development of REMP guidance documents, which aims to create a standardised approach for the development of REMPs as well as a REMP template.¹⁰³ Indeed, during the second part of the 27th session in 2022, the Council requested that the Commission only continue the revision of the N-MAR REMP after the standardised procedure is finalised.¹⁰⁴

3.3 *Crucial Factors Influencing the Design of Non-use Measures*

The approach used during the development of the Draft N-MAR REMP is very different from the one used for the CCZ REMP, and this has had an impact on the design of non-use measures. First, the type and level of scientific knowledge available and the different environmental characteristics have influenced the outcomes. In the CCZ indeed, the generally limited scientific information and lack of location-specific knowledge led experts to use environmental characteristics known to influence deep-sea biodiversity to design the APEIS, resulting in a network of large and square-shaped areas. In contrast, the N-MAR's habitat-specific knowledge allowed for a site-specific approach in the proposed SiNPs and AiNPs.

Second, the approaches also varied based on the type of mineral resource. The extent of mining exploration areas for massive sulphides remains much smaller compared to polymetallic nodules due to significantly different morphological characteristics associated with mineral deposition. This further

¹⁰¹ *ibid.*

¹⁰² N-MAR REMP (n 34) para 33.

¹⁰³ ISBA/27/C/37 (n 26). Part of the procedure described within this guidance document comes from a joint submission made in 2020 by Germany and the Netherlands, co-sponsored by Costa Rica (ISBA/26/C/6 and ISBA/26/C/7 (n 28)), which suggested specific procedure standards for the development, review and approval of REMPs and REMP templates. These were developed during a workshop in Hamburg in 2019, see S. Christiansen, H. Ginzky and P. Singh, "Towards a standardized approach to Regional Environmental Management Plans in the Area – International Workshop" (2020), available at <https://www.umweltbundesamt.de/sites/default/files/medien/2875/dokumente/rem_p_workshop_report.pdf> accessed 15 September 2024.

¹⁰⁴ ISA Council, "Draft decision of the Council of the International Seabed Authority relating to the approval of the regional environmental management plan for the Area of the northern Mid-Atlantic Ridge with a focus on polymetallic sulphide deposits" (2022) ISBA/27/C/L.6.

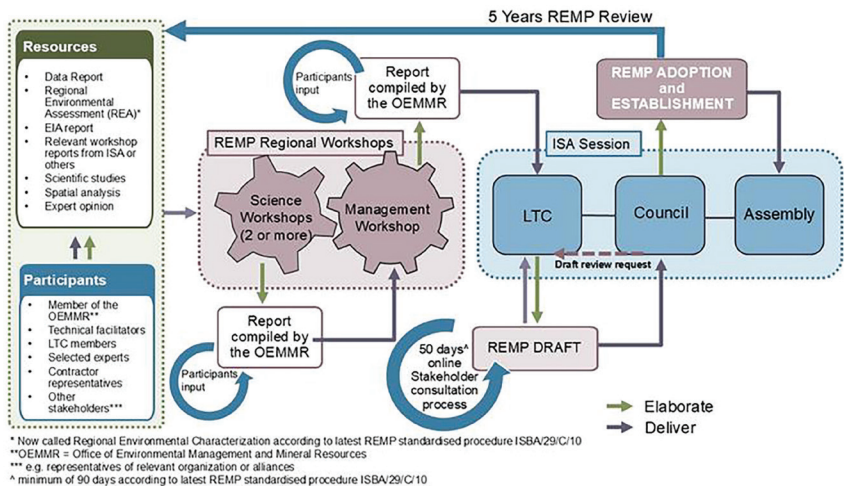


FIGURE 11.2 Process for the development, adoption and establishment of Regional Environmental Management Plans followed since the Northern Mid-Atlantic Ridge REMF
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explains the larger APEIS in the CCZ and the site-specific approach in the N-MAR.

Third, existing contracts have also had an impact on the design of non-use measures. As seen previously, the large APEIS' location and size in the CCZ were based on biodiversity indicators, which at the time could not be calculated precisely. Because of this, and in order not to interfere with existing contracts, APEIS were placed outside exploration areas, consequently prioritising the rights of contractors. On the other hand, the direct knowledge of ecologically significant sites and areas in the N-MAR region allowed the identification of specific SiNPs, even inside contract areas for exploration. However, this is also part of the reason why SiNPs do not have an exact spatial definition yet; the characteristics of their non-mining area and associated zoning might depend on the contractors' ability to develop technologies that will prevent serious harm while mining adjacent sites of interest. Hence, while SiNPs have been identified inside contract areas for exploration, the rights of the mining licenses are still prioritised in that the non-use measures' exact spatial definition will have to adapt to the specificities of each operation.

3.4 *Roles of Environmental Data and Scientific Information in Shaping REMPS and Non-use Measures*

Environmental data and scientific information act as important bases for the development of REMPS and identification of sites for non-use measures. Yet, the design of non-use measures in REMPS is challenged by scientific uncertainty and lack of environmental baseline data – as well as by the policy decision to prioritise the rights of existing exploration contracts.

At present, further research is needed to improve the scientific understanding of deep-sea ecosystems. The Authority is in a unique position to facilitate the gathering and sharing of such knowledge, by encouraging the collection of scientific data, by sharing environmental data, and by coordinating research activities in the Area.¹⁰⁵ Moreover, environmental data collection is increasing through the EIAs that contractors must submit as part of their contracts.¹⁰⁶ And the information included in these EIAs is an important source of data to design non-mining measures. For example, information on the results of the testing of mining components, their operational efficiency, and impact will be essential to implement zonation around SiNPs, since they are currently within contract blocks.

Even if more data is becoming available, there is still an issue of accessibility. Indeed, a lot of geophysical and geological data remain only available to the Secretariat and the Commission because they are deemed confidential by contract rules. As contractors must submit all data collected within their exploration activities to the ISA,¹⁰⁷ this represents large sources of potentially important scientific information. At present, non-confidential information and environmental data are included in REMPS' Data Reports¹⁰⁸ and are made publicly available in the common data depository created by the ISA in 2019, DeepData.¹⁰⁹

The public information available in DeepData is limited and often requires expert reading and treatment, which can hinder meaningful stakeholder

¹⁰⁵ UNCLOS, art 143.

¹⁰⁶ For examples of EIAs in the CCZ and Indian Ocean, see Indian Ministry of Earth Sciences, "Environmental conditions and likely impact in the area selected for nodule collection trials at the Indian PM extension site in the Central Indian Ocean Basin collection trials at the Indian PM extension site in the Central Indian Ocean Basin" (2020), available at <https://moes.gov.in/writereaddata/files/India_PMN_EIS_Jan_2020.pdf> accessed 15 September 2024.

¹⁰⁷ Exploration regulations for polymetallic nodules (n 6).

¹⁰⁸ Cleary et al (n 50).

¹⁰⁹ ISA, "DeepData Database", available at <<https://www.isa.org/jm/deepdata-database/>> accessed 15 September 2024.

engagement.¹¹⁰ The N-MAR REMP procedure created a precedent for the inclusion of a more advanced public consultation, which can improve the incorporation of scientific information in the management procedures. Indeed, public consultation allows scientists and other professionals to provide comments and suggestions, which are seen by policy makers at the ISA and can influence the outcomes of the non-use measures in the REMP.¹¹¹ Increasing accessibility of data will consequently improve the quality and meaningfulness of public stakeholder engagement.

Notwithstanding this accessibility issue, DeepData's impact is overall positive. It contributes to bigger datasets, which serve the portfolio of data used during the REMP procedure. Hence, DeepData has the potential for advancing knowledge of deep-sea marine ecosystems, especially within the REMP development, from the design of non-use measures to monitoring their effectiveness.¹¹²

Indeed, improved scientific knowledge will not only serve the development and revisions of REMPs and non-use measures, but also the evaluation of their effectiveness. New data and insight from contractors' EIAs are also valuable for the development of environmental thresholds,¹¹³ key for assessing the effectiveness of non-use and other conservation and management measures. However, since no exploitation has begun in the Area, it is still too early to determine whether the REMPs' non-use measures are effective in protecting the marine environment. In the meanwhile, the flexible structure of the REMPs allows for the integration of new environmental data to revise or expand existing non-use measures.¹¹⁴

110 M. Rabone et al, "A review of the International Seabed Authority database DeepData: challenges and opportunities in the UN Ocean Decade" (2022) *bioRxiv*.

111 ISA LTC, "Recommendations for the guidance of the contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area" (2020) ISBA/25/LTC/6/REV.1, para 41.

112 Rabone et al (n 110).

113 BGR – Federal Institute for Geosciences and Natural Resources, "Environmental Impact Assessment for the Testing of a Pre-Prototype Manganese Nodule Collector Vehicle in the Eastern German License Area (Clarion-Clipperton Zone) in the Framework of the European JPI-O MiningImpact 2 Research Project" (2022), available at <https://miningimpact.geomar.de/documents/1082101/1299978/EIA_BGR_submission.pdf/29ebe7dc-f231-45f7-8d3b-02da41899d94> accessed 15 September.

114 G. Ardito and M. Rovere, "Racing the clock: Recent developments and open environmental regulatory issues at the International Seabed Authority on the eve of deep-sea mining" (2022) 140 *Marine Policy* 105074; Ardito, Andreone and Rovere (n 79).

4 Conclusion

The REMPs under the deep-seabed mining regime have been developed under varying circumstances, and this has led to the adoption of non-mining measures that differ in terms of their shape, size, location, and functioning. The establishment of the APEIs in the CCZ as the first non-use measure in the context of deep-seabed mining was the result of a growing demand for exploration licenses. The initial spatial definition of the APEIs was constrained by a substantial scientific uncertainty and by the need not to overlap with exploration contract areas. In the more recent Draft N-MAR REMP, the suggested non-use measures are the result of a much more participatory process that identified specific locations and areas to be protected on the basis of site-specific scientific knowledge.

Environmental data and scientific information, or the lack thereof, not only have shaped the development of REMPs and their non-use measures but also influence their effectiveness and their adaptiveness. Indeed, scientific workshops play a key role in creating REMPs and non-use measures (despite the prioritisation of contractor's rights). Future REMP development and revisions will benefit from the growing availability of data from EIAs, an improved accessibility of DeepData, and increasing transparency through stakeholder consultation. As other REMPs are still in early development stages, greater participation from the scientific community and inclusion of indigenous knowledge, especially in regions like the Western Pacific Ocean, where island States might have a stronger voice, is expected.¹¹⁵

The way in which the development of REMPs is changing opens opportunity for a transparent collaboration and synergy among international conservation initiatives, such as through the involvement of more experts, preparatory workshops, stakeholder consultations, and the inclusion of conservation goals, criteria, and concepts from other international processes. At the same time, it facilitates the creation of a broader network of professionals and civil society with different expertise, but with the common goal of improving the conservation of the ocean.

Though REMPs and their non-use measures are limited to deep-seabed mining, they could contribute to a broader cross-sectoral approach to protection, alongside non-use measures from other activities. This potential may be facilitated by the recently adopted Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction

115 ISBA/29/LTC/8 (n 30).

(BBNJ Agreement). This treaty presents the possibility to develop ABMTs while recognising existing regimes.¹¹⁶ Although it is a potential avenue for collaborations worth exploring,¹¹⁷ one should not overestimate what the BBNJ Agreement will be able to do, once ratified by the required number of States, as due regard remains towards existing measures adopted by other bodies,¹¹⁸ including the ISA. Ideally, non-use measures should be defined and designated before granting exploration and eventually exploitation licenses. In this regard, the provisions on ABMT within the BBNJ Agreement could come into play in establishing ABMTs in regions that are yet to be targeted by mining activities, as well as in creating synergetic intersections with existing non-mining measures.¹¹⁹

Acknowledgements

This chapter is part of Elisabetta Menini's doctoral dissertation at Duke University. E. M. wishes to express gratitude to the Marine Geospatial Ecology Laboratory for their support and for the opportunity to participate in all the REMP technical workshops since 2019. We also extend our thanks to Giovanni Ardito for introducing E. M. and M. R. to the opportunity of contributing to this book, and to the editorial team for making its publication possible.

¹¹⁶ See the discussion by Klerk in chapter 4 of this volume.

¹¹⁷ See eg S. Robb, A. Jaeckel and C. Blanchard, "How could the BBNJ Agreement affect the International Seabed Authority's Mining Code?" (2023) *EJIL: Talk!*, available at <<https://www.ejiltalk.org/how-could-the-bbnj-agreement-affect-the-international-seabed-authoritys-mining-code/>> accessed 15 September 2024; K. Willaert, "The interaction between the BBNJ Agreement and the international deep sea mining regime: more questions than answers?" (submitted) *Ocean Development & International Law*.

¹¹⁸ Indeed, the BBNJ Agreement provides that initiatives should not undermine "relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies and that promotes coherence and coordination with those instruments, frameworks and bodies"; see Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, Document A/CONF.232/2023/4 (30 June 2023), art 5(2).

¹¹⁹ Robb, Jaeckel and Blanchard (n 117); S. Robb, "Contributing to Coherent Area-based Management Tool (ABMT) Networks in ABNJ: A Comparative Analysis of the BBNJ Agreement and ISA ABMT Processes" (forthcoming 2024) *International Journal of Marine and Coastal Law*.

PART 4

Antarctica



CCAMLR Marine Protected Area in the Weddell Sea (Antarctica)

A Scientific Assessment

Katharina Teschke and Rebecca Konijnenberg

1 Introduction

Non-use measures (ie measures that ban or suspend the use of a resource) and restricted- or limited-use measures (ie measures that restrict certain types of uses) form one important set of tools for conserving the marine environment. In larger management frameworks, such as in marine protected areas (MPAs), the two approaches are often intertwined.¹ Measures are tailored to the conservation objectives of the MPA and as a result can be extraordinarily diverse. Furthermore, they can apply to the whole range (or most) of an activity (eg fishing) or species (all fish taxa), or be much more specific.² Often, MPAs do not prohibit a use altogether, but use more specific restricted- or limited-use measures that take the form of rules specifying the appropriate method of use (eg minimum mesh sizes for nets, prohibition of certain fishing gear). In this case, the smooth transition between non-use measures and use measures becomes clear, highlighting the concepts are in fact on a continuous spectrum.³ The geographical scope of non-use measures may be applied to the entire MPA, so-called ‘no-take’ MPAs, or be limited to sub-areas, known as ‘zones’. Some MPAs may also contain a combination of geographical and temporal scopes, such as non-use measures that are only in place in certain zones during certain seasons (eg no-fishing zone during spawning season).

The case study in this chapter examines an MPA in the Southern Ocean, one of the world’s last great wilderness regions that contribute significantly to global marine biodiversity and ecosystem services.⁴ While the Southern

¹ This is also discussed by Guggisberg in chapter 2 of this volume.

² *ibid.*

³ *ibid.*

⁴ M. C. Kennicutt II et al, “Sustained Antarctic Research: A 21st Century Imperative” (2019) 1 *One Earth* 95–113; N. S. Steiner et al, “Climate change impacts on sea-ice ecosystems and associated ecosystem services” (2021) 9 *Elementa*.

Ocean is of crucial importance for the world's climate, biosphere, and well-being of [hu]mankind,⁵ at the same time, up to 20 nations fish in the Southern Ocean, mainly on Antarctic krill and Patagonian and Antarctic toothfish.⁶ In addition, there is growing evidence that the Southern Ocean is particularly sensitive to environmental change, such as change in sea ice concentration and extent,⁷ atmospheric and oceanic temperature rise,⁸ and increasing ocean acidification.⁹

To protect the life of the Southern Ocean, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) – the body responsible for conserving biodiversity in the Southern Ocean – is working on the establishment of a representative system of MPAs around Antarctica that largely utilises a non-use approach, albeit with zone-specific restricted-use measures for fishing activities and certain allowances for scientific research.

The following chapter discusses the MPA conservation planning of a large-scale international MPA proposal in the Weddell Sea as a case study. Beginning with a brief overview of spatial conservation planning in the Southern Ocean under the CCAMLR regime in general (section 2) and MPA planning in the Weddell Sea in particular (section 3), we provide insight into the rationale for protecting the Weddell Sea ecosystem (section 4) and present the non-use and (restricted-) use measures of the MPA (section 5). In doing so, we address the following questions: To what extent is the MPA with associated measures an embodiment of the precautionary approach? And to what extent is the Phase 1 of the Weddell Sea Marine Protected Area (hereafter: WSMPA P1) proposal related to the global problem of climate change? Finally,

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- 5 R. D. Cavanagh et al, "Future risk for Southern Ocean ecosystems: changing physical environments and anthropogenic pressures in an Earth system" (2021) 7 *Frontiers in Marine Science* 615214.
 - 6 C. M. Brooks, "Competing values on the Antarctic high seas: CCAMLR and the challenge of marine-protected areas" (2013) 3(2) *The Polar Journal* 277–300.
 - 7 S. Stammerjohn et al, "Regions of rapid sea ice change: An inter-hemispheric seasonal comparison" (2012) 39 *Geophysical Research Letters*; C. L. Parkinson and N. E. DiGirolamo, "Sea ice extents continue to set new records: Arctic, Antarctic, and global results" (2021) 267 *Remote Sensing of Environment* 112753.
 - 8 D. G. Vaughan et al, "Recent Rapid Regional Climate Warming on the Antarctic Peninsula" (2003) 60 *Climatic Change* 243–274; M. P. Meredith and J. C. King, "Rapid climate change in the ocean west of the Antarctic Peninsula during the second half of the 20th century" (2005) 32 *Geophysical Research Letters*.
 - 9 J. Turner et al, "Antarctic climate change and the environment: an update" (2014) 50 *Polar Record* 237–259; S. A. Morley et al, "Global Drivers on Southern Ocean Ecosystems: Changing Physical Environments and Anthropogenic Pressures in an Earth System" (2020) 7 *Frontiers in Marine Science* 547188.

we present some of the arguments and motivations of the opponents of the WSMPA P1 proposal and associated measures (section 6).

2 CCAMLR and MPAS – the Protection of Marine Living Resources of the Southern Ocean

Several initiatives are currently underway to establish MPAs in the high seas of the Southern Ocean under the Convention on the Conservation of Antarctic Marine Living Resources (CAMLR Convention).¹⁰ The objective of the Convention is the conservation of Antarctic marine living resources which includes their rational use.¹¹ It utilises precautionary, ecosystem-based, and science-led approaches for which it has been applauded internationally.¹² The Convention is implemented through CCAMLR. Under its auspices, 27 Contracting Parties determine the use of Antarctic marine living resources through consensus-based decision-making based on the best available scientific information. CCAMLR's conservation measures span the spectrum from restricted- or limited-use measures to non-use measures.

In 2009, CCAMLR and its Member States committed themselves to the establishment of a representative system of MPAs in the Convention Area¹³ as a key tool to achieve the Convention's objective of conserving Antarctic marine living resources while enabling, and in some cases, benefiting their rational use. Since then, two MPAs have been established in the Convention Area: (1) The Southern Shelf Area of the South Orkney Islands MPA in 2009, the first MPA beyond national jurisdiction,¹⁴ and (2) The Ross Sea Region MPA, the

10 For more information on MPAs in the Southern Ocean, see the discussion by Guggisberg in chapter 13 of this volume.

11 Convention for the Conservation of Antarctic Marine Living Resources (CAMLR Convention) (adopted 20 May 1980, entered into force 7 April 1982) 1329 UNTS 47, art II.

12 D. G. M. Miller and N. M. Slicer, "CCAMLR and Antarctic conservation: the leader to follow?" in S. M. Garcia, J. Rice, A. Charles (eds), *Governance of Marine Fisheries and Biodiversity Conservation: Interaction and Coevolution* (John Wiley & Sons Ltd 2014) 253–270.

13 CCAMLR, "Map of the CAMLR Convention Area" (last updated October 2017), available at <www.ccamlr.org/node/86816> accessed 18 July 2024.

14 CCAMLR, "Conservation Measure 91–03 (2009) Protection of the South Orkney Islands Southern Shelf" (2009) CM 91–03, available at <<https://www.ccamlr.org/en/measure-91-03-2009>> accessed 18 July 2024; P. N. Trathan and S. M. Grant, "The South Orkney Islands Southern Shelf Marine Protected Area: towards the establishment of marine spatial protection within international waters in the Southern Ocean" in: J. Humphreys and R. W. E. Clark (eds) *Marine Protected Areas. Science, Policy and Management* (Elsevier 2020) 67–98.

largest MPA in the world.¹⁵ In addition, four other MPAs (one in East Antarctica, two in the Weddell Sea and one near the Antarctic Peninsula) have since been proposed but are pending approval despite several years of discussion.¹⁶ Member States disagree strongly about the need for MPAs. Disagreement exists around the development process, the management and the research and monitoring plan of MPAs. Recently, CCAMLR hosted a Special Meeting on MPAs (Santiago, Chile, 19 to 23 June 2023). Unfortunately, a roadmap for the adoption of a representative system of MPAs could not be agreed upon at this meeting, and no other constructive outcome could be achieved.

3 MPA Planning in the Weddell Sea

The whole WSMPA remains, to the day of writing this chapter (July 2024), unadopted. For reasons explained below, the focus here is on a proposal related to part of the WSMPA, known as Phase 1. It has so far failed to achieve political consensus within CCAMLR.

The wider Weddell Sea region lies east of the Antarctic Peninsula and includes the Weddell Sea as well as the smaller Lazarev and Riiser-Larsen Seas (Figure 12.1(a)). The Weddell Sea region is important with regards to the global climate, biosphere, and human well-being, as it contributes significantly to global marine biodiversity¹⁷ and ecosystem functions, such as primary and secondary production¹⁸ and services, such as carbon sequestration.¹⁹

At the 35th Meeting of CCAMLR in 2016, the European Union and its Member States submitted the first proposal for a conservation measure to establish an MPA in the Weddell Sea region.

The scientific work underpinning the proposal was carried out by a team at the Alfred Wegener Institute (AWI) (Bremerhaven, Germany).²⁰ The

15 CCAMLR, "Conservation Measure 91-05 (2016) Ross Sea Marine Protected Area" (2016) CM 91-05, available at <<https://www.ccamlr.org/en/measure-91-05-2016>> accessed 18 July 2024; C. M. Brooks et al, "Reaching consensus for conserving the global commons: the case of the Ross Sea, Antarctica" (2020) 13 *Conservation Letters* e12676.

16 K. Teschke et al, "Planning marine protected areas under the CCAMLR regime – The case of the Weddell Sea (Antarctica)" (2021) 124 *Marine Policy* 104370.

17 T. Brey et al, "Antarctic benthic diversity" (1994) 368 *Nature* 297–297; A. Brandt et al, "First insights into the biodiversity and biogeography of the Southern Ocean deep sea" (2007) 447 *Nature* 307–311.

18 J. Gutt et al, "Reviews and syntheses: A framework to observe, understand and project ecosystem response to environmental change in the East Antarctic Southern Ocean" (2022) 19 *Biogeosciences* 5313–5342.

19 M. Deininger et al, "Towards mapping and assessing Antarctic marine ecosystem services – The Weddell Sea case study" (2016) 22 *Ecosystem Services* 174–192.

20 Teschke et al (n 16).

translation of MPA aims into concrete and geographically specific conservation measures involved several rounds of thorough statistical analyses based on the best available science. The team ran spatial prioritisation algorithms based on 75 conservation features, having previously compiled the necessary data on environmental characteristics (eg sea ice concentration, water temperature) and ecological components (small invertebrates to fish, birds, and mammals) from scientists and institutions from more than 20 countries. The scientists also generated a variety of data products to obtain a better understanding of the habitats or feeding grounds of individual species and species assemblages.²¹ Developing the scientific basis for a WSMMA was an iterative process. From the beginning of the WSMMA planning initiative in 2013, the status of scientific work was discussed each year in the relevant CCAMLR working groups and then presented to the CCAMLR Scientific Committee. The scientific papers were revised according to the suggestions from the working groups and resubmitted to the Scientific Committee for discussion the following year. In addition, two international WSMMA workshops were held to discuss and agree on the WSMMA conservation objectives, features and their target values in more depth.

The original WSMMA proposal was split into two sub-proposals in 2019: WSMMA P1 (west of the prime meridian) and WSMMA P2 (east of the prime meridian) (Figure 12.1(b)).²² This division into two phases occurred because Norwegian scientists had raised concerns about differences in the data availability between the western and the eastern parts of the Weddell Sea region, and the implications of such differences on the statistical modelling efforts. A Norwegian team of scientists has been redeveloping the scientific basis for a WSMMA P2 conservation measure proposal and submitted this to CCAMLR in 2023. In the meantime, the German team (who had drafted the original proposal) amended the original proposal for a WSMMA conservation measure to cover only P1. The WSMMA P1 proposal is updated regularly to reflect major scientific discoveries, such as the world's largest fish nest colony.²³ It has been resubmitted to the CAMLR Commission every year, most recently in 2023. Nevertheless, to date, no consensus on either the WSMMA P1 or P2 proposals has been achieved among Member States within the CAMLR Commission.

21 K. Teschke et al, "An integrated compilation of data sources for the development of a marine protected area in the Weddell Sea" (2020) 12 *Earth System Science Data* 1003–1023.

22 Teschke et al (n 16).

23 A. Purser et al, "A vast icefish breeding colony discovered in the Antarctic" (2022) 32 *Current Biology* 842–850.

4 Rationale for Protection – Weddell Sea Ecosystem under Climate Change

One of the main aims behind the WSMPA P1 proposal is to ensure that the Weddell Sea can function as a climate refugia for ice-dependent species (like Antarctic krill, Weddell seals) or species with low heat tolerance (like many Antarctic fish species). The reasoning is that the Weddell Sea is expected to be one of the last regions of the Southern Ocean where the consequences of climate change will manifest due to its ice cover and favourable currents.²⁴ It is therefore conceivable that these cold-adapted species will use the Weddell Sea as a refuge in the future. Researchers have already found that some ice-dependent penguin species are abandoning their traditional colony locations due to a lack of ice cover.²⁵ Furthermore, some projections suggest that favourable habitats for Antarctic krill might be shifting southward, resulting in possible declines in abundance and/or biomass.²⁶ The extent to which habitat shifts have already occurred and the potential future effects on individual species or the ecosystem as a whole continue to be the subject of debate and active research. Detailed scientific evidence may not be available until species shifts (which are likely irreversible) have occurred, therefore a precautionary approach is required.

The WSMPA P1 proposal also recognises that the Weddell Sea ecosystem deserves protecting in its own right, as it is a pristine ecosystem (compared to other regions in the Southern Ocean), home to many important species and has no major current threats.²⁷ The area offers an important breeding and foraging ground for birds and mammals,²⁸ and a habitat for many rare species or

24 SEAICE Portal, “Das Meereisportal – Log-Buch Einer Schwindenden Welt”, available at <<https://www.meereisportal.de>> accessed 12 July 2024.

25 H. J. Lynch et al, “Spatially integrated assessment reveals widespread changes in penguin populations on the Antarctic Peninsula” (2012) 93 *Ecology* 1367–1377.

26 A. Atkinson et al, “Krill (*Euphausia superba*) distribution contracts southward during rapid regional warming” (2019) 9 *Nature Climate Change* 142–147; D. Veytia et al, “Circumpolar projections of Antarctic krill growth potential” (2020) 12 *Nature Climate Change* 568–575.

27 K. Teschke et al, “Scientific background document in support of the development of a CCAMLR MPA in the Weddell Sea (Antarctica) – Version 2016 – Part A: General context of the establishment of MPAs and background information on the Weddell Sea MPA planning area”, Meeting of CCAMLR Working Group on Ecosystem Monitoring and Management, Bologna, Italy, 04 Jul 2016 to 15 Jul 2016, WG-EMM-16/01, 2016.

28 M. A Hindell et al, “Tracking of marine predators to protect Southern Ocean ecosystems” (2020) 580 *Nature* 87–92; J. Handley et al, “Marine Important Bird and Biodiversity Areas for Penguins in Antarctica, Targets for Conservation Action” (2021) 7 *Frontiers in Marine Science* 602972.

vulnerable features such as fish nest colonies²⁹ or sponge communities.³⁰ Any alterations to their environment, such as warming ocean temperatures³¹ and changes in sea ice concentration and extent,³² could have serious consequences for biodiversity and community stability, and thus ecosystem functioning and services.³³ In general, the relatively short food chains³⁴ and lower adaptive capacity of species³⁵ makes polar ecosystems particularly vulnerable to change.

While the proposed WSMPA P1 cannot prevent the effects of climate change, it can serve to minimise other important stressors to increase the region's resilience to climate change. It can also support research and monitoring that will improve our understanding of the Antarctic ecosystems and the effects of climate change disentangled from other human activities. Given the uncertainty about the future extent and potential consequences of climate change on biotic ecosystem components of the Weddell Sea, the MPA proposal argues for protection under the precautionary principle. The rationale is that by minimising anthropogenic impacts on the Weddell Sea ecosystem, we maximise the likelihood of being able to pass on this natural heritage to future generations. This is especially pertinent given that exploitation of living marine resources in the area is likely to expand. With climate change affecting sea ice cover, previously inaccessible areas may become accessible in the future. The Weddell Sea has already seen a slight increase in fishing activity in recent years, catches for Antarctic toothfish have increased from below 100 tonnes in the early 2000s to >300 tonnes each year in 2017–2023.³⁶ Given continuous advances in fishing technology and increasing need for food globally, it stands to reason that economic interests may look to expand into the Weddell Sea in the near future. The WSMPA P1 proposal seeks to restrict fishing activity as a

29 Purser et al (n 23).

30 D. Barthel and J. Gutt, "Sponge associations in the eastern Weddell Sea" (1992) 4 *Antarctic Science* 137–150.

31 Vaughan et al (n 8); Meredith and King (n 8).

32 Stammerjohn et al (n 7); Parkinson and DiGirolamo (n 7).

33 A. J. Constable et al, "Climate change and Southern Ocean ecosystems 1: how changes in physical habitats directly affect marine biota" (2014) 20 *Global Change Biology* 3004–3025; J. Gutt et al, "The Southern Ocean ecosystem under multiple climate change stresses-an integrated circumpolar assessment" (2015) 21 *Global Change Biology* 1434–1453; A. D. Rogers et al, "Antarctic Futures: An Assessment of Climate-Driven Changes in Ecosystem Structure, Function, and Service Provisioning in the Southern Ocean" (2020) 12 *Annual Review of Marine Science* 87–120.

34 E. J. Murphy et al, "Spatial and temporal operation of the Scotia Sea ecosystem: a review of large-scale links in a krill centred food web" (2007) 362 *Philosophical Transactions of the Royal Society B* 113–148.

35 L. S. Peck et al, "Acclimation and thermal tolerance in Antarctic marine ectotherms" (2014) 217 *Journal of Experimental Biology* 16–22.

36 CCAMLR Secretariat, "Fishery Report 2023: *Dissostichus mawsoni* in Subarea 48.6." (2024).

precautionary measure before it spreads into the Weddell Sea and potentially impacts ecosystem resilience.

5 **Zone-Specific Regulations**

In line with the precautionary approach, the WSMPA P1 proposal addresses the potential increase of economic use by pre-emptively assigning three management zones (Figure 12.2) that have different main aims and allow or prohibit different activities of fishing as well as scientific research (see Table 12.1). This approach is already applied in other MPAs established within CCAMLR (see

TABLE 12.1 Summary of specific provisions in each of the WSMPA P1 management zones.
AMLR: Antarctic marine living resources; CM: Conservation measure

Zone	Specific management provisions
Fisheries Research Zone – (Restricted-) use	
Prohibited	<i>Fishing:</i> Directed fishing for all finfish and non-fish taxa (incl. krill), except of <i>Dissostichus</i> spp.
Permitted (with limitations)	<i>Fishing:</i> Directed fishing for <i>Dissostichus</i> spp. between 550 m and 2100 m water depth in accordance with established CCAMLR procedures and CMS ^a <i>Scientific research:</i> – Directed fishing on all other finfish and non-fish taxa (incl. krill) for scientific research in accordance with CM 24–01: a. Catch limit for all other finfish taxa: 1 t/vessel/year b. Catch limit for krill: 1 t/vessel/year – Scientific research on AMLR that uses towed gear that interacts physically with the seafloor; limit: 1 km ² /vessel/season
Permitted	– All other scientific research on AMLR
Scientific Reference Area and General Protection Zone – Primarily non-use	
Prohibited	<i>Fishing:</i> Directed fishing for all finfish and non-fish taxa (incl. krill)

TABLE 12.1 Summary of specific provisions in each of the WSMPA P1 management zones (cont.)

Zone	Specific management provisions
Permitted (with limitations)	<i>Scientific research:</i> – Directed fishing on all finfish and non-fish taxa (incl. krill) for scientific research in accordance with CM 24-01: a. Catch limit for <i>Dissostichus</i> spp.: 5 t/vessel/year b. Catch limit for all other finfish taxa: 1 t/vessel/year c. Catch limit for krill: 1 t/vessel/year – Scientific research on AMLR that uses towed gear that interacts physically with the seafloor; limit: 1 km²/vessel/season
Permitted	– All other scientific research on AMLR
Special Protection Zone – Non-use only	
Prohibited	<i>Fishing:</i> Directed fishing for all finfish and non-fish taxa (incl. krill) <i>Scientific research:</i> – Directed fishing on all finfish and non-fish taxa (incl. krill) for scientific research – Scientific research on AMLR that uses towed gear that interacts physically with the seafloor (eg beam/otter trawls, dredges, sledges)
Permitted	– All other scientific research on AMLR

a For example, CM 22-08 (2009) (n 41); CM 41-04 (2022) (n 39)

for instance the Ross Sea MPA³⁷). Zonation works in tandem with CCAMLR’s existing Conservation Measures that regulate the harvesting of marine living resources and associated activities (incl. setting of catch limits, gear restrictions, area closures). This approach was chosen primarily to reconcile different interests (*conservation and rational use*) of CCAMLR Member States.

Antarctic krill and Antarctic toothfish constitute the main species of commercial interest in the Southern Ocean.³⁸ At the moment, there is only one

37 CM 91-05 (n 15); Brooks et al (n 15).
38 C. M. Brooks et al, “Antarctic fisheries: factor climate change into their management” (2018) 558 *Nature* 177–180.

active fishery in the WSMFA P1, ie exploratory fishing on Antarctic toothfish, which is conducted in the eastern part of the proposed MPA (Figure 12.2) by Japan, Spain and South Korea and is regulated by CCAMLR Conservation Measure 41–04.³⁹ The catch for Antarctic toothfish in this area (ie in CCAMLR Research Block 48.6_5) in 2023 was 141 tonnes (which made up 83.9% of the area's allocated catch limit).⁴⁰ Licensed commercial fishing is currently not allowed. The fact that exploratory fishing has not transitioned to commercial fishing to date and that no further proposals for exploratory fishing in other parts of the proposed WSMFA P1 have been submitted to CCAMLR is primarily the consequence of the limited access for fishing vessels due to sea ice conditions in the region. As a result, only limited data are available for scientists to estimate the stock size of Antarctic toothfish. This means current estimates carry a high uncertainty and that potential impacts of fishing on this target species remain unknown. Possible wider ecosystem effects and trophic impacts of longline fishing for Antarctic toothfish have also not been investigated to date.

The Proposal's Fisheries Research Zone (FRZ), which includes a Scientific Reference Area (SRA) (Figure 12.2) was designed specifically to contribute to science-based management of the Antarctic toothfish stock through ongoing research by fishing vessels. The FRZ encompasses an existing CCAMLR research area (Research Block 48.6_5) for exploratory fishing for Antarctic toothfish. It is intended to be managed in accordance with established CCAMLR procedures and conservation measures,⁴¹ and therefore does not require an addendum to existing CCAMLR regulations. However, an addendum would be required for the proposed SRA, as fishing for Antarctic toothfish would not be permitted there. The proposed SRA is located spatially adjacent to the FRZ and would allow researchers to directly compare the fished FRZ to a 'controlled' unfished area.⁴² This enables the study of potential wider ecosystem effects and trophic impacts of longline fishing for Antarctic toothfish, thereby reducing uncertainty around this issue in the future. Both the FRZ and the SRA have a limit of one tonne per vessel per year for all other fisheries exploiting finfish and

39 CCAMLR, "Conservation Measure 41–04 (2022) Limits on the exploratory fishery for *Dissostichus mawsoni* in Statistical Subarea 48.6 in the 2022/23 season" (2022) CM 41–04.

40 CCAMLR Secretariat (n 36).

41 CCAMLR, "Conservation Measure 21–02 (2019) Exploratory fisheries" (2019) CM 21–02; CCAMLR, "Conservation Measure 22–08 (2009) Prohibition on fishing for *Dissostichus* spp. in depths shallower than 550 m in exploratory fisheries" (2009) CM 22–08; CM 41–04 (n 39).

42 Fisheries Research Zone (FRZ) and Scientific Reference Area (SRA) are similar to Impact Reference Zone (IRZ) and Preservation Reference Zone (PRZ) used in deep-seabed mining, see ISA, "Workshop: Design of Impact Reference Zones and Preservation Reference Zones in the Area" (2017), available at <<https://www.isa.org.jm/events/workshop-design-of-impact-reference-zones-and-preservation-reference-zones-in-the-area/>> accessed 16 September 2024.

non-fish taxa (such as krill). This is in line with CCAMLR Conservation Measure 24-01.⁴³ For other scientific research in the FRZ incl. SRA, the use of any towed gear that physically interacts with the seafloor, such as trawls and dredges, would be limited to one square kilometre per vessel per season.

The other two zones, the General Protection Zone (GPZ) and the Special Protection Zone (SPZ), were designed with the goal of ensuring that the Weddell Sea can function as a climate refugia for ice-dependent species or species with low heat tolerance. The zones are intended to provide a general level of protection (eg for representative examples of pelagic and benthic ecosystems, biodiversity and habitats) or enhanced protection for known vulnerable marine ecosystems and unique, rare or biodiverse and/or endemic habitats and features. To ensure this protection and prevent possible impacts from fishing under the precautionary principle, no fishing activities are allowed. In the GPZ, only scientific research on marine living resources shall be allowed at five tonnes per vessel per year for Antarctic toothfish and one tonne per vessel per year for all other finfish and non-fish taxa (such as krill). In the SPZ, all fishing activities (including scientific research fishing) are to be prohibited. For other scientific research activities, the same restriction shall apply for the GPZ and SPZ as that of within the FRZ.

The WSMMA P1 should therefore be viewed not as a single non-use/ (restricted-) use measures, but rather a combination of several measures bundled into a larger management framework (see definitions at the beginning of this chapter).

6 Arguments of the Opposition to the WSMMA

Throughout its lifetime, the WSMMA P1 proposal has faced major opposition. The Republic of China and the Russian Federation have continued to be the most vocal members of the opposition throughout the years, blocking the proposal in both the Scientific Committee and the Commission. Their main arguments condense down to concerns about the CCAMLR principle of 'best available science' (ie the adequacy of scientific evidence underpinning the proposal),⁴⁴ citing the need to provide more scientific data to demonstrate threats to the ecosystem and thus justify the rationale behind the WSMMA P1 conservation objectives. The opposition's reasoning may be a reflection of

43 CCAMLR, "Conservation Measure 24-01 (2019) The application of conservation measures to scientific research" (2019) CM 24-01.

44 K. N. Scott, "MPAs in the Southern Ocean under CCAMLR" (2021) 9 *The Korean Journal of International and Comparative Law* 84-107.

political motives (eg a matter of national importance or even sovereignty) rather than genuine scientific concerns.⁴⁵ Through this narrative, China and Russia directly oppose a 'precautionary approach' that would necessitate the establishment of MPAs precisely because the complexity of the ecosystem and its possible threats are not yet fully understood.

The Republic of China and the Russian Federation most often apply this line of argumentation to question the non-use and (restricted-) use measures associated with the proposed GPZ and SPZ, which would restrict their long-distance fisheries in the future. In contrast, the majority of other CCAMLR fishing Member States (eg the United Kingdom, New Zealand) recognise that MPAs are an effective tool for marine conservation and may even have positive effects on commercially exploited fish stocks (see for instance the UK's leading role in the Global Ocean Alliance⁴⁶).

The opposition's narrative using 'best available science' argumentation is not always focused on individual measures but also applied broadly within larger CCAMLR discussions. For instance, the Republic of China and the Russian Federation apply it to question the development process of MPA proposals generally and to any topics related to the link between fishing pressure and climate change. They articulate the need to provide more scientific data to demonstrate threats to the ecosystem that would be caused by fishing or climate change. As highlighted previously, such data are not currently available, nor is it likely that a substantial amount of it becomes available before some of the intended aims of the WSMFA P1 proposal have already become impossible.

This narrative continues despite the fact that the Scientific Committee certified the process of scientific work (described above) to develop the MPA proposal to reflect the 'best available science' in 2016. In CCAMLR, the role of science is clearly defined. Scientific representatives from each Member State are represented in the Scientific Committee. The task of the Scientific Committee as a whole is to evaluate the best science currently available and to outline the risk and benefits of any proposed management measures. It is only in the CAMLR Commission that Member States must decide what credence to give to the scientific recommendations in favour of a WSMFA P1 proposal.

As has become evident in the discussions in the Commission, some CCAMLR Member States are far more content to err on the side of caution (accepting potential economic consequences of non-use or restricted-use measures), while others seem to prioritise economic interests. This is underscored by the

45 C. M. Brooks et al, "Science-based management in decline in the Southern Ocean" (2016) 354(6309) *Science* 185–187; Teschke et al (n 16).

46 United Kingdom, "Global Ocean Alliance", available at <<https://www.gov.uk/government/topical-events/global-ocean-alliance-30by30-initiative/about>> accessed 12 July 2024.

way in which the opposition to the WSMPA P1 proposal challenges the precautionary principle behind the central pillars of the proposal. Unsurprisingly, this is an efficient manner to oppose potential limitations to one's fishing activities. Having economically-motivated opposition is not a problem unique to the WSMPA process. Brooks et al. have found economic interests to be a central roadblock to MPAs in the Southern Ocean, and this is generally true for MPAs worldwide.⁴⁷ Economic interests have also prevented successful CCAMLR conservation action on other matters outside the MPA debates, owed to the fact that CCAMLR operates on a consensus-based approach.⁴⁸

7 Conclusion

As the recent 3rd CCAMLR Special Meeting on MPAs (Santiago, Chile, 19 to 23 June 2023) showed, CCAMLR has not been able to resolve the deadlock in the MPA negotiations. Rather, the deadlock crystallised more clearly than ever. The scientific and political debates in CCAMLR appear to be moving further apart, ie scientific findings and recommendations from the CCAMLR Scientific Committee seems to be increasingly ignored by the CAMLR Commission, where economic concerns over the non-use or (restricted-) use measures dominate. It is likely that a breakthrough must be sought at much higher political levels. In forums such as the European Parliament,⁴⁹ there are increasing calls for high-level political commitment to support the WSMPA P1 proposal and those for other MPAs around Antarctica. Hopefully, given the increase in political pressure and will, the issue of marine conservation around Antarctica can be placed on the agenda of future high-level political discussions to break the current deadlock in MPA negotiations in CCAMLR. Such negotiations should exercise great caution, however, to ensure any compromises do not result in concessions below the level of current protection afforded by the overall non-use and (restricted-) use measures enacted by CCAMLR.

47 Brooks et al (n 38).

48 L. Goldsworthy, "Consensus decision-making in CCAMLR: Achilles' heel or fundamental to its success?" (2022) 22 *International Environmental Agreements: Politics, Law and Economics* 411–437.

49 European Parliament, "Resolution of 8 July 2021 on the establishment of Antarctic Marine Protected Areas (MPAs) and the conservation of Southern Ocean biodiversity" (2022) 2021/2757(RSP) OJ C99, 214, available at <https://www.europarl.europa.eu/doceo/document/TA-9-2021-0361_EN.html> accessed 12 July 2024.

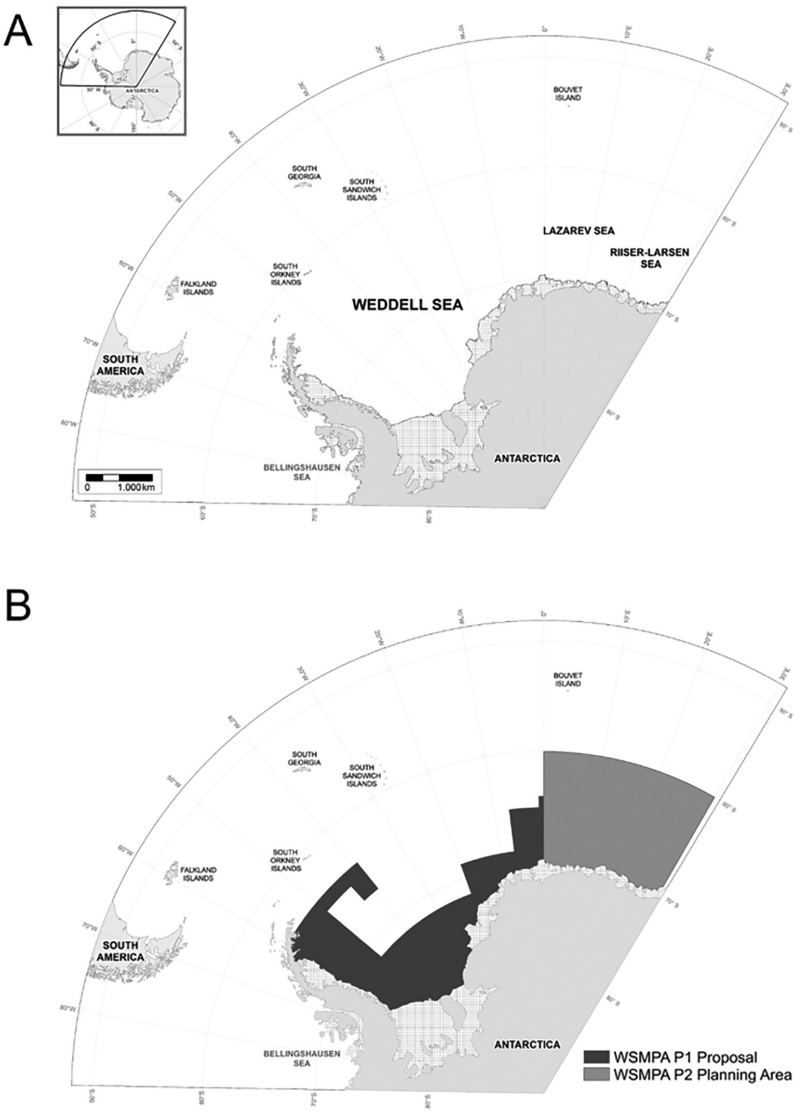


FIGURE 12.1 Wider Weddell Sea region (Antarctica) including the Weddell Sea as well as the smaller Lazarev and Riiser-Larsen Seas (A); 2023 Weddell Sea Marine Protected Area Phase 1 (WSMPA P1) Proposal alongside the Planning Area for which a Phase 2 Proposal was first proposed in 2023 (B). Base layers for Antarctica and the ice shelf taken from Quantarctica K. MATSUOKA ET AL, "QUANTARCTICA, AN INTEGRATED MAPPING ENVIRONMENT FOR ANTARCTICA, THE SOUTHERN OCEAN, AND SUB-ANTARCTIC ISLANDS" (2021) 140 ENVIRONMENTAL MODELLING & SOFTWARE 105015

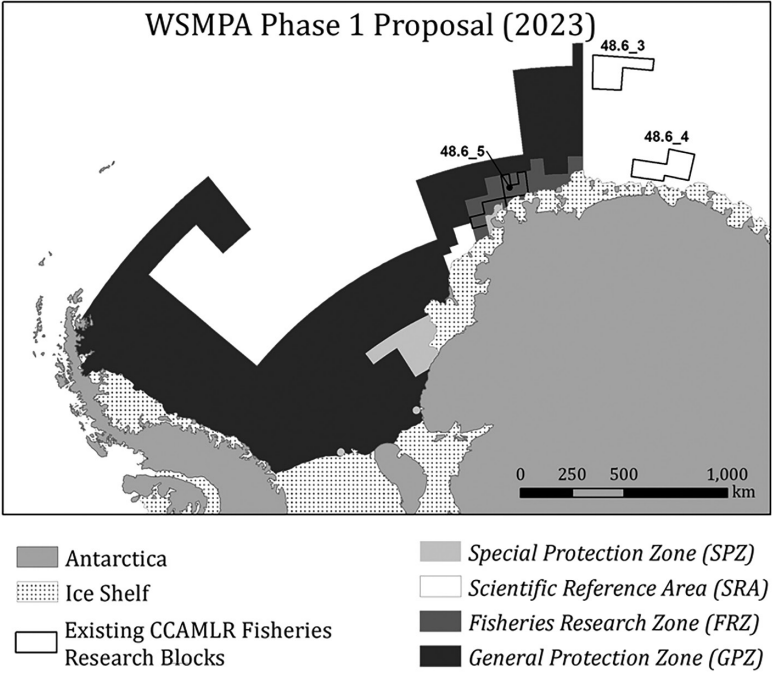


FIGURE 12.2 Weddell Sea MPA Phase 1 Proposal with planned management zones: The General Protection Zone (GPZ), the Special Protection Zone (SPZ), the Fisheries Research Zone (FRZ), and the Scientific Reference Area (SRA). It also shows the CCAMLR fisheries research blocks (48.6_3, 48.6_4, 48.6_5) that are already in effect. Base layers for Antarctica and the ice shelf taken from Quantarctica

K. MATSUOKA ET AL, "QUANTARCTICA, AN INTEGRATED MAPPING ENVIRONMENT FOR ANTARCTICA, THE SOUTHERN OCEAN, AND SUB-ANTARCTIC ISLANDS" (2021) 140 ENVIRONMENTAL MODELLING & SOFTWARE 105015

CCAMLR's Marine Protected Areas

Successes and Challenges

Solène Guggisberg

1 Introduction

The biodiversity crisis now extends to all corners of the globe, including remote regions such as the Antarctic which is often touted as one the 'last remaining wildernesses'. As noted by the Intergovernmental Panel on Climate Change,

the polar regions, notably [...] the maritime Antarctic, are experiencing impacts from climate change at magnitudes and rates that are among the highest in the world, and will become profoundly different in the near-term future (by 2050) under all warming scenarios.¹

This presents a threat to the region's distinctive biodiversity,² with rising temperatures projected to impact species' abundance, migration patterns and distribution in the Antarctic, and alter species' metabolic processes, influencing growth and reproduction.³ In addition to climate-associated stressors, the cumulative impacts of increased human activities in the region continue to affect Antarctic marine ecosystem functioning through extraction of living resources, habitat alteration, pollution and the introduction of invasive non-native species.⁴ The primary culprit is the mounting interest in industrial fishing, particularly in relation to Antarctic krill (*Euphausia superba*), considered

1 A. Constable et al, "Cross-Chapter Paper 6: Polar Regions" in IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (CUP 2022) 2319, 2321.

2 S. L. Chown et al, "Antarctic Climate Change and the Environment: A Decadal Synopsis and Recommendations for Action" (2022) *Scientific Committee on Antarctic Research*, available at <https://documents.ats.aq/atcm44/att/atcm44_att11_e.pdf> accessed 22 September 2024.

3 S. L. Chown et al, "Challenges to the Future Conservation of the Antarctic" (2012) 337 *Science* 158; M. Meredith et al, "Polar Regions" in IPCC, *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (CUP 2019) 203, 230–234; D. G. M. Miller, "Antarctic Marine Living Resources: 'The Future Is Not What It Used to Be'" in T. Tin et al (eds), *Antarctic Futures* (Springer Netherlands 2014).

4 S. L. Chown, "Antarctic Environmental Challenges in a Global Context" in K. Dodds, A. D. Hemmings and P. Roberts (eds), *Handbook on the Politics of Antarctica* (Edward Elgar Publishing

one of the last 'under-exploited fisheries' in the world.⁵ This is of particular concern as krill is a cornerstone species of the Antarctic, being the primary food source of the Southern Ocean ecosystem⁶ and already particularly vulnerable to climate-change related pressures.⁷

The main legal instrument of relevance in the region, the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CAMLR Convention), aims at the conservation of Antarctic marine living resources, with conservation understood as including rational use.⁸ It establishes the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) which has the competence to adopt a variety of conservation measures (CMs) in application of the Convention. It has done so in order to address various conservation concerns such as over-exploitation of targeted marine living resources, habitat degradation, or illegal, unreported and unregulated fishing.⁹ Over the years, it has gained a track record of conservation successes, and it garnered a reputation as a progressive international organisation and a pioneer of the ecosystem-based approach.¹⁰ However, there is growing recognition that CCAMLR's existing body of CMs – although a positive step – is

2017); Miller (n 3); R. Warner, "Antarctic Environmental Security: Status and Challenges" in C. Leuprecht and D. Causey (eds), *Polar Cousins* (University of Calgary Press 2022).

5 P. N. Trathan et al, "The Ecosystem Approach to Management of the Antarctic Krill Fishery. The 'Devils Are in the Detail' at Small Spatial and Temporal Scales" (2022) 225 *Journal of Marine Systems* 1.

6 E. Cavan et al, "Antarctic Krill. Powerhouse of the Southern Ocean" (2022) *WWF Australia*, available at <<https://static1.squarespace.com/static/5fb210d07f71d5494d254bb9/t/6351341597777d4ed0422a3b/1666266204854/2022-WWF-AU-KRILL-REPORT-DIGITAL.pdf>> accessed 22 September 2024; S. Nicol, J. Foster and S. Kawaguchi, "The Fishery for Antarctic Krill – Recent Developments" (2012) 13 *Fish and Fisheries* 30.

7 Cavan et al (n 6) 10; G. Dickie, "Insight: In Antarctica, Does a Burgeoning Krill Fishery Threaten Wildlife?" (*Reuters*, 24 February 2022), available at <<https://www.reuters.com/business/cop/antarctica-does-burgeoning-krill-fishery-threaten-wildlife-2022-02-24/>> accessed 1 May 2024.

8 Convention on the Conservation of Antarctic Marine Living Resources (CAMLR Convention) (adopted 20 May 1980, entered into force 7 April 1982) 1329 UNTS 47, art II(1)-(2).

9 A schedule of CCAMLR's past and present conservation measures is available at <<https://www.ccamlr.org/en/publications/past-conservation-measures>> accessed 20 September 2024.

10 A. J. Constable, "Lessons from CCAMLR on the Implementation of the Ecosystem Approach to Managing Fisheries" (2011) 12 *Fish and Fisheries* 138, 139; J. P. Croxall and S. Nicol, "Management of Southern Ocean fisheries: global forces and future sustainability" (2004) 16 *Antarctic Science* 569; K. H. Kock, "Antarctic Marine Living Resources – Exploitation and its Management in the Southern Ocean" (2007) 19 *Antarctic Science* 231; Miller (n 3) 84; O. S. Stokke, "The Effectiveness of CCAMLR" in O. S. Stokke and D. Vidas (eds), *Governing the Antarctic* (CUP 1997) 120–151.

insufficient to achieve its conservation objectives in the face of rising climate change and human activities.¹¹

It is widely acknowledged that the implementation of a network of marine protected areas (MPAs) protecting representative examples of marine ecosystems within the geographical area to which the Convention applies (Convention Area)¹² presents one of the most effective conservation tools to combat these cumulative threats.¹³ While CCAMLR itself has not defined the term, an MPA is usually understood as “[a] clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”.¹⁴

In 2009 and 2016, CCAMLR adopted two MPAs in the Convention Area. These are respectively the first ever and largest high seas MPAs, and both include strict non-use measures, such as no-take zones. However, following those early successes, it has been impossible for CCAMLR Members to agree to the establishment of further MPAs, notwithstanding the explicit commitment to do so.¹⁵ This chapter examines the existing CCAMLR MPAs, as well as the ones that have been put forward in proposals by Members. The questions that this chapter addresses relate in particular to the conditions of adoption of non-use measures and the prospects of adoption of further non-use measures within MPAs.

To do so, this chapter starts with a presentation of CCAMLR and its evolution towards the adoption of MPAs (section 2), before focusing on the two

11 CCAMLR, “Report of the Third Special Meeting of the Commission” (2023) (Report SM-III), para 2.16; K. A. Hughes and S. M. Grant, “The Spatial Distribution of Antarctica’s Protected Areas: A Product of Pragmatism, Geopolitics or Conservation Need?” (2017) 72 *Environmental Science & Policy* 41, 42.

12 The Convention Area spans from the area south of 60° South latitude (the geographical scope of the Antarctic Treaty), as well as in the area between that latitude and the Antarctic Convergence (CCAMLR Convention, art I(1)). The Antarctic convergence (or the ‘Polar Front’) is a varying natural boundary where cold and warmer waters meet, extending from the coast of Antarctica to latitudes between 45–60° South.

13 CCAMLR, “Conservation Measure 91-04 (2011) General Framework for the Establishment of CCAMLR Marine Protected Areas” (2011) CM 91-04, preamble and para 2(vi); “G20 Rome Leaders Declaration” (2021), available at <https://www.governo.it/sites/governo.it/files/G20ROMELEADERSDECLARATION_0.pdf> accessed 24 June 2024; Report SM-III (n 11) para 2.4; Miller (n 3) 84.

14 N. Dudley (ed), *Guidelines for Applying Protected Area Management Categories* (International Union for Conservation of Nature and Natural Resources 2009) 8.

15 CCAMLR, “Report of the Twenty-Eighth Meeting of the Commission” (2009) (Report CCAMLR-28), para 7.19; CM 91-04 (n 13) preamble; CCAMLR, “Report of the Fortieth Meeting of the Commission” (2021) (Report CCAMLR-40), Annex 7, para 9.

existing MPAs, presenting their characteristics, discussing the conditions that have led to their adoption, and examining the non-use measures they include (section 3). Then, the chapter turns to the current situation where proposals for three further MPAs (one of which being further divided into two proposals) have been repeatedly put forward without Members reaching consensus to adopt them (section 4). Finally, it analyses the successes and challenges faced by CCAMLR in establishing MPAs, and discusses whether there is a potential pathway to overcome the current MPA deadlock in the form of the recent Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement)¹⁶ (section 5).

2 CCAMLR and Its Evolution towards MPAS

2.1 *Introduction to CCAMLR*

CCAMLR was established pursuant to the CAMLR Convention,¹⁷ which was adopted largely in response to concerns that the rapid expansion in krill exploitation could endanger the entire Antarctic ecosystem.¹⁸ The Convention entered into force in 1982 and forms part of the Antarctic Treaty System (ATS), the multilateral regime regulating many human activities in Antarctica.¹⁹ A cornerstone of the ATS is Article IV of the Antarctic Treaty, according to which territorial claims in relation to Antarctica are frozen, a provision which is reiterated in Article IV of the CAMLR Convention. The seven States that had made territorial claims prior to the Antarctic Treaty are known as 'claimant States', while all others are 'non-claimant States'. CCAMLR membership includes both categories.

16 Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, Document A/CONF.232/2023/4 (30 June 2023) (BBNJ Agreement).

17 CAMLR Convention, art VII(1).

18 Hughes and Grant (n 11) 42; K.-H. Kock, "Understanding CCAMLR's Approach to Management" (2000) *CCAMLR*, para 2.1, available at <<https://www.ccamlr.org/en/system/files/am-all.pdf>> accessed 22 May 2024; Miller (n 3) 65.

19 The ATS is defined as the Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71, the Protocol on Environmental Protection to the Antarctic Treaty (adopted 4 October 1991, entered into force 14 January 1998) 2941 UNTS 3, the Convention for the Conservation of Antarctic Seals (CCAS) (adopted 1 June 1972, entered into force 11 March 1978) 1080 UNTS 175, the CAMLR Convention, and all the instruments adopted under these four treaties.

CCAMLR is currently composed of 27 Members (including the European Union)²⁰ that are bestowed with full decision-making powers,²¹ and 10 Acceding States, that have neither decision-making powers nor the right to fish in the Convention Area. This two-tier system is based on the level of involvement in research or harvesting activities concerning Antarctic marine living resources, with Acceding States required to hold an 'interest' in such activities and Members required to be 'engaged' in such activities.²² Hence, Acceding States, both fishing States and States not active in fishing, but engaged in research activities, can become Members of the Commission. Originally, there was a 2:1 majority of non-fishing States, but this situation was reversed in the mid-1990s when the toothfish fishery became increasingly lucrative and many fishing States became CCAMLR Members.²³

The Convention's objective is the conservation of Antarctic marine living resources which form part of the Antarctic marine ecosystem, including populations of finfish, molluscs, crustaceans, birds and all other species of living organisms within the Convention Area.²⁴ Pursuant to Article IX, the Commission was established to give effect to this objective. Although CCAMLR is generally considered as more than a regional fisheries management organisation, it does not directly involve itself with the conservation and management of marine mammals and seals²⁵ and its material competence is "limited to fishing, fishing-related activities and research".²⁶ Indeed, it does not regulate other activities that might have an impact on the conservation of Antarctic marine living resources.

Of note, in the context of the CAMLR Convention, conservation includes 'rational use'. This term, although not expressly defined in the Convention, is

20 The status of the CAMLR Convention is available at <https://www.austlii.edu.au/au/other/dfat/treaty_list/depositary/CCAMLR.html> accessed 21 September 2024.

21 CAMLR Convention, arts XII, XIX.

22 *ibid* arts VII(2)(b), XXIX. To become a CCAMLR Member, an Acceding State's application for membership must be approved by consensus.

23 C. M. Brooks, "Competing Values on the Antarctic High Seas: CCAMLR and the Challenge of Marine-Protected Areas" (2013) 3 *The Polar Journal* 277, 294–295. The situation has not changed dramatically since that study, as only the Netherlands and Ecuador have joined the Commission in 2019 and 2022, respectively.

24 CAMLR Convention, arts I(2), II.

25 *ibid* art VI. Whales and seals are governed, respectively, by the International Convention for the Regulation of Whaling (ICRW) (adopted 2 December 1946, entered into force 10 November 1948) 161 UNTS 72, and by CCAS.

26 E. J. Molenaar, "Participation in Regional Fisheries Management Organizations" in R. Cad-dell and E. J. Molenaar (eds), *Strengthening International Fisheries Law in an Era of Changing Oceans* (Hart Publishing 2019) 103–129, 107.

considered to have been initially understood as the use of living resources consistent with the conservation principles set out in Article 11(3) (more on these principles below).²⁷ However, there is a long track record of division amongst CCAMLR Members concerning the meaning of the term, which has only intensified with the expanded representation of fishing States amongst CCAMLR Members.²⁸

Any harvesting and associated activities must comply with the provisions of the Convention and, in particular, three core conservation principles set out in Article 11(3), which aim to: (i) prevent a decrease in harvested stocks below stable population levels, (ii) maintain ecological relationships between harvested and dependant species, and (iii) minimise the risk of impacts to the marine ecosystem which are not potentially reversible over two or three decades. These principles embody the precautionary and ecosystem approaches to the conservation of Antarctic marine living resources. The former encourages proactive and early action to minimise long-term adverse effects notwithstanding scientific uncertainty, which is particularly critical in the context of relatively data-poor Antarctica.²⁹ Meanwhile, an ecosystem approach seeks to holistically minimise the impact of fishing on the ecosystem as a whole, rather than focusing upon a specific species or habitats.³⁰

CCAMLR discharges its conservation mandate through the adoption of CMS and complementary non-binding resolutions during its annual meetings, based upon the 'best scientific evidence available' provided by an advisory Scientific Committee and its working groups.³¹ CMS are binding upon all CCAMLR Members, subject to limited exceptions such as the Chairman's Statement³² or the

27 J. Jacquet et al, "Rational Use' in Antarctic Waters" (2016) 63 *Marine Policy* 28, 32.

28 Brooks (n 23) 294–295; Jacquet et al (n 27) 32–33.

29 A. Fabra and V. Gascon, "The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Ecosystem Approach" (2008) 23 *International Journal of Marine and Coastal Law* 567, 570. On the precautionary approach and CCAMLR, see eg G. Parkes, "Precautionary fisheries management: the CCAMLR approach" (2000) 24 *Marine Policy* 83.

30 Constable (n 10) 140; Fabra and Gascon (n 29) 568–569; Kock (n 18) (111). While the ecosystem approach and ecosystem-based management can have different meanings, they seem to be used interchangeably in the CCAMLR context.

31 CAMLR Convention, art IX(1)(f); L. Wenzel et al, "Polar Opposites? Marine Conservation Tools and Experiences in the Changing Arctic and Antarctic" (2016) 26 *Aquatic Conservation: Marine and Freshwater Ecosystems* 61, 71.

32 The 1980 Chairman's Statement allows coastal States of islands over which "the existence of State sovereignty is recognised by all Contracting Parties" to lodge reservations to CMS, and instead adopt national measures, see CCAMLR, "Statement by the Chairman of the Conference on the Conservation of Antarctic Marine Living Resources" (1980), available at <<https://www.ccamlr.org/en/organisation/camlr-convention-text#Chair>> accessed

rarely invoked 'opt-out' mechanism.³³ As with all decisions of substance made by CCAMLR, CMS and resolutions are adopted by consensus,³⁴ requiring all Members to be in agreement or to not formally object to a proposed measure.³⁵

2.2 CCAMLR's First Steps towards MPAs

Although the CAMLR Convention does not explicitly refer to MPAs, the Commission has asserted its jurisdiction to establish MPAs in the Convention Area on the basis of its broad conservation mandate.³⁶ The Commission has also expressly identified Article IX(2)(f) and (g) as a legal basis for the establishment of MPAs.³⁷ These provisions enable the Commission to establish CMS designating "open and closed seasons for harvesting" and "the opening and closing of areas, regions or sub-regions" for, amongst other things, conservation purposes.³⁸

The valuable role of MPAs in furthering CCAMLR's conservation objective has long been recognised within the Commission,³⁹ with the idea of MPAs developed within CCAMLR first introduced by an International Union for Conservation of Nature observer at the 1996 Commission meeting.⁴⁰ CCAMLR then included protected areas as a separate ongoing agenda item and established an advisory sub-group to consider the issue in 2002.⁴¹ The

22 September 2024. For example, both France and South Africa have lodged reservations to conservation measures requiring, inter alia, data reporting and notification for new or exploratory fisheries and in their respective waters (See D. G. M. Miller, "CCAMLR Conservation Measures: How the Chairman's Statement Works" (2015) 7 *The Yearbook of Polar Law Online* 501, 524, table 5). The application of the Statement to 'disputed' islands' remains debated, as discussed by B. Arpi and J. McGee, "Fishing around the South Georgia Islands and the 'Question of the Falklands/Malvinas': Unprecedented Challenges for the Antarctic Treaty System" (2022) 143 *Marine Policy* 105201, 1.

33 CAMLR Convention, art IX(6).

34 CAMLR Convention, art XII.

35 L. Goldsworthy, "Consensus Decision-Making in CCAMLR: Achilles' Heel or Fundamental to Its Success?" (2022) 22 *International Environmental Agreements: Politics, Law and Economics* 411, 412.

36 CCAMLR, "Report of the CCAMLR Workshop on MPAs" (2005), para 36; CCAMLR, "Report of the Twenty-Fourth Meeting of the Commission" (2005) (Report CCAMLR-24), para 4.14.

37 CM 91-04 (n 13); preamble; CCAMLR, "Conservation Measure 91-05 (2016) Ross Sea Region Marine Protected Area" (2016) CM 91-05, preamble.

38 CAMLR Convention, arts IX(2)(f)(g).

39 Report CCAMLR-24 (n 36) para 4.14.

40 CCAMLR, "Report of the Fifteenth Meeting of the Commission" (1996), para 11.13; Jacquet et al (n 27) 33.

41 CCAMLR, "Report of the Twenty-First Meeting of the Commission" (2002), paras 4.17, 4.20.

first workshop to explore the development of an MPA network in the Antarctic – with a particular focus upon representativeness, ie the ability to reflect the diversity of marine ecosystems – was then convened in 2005.⁴²

In 2009, CCAMLR both adopted its first MPA and formally committed to the establishment of a representative network, or system, of MPAs in the Convention Area by 2012.⁴³ To do so, CCAMLR started by identifying priority areas for MPA designation through bioregionalisation.⁴⁴ Then, in 2011, at a CCAMLR workshop on MPAs, the Convention Area was divided into nine MPA planning domains.⁴⁵ That same year, CCAMLR adopted a “General framework for the establishment of CCAMLR Marine Protected Areas” (MPA Framework).⁴⁶ According to this instrument, the general objectives of MPAs encompass protecting key marine ecosystems’ processes, habitats and species, representative ecosystems, biodiversity and habitats, local ecosystems’ critical features and vulnerable areas, as well as building climate change resilience and adaptability and establishing scientific reference areas.⁴⁷

3 Existing CCAMLR MPAS

As of September 2024, two MPAs have been established by CCAMLR: the South Orkney Islands southern shelf MPA (South Orkney Islands MPA) and the Ross Sea region MPA. Several other MPAs exist in the Convention Area but in areas under national jurisdiction⁴⁸ and are hence not presented here.⁴⁹

42 Report of the CCAMLR Workshop on MPAs (n 36); Report CCAMLR-24 (n 36) paras 4.12–4.14.

43 Report CCAMLR-28 (n 15) para 7.19; CM 91–04 (n 13).

44 CCAMLR, “Report of the Twenty-Seventh Meeting of the Commission” (2008), paras 7.1–7.2; CM 91–04 (n 13).

45 Scientific Committee for the Conservation of Antarctic Marine Living Resources, “Report of Thirtieth Meeting of the Scientific Committee” (2011) SC-CAMLR XXX, Annex 6, 296. For an overview of the planning domains, see CCAMLR, “MPA planning domains”, available at <<https://www.ccamlr.org/en/science/mpa-planning-domains>> accessed 22 September 2024.

46 CM 91–04 (n 13).

47 *ibid.*

48 The marine areas under national jurisdiction stem from the five groups of sub-Antarctic islands that fall under national jurisdiction and are located within the Convention Area (ie Crozet; Heard Island and McDonald Islands; Kerguelen; Prince Edward Islands; and South Georgia and South Sandwich Islands).

49 On this, see eg Brooks et al, “Progress towards a representative network of Southern Ocean protected areas” (2020) 15(4) *PLOS ONE* e0231361.

3.1 *South Orkney Islands Southern Shelf MPA*

Adopted in 2009, the South Orkney Islands MPA was the first MPA in areas beyond national jurisdiction (ABNJ).⁵⁰ The MPA will remain in place except if it is decided otherwise by consensus of the CCAMLR Members.

Covering 94,000 km², this MPA was identified as an area of “high conservation importance, and representative of key environmental and ecosystem characteristics in the region”.⁵¹ There, commercial fishing is prohibited, as are transshipment and discharges or dumping by fishing or fishing-related vessels. In addition to an emergency exception to the prohibitions, research activities can also take place if CCAMLR’s Scientific Committee gives its approval, in which case specific rules for scientific research apply.⁵²

The South Orkney Islands MPA was adopted prior to the development of the CCAMLR MPA Framework; hence, there were no dedicated criteria or rules on how to develop and adopt the MPA proposal.⁵³ On the basis of a proposal made by the United Kingdom, which excluded the regions adjacent to the South Orkney Islands that were the most biologically rich (but also important fishing ground),⁵⁴ the MPA was adopted the same year that it was first put forward. This swift process was probably made possible by the fact that, from the outset, the proposal was designed not to interfere with existing fisheries, and concessions were then made in order to avoid interferences with potential future fisheries.⁵⁵

3.2 *Ross Sea Region MPA*

The second CCAMLR MPA is the Ross Sea region MPA, which was adopted in 2016 after five years of negotiations.⁵⁶ It has been designated for a period 35 years, and will consequently lapse at the end of the 2051–2052 fishing season,

50 CCAMLR, “Conservation Measure 91–03 (2009) Protection of the South Orkney Islands Southern Shelf” (2009) CM 91–03. On this MPA, see eg P. N. Trathan and S. M. Grant, “The South Orkney Islands Southern Shelf Marine Protected Area: towards the establishment of marine spatial protection within international waters in the Southern Ocean” in J. Humphreys and R. W. E. Clark (eds), *Marine Protected Areas: Science, Policy and Management* (Elsevier 2020) 67–98.

51 CM 91–03 (n 50) preamble.

52 CCAMLR, “Conservation Measure 24–01 (2023) The application of conservation measures to scientific research” (2023) CM 24–01.

53 C. M. Brooks et al, “Reaching Consensus for Conserving the Global Commons: The Case of the Ross Sea, Antarctica” (2020) 13 *Conservation Letters* e12676, 3.

54 Brooks (n 23) 282.

55 Brooks et al (n 53) 3.

56 CM 91–05 (n 37). On this MPA, see eg C. M. Brooks et al, “The Ross Sea, Antarctica: A highly protected MPA in international waters” (2021) 134 *Marine Policy* 104795.

unless Members agree otherwise (ie to extend the duration) by consensus.⁵⁷ In the meantime, it could also be terminated in the highly unlikely event that consensus is reached to do so.

Covering an area of 1.55 million km², it is the largest high seas MPA in the world. The Ross Sea region MPA was established inter alia to conserve that area's "natural ecological structure, dynamics and function", to protect "large-scale ecosystem processes responsible for the productivity and functional integrity of the ecosystem", specific habitats and/or areas important for certain species' crucial lifecycle stages, as well as to promote research.⁵⁸ In the Ross Sea region MPA, as a default, fishing activities and transshipment activities by fishing vessels are not allowed, but exceptions to these prohibitions exist.

The MPA is divided in three zones, which are more or less strictly focused on non-use. In the largest zone, the General Protection Zone (GPZ), fishing other than for scientific research is prohibited. In the Krill Research Zone (KRZ), in addition to a scientific research exemption for species other than krill, exploratory fishing for krill is allowed.⁵⁹ In the Special Research Zone (SRZ), exploratory krill and toothfish fishing are allowed.⁶⁰

The Ross Sea region MPA was first proposed in 2012 by the United States and New Zealand. An in-depth study analysed the negotiation process, highlighting the main issues and steps that led to the MPA's adoption in 2016.⁶¹ In 2012, many concerns were raised, in particular regarding the proposed MPA's size and boundaries. Not long thereafter, it was acknowledged that the proposal met the criteria found in the MPA Framework,⁶² but further concerns about interference with fishing and the scientific basis for the proposed northern parts of the MPA were nonetheless voiced. The northern parts of the proposal were subsequently removed, but Russia's opposition, in particular, did not seem to abate and it even questioned the ability of CCAMLR to adopt MPAs. The 40% reduction in size led many fishing States to support the proposal, but consensus could still not be reached in 2013. By the end of the 2014

57 CM 91-05 (n 37) para 20. The restrictions in the Special Research Zone will lapse after 30 years already.

58 *ibid* para 3.

59 An exploratory fishery is a fishery for which necessary information for sustainable management is not yet available, see eg CCAMLR, "Conservation Measure 21-02 (2019) Exploratory Fisheries" (2019) CM 21-02. This type of fishery is a step towards fully establishing a new commercial fishery, but the total allowable catch is a precautionary one, at the level needed to obtain the necessary information.

60 CM 91-05 (n 37).

61 Brooks et al (n 53) 4-6.

62 Scientific Committee for the Conservation of Antarctic Marine Living Resources, "Report of the First Intersessional Meeting of the Scientific Committee" (2013), paras 2.30-2.33.

Commission's annual meeting, it was felt that positions were entrenched and trust was broken, but only two opponents remained, ie Russia and China. During the 2015 CCAMLR meeting, negotiations led to additional compromises, in particular further reduction in size, the expansion of the SRZ, and the inclusion of a sunset clause providing that the MPA would lapse after 50 years. More concessions were made to China in the final morning of the meeting. By then, the proposal included a KRZ, and krill fishing was to be allowed in the SRZ. With those changes and high-level political meetings, China finally consented to the adoption of the MPA but Russia's opposition, however, remained. In the lead up to the 2016 CCAMLR meeting, high-level political meetings between US Secretary of State John Kerry and Russian officials paved the way to Russia joining the consensus. This achievement was also made possible by Russia's strong environmental narrative at the time, Putin having declared a Year of Ecology for 2017. At the CCAMLR meeting itself, further compromises were made, with increased fishing in the SRZ and the opening of fishing grounds outside of the MPA, as well as a reduction of the MPA duration, bringing the sunset clause to 35 years. The Ross Sea region MPA could then be adopted by consensus.

It appears that the adoption of the Ross Sea region MPA was made possible by the large reduction in size of the proposal, the introduction of a sunset clause, and high-level diplomatic pressure by the United States.

3.3 *Analysis of Existing Non-use Measures*

Both CCAMLR MPAs include non-use measures: fishing is, by default, prohibited. Some activities that are related to fishing are also covered by non-use measures. Indeed, in the South Orkney Islands MPA, in addition to commercial fishing, discharges or dumping by fishing or fishing-related vessels are prohibited, as is transshipment. In the Ross Sea region MPA, fishing vessels are not allowed to undertake transshipment activities, but dumping and discharges are only to be avoided, hence less strictly prohibited.

Yet, a variety of exceptions to the non-use measures exist, which allow some fishing or fishing-related activities to take place. First, a general emergency exception for the safety of life at sea is applicable in the South Orkney Islands MPA, while a similar one is included in the Ross Sea region MPA with regard to transshipment activities in particular.⁶³ Second, in both MPAs, scientific research fishing is permitted to proceed. Such activity is however regulated by CCAMLR.⁶⁴ Indeed, in the South Orkney Islands MPA, the approval of the Scientific Committee is required before scientific fishing can take place. In the

63 CM 91-03 (n 50) para 6; CM 91-05 (n 37) para 11.

64 CM 24-01 (n 52).

Ross Sea region MPA, Members can decide to allow scientific fishing themselves if the research program involves catching up to a certain amount of a species (with different caps for different species), while the decision is in the hands of the Commission above that amount.⁶⁵ Third, in both the SRZ and the KRZ of the Ross Sea region MPA, exploratory fishing can take place: toothfish can be caught in the SRZ, while krill can be caught in both zones. Other CMS then regulate such exploratory fishing.⁶⁶

It is worth noting that exceptions to non-use measures could also be construed as measures regulating use, in particular here in the case of scientific fishing and exploratory fishing. However, whereas the heading of the relevant section in Conservation Measure 91–05 on the Ross Sea region MPA ambiguously reads “Restricted, prohibited and managed activities”, the first paragraph clearly provides that “[e]xcept as authorised under paragraphs 8, 9 and 21 fishing activities are prohibited within the MPA”, a non-use default situation. Nonetheless, depending on the scope of the exceptions, one can wonder whether the non-use measure description applied to fishing prohibitions in MPAs, in particular in the SRZ and KRZ of the Ross Sea region MPA, is fully warranted.

Many of CCAMLR's other CMS include non-use measures, which are not discussed in detail here.⁶⁷ These non-use measures can have a variety of foci: the species that cannot be caught, the time of the year when fishing is not permitted to take place, the areas where it is not allowed to occur, and the type of fishing gear that may not be used. Some measures are a mix of these categories. Examples include the prohibition of bottom fishing in registered Vulnerable Marine Ecosystems,⁶⁸ and the prohibition of directed fishing of listed species in designated areas⁶⁹ or during a given period.⁷⁰ Some of these non-use meas-

65 *ibid* paras 2–3; on this and the stringency of the process, see eg Brooks et al (n 53) 4.

66 See eg CCAMLR, “Conservation Measure 41–09 (2023) Limits on the exploratory fishery for *Dissostichus mawsoni* in Statistical Subarea 88.1 in the 2023/24 season” (2023) CM 41–09 for toothfish; and CCAMLR, “Conservation Measure 51–04 (2023) General measure for exploratory fisheries for *Euphasia superba* in the Convention Area in the 2023/24 season” (2023) CM 51–04 for krill.

67 On this, see the discussion by Urrutia in chapter 5 of this volume.

68 CCAMLR, “Conservation Measure 22–09 (2012) Protection of registered vulnerable marine ecosystems in subareas, divisions, small-scale research units, or management areas open to bottom fishing” (2012) CM 22–09.

69 CCAMLR, “Conservation Measure 32–02 (2017) Prohibition of directed fishing” (2017) CM 32–02.

70 CCAMLR, “Conservation Measure 32–09 (2023) Prohibition of directed fishing for *Dissostichus spp.* Except in accordance with specific conservation measures in the 2023/34 season” (2023) CM 32–09.

ures are similar, in nature, to the non-use measures included in CCAMLR MPAs in that fishing is not allowed in certain areas, for a certain period of time. The main differences are meant to be in scopes and objectives: MPAs are considered to have broader conservation objectives than other CMS, which typically focus upon a limited number of species or cover a smaller area⁷¹ and aim at the sustainable management of targeted species rather than the protection of ecosystem processes. That being said, these distinctions become rather tenuous when an MPA's proposal must be watered down in order to be adopted. For example, the compromises that were necessary for consensus to be reached on the Ross Sea region MPA led to many exceptions to the no-take measure, including for exploratory fishing, which is fisheries management rather than conservation; to a large decrease in size, ultimately leaving some key parts of the relevant ecosystem unprotected; and to a time limit that may not ensure the best protection for the Ross Sea's species. Hence, just as a clear division between non-use and limited-use measures can be difficult to make in practice, the firm distinction between MPAs and fisheries management measures might be elusive, particularly when the purportedly stricter conservation measure is subject to extensive exceptions and carve-outs.

4 Current Situation

4.1 *Blocked Proposals*

In addition to the Weddell Sea MPA Phase 1 proposed in 2018 (on this, see the detailed discussion conducted by Teschke and Konijnenberg in chapter 12 of this volume),⁷² two further MPAs have been put forward over the years: East Antarctica in 2012 and the Antarctic Peninsula (Domain 1) in 2022 – and

71 P. N. Trathan, "What Is Needed to Implement a Sustainable Expansion of the Antarctic Krill Fishery in the Southern Ocean?" (2023) 155 *Marine Policy* 105770, 8; Report SM-III (n 11) 2.8, 2.11, 2.16.

72 A first proposal for the Weddell Sea MPA was submitted in 2016. It was then divided into the current Phase 1 proposal and Phase 2 proposal (covering areas in Domain 4 east of the prime meridian) at the demand of Norway, which was concerned about data availability in the east Weddell Sea. The proposal for Phase 2, submitted by Norway in 2023, is currently in the earlier stages of development and will consequently not be examined here. At first glance, however, it seems designed with restricted-use measures in mind, rather than non-use measures.

several times since. However, they have not (yet) met with the approval of all CCAMLR Members.⁷³

4.1.1 East Antarctic MPA

The East Antarctic MPA (EAMPA) was first formally proposed in 2012 by Australia, France and the European Union, and by Australia and the European Union and its Member States from 2016 onwards. Several co-sponsors have joined since. The EAMPA is proposed as a 'multi-use', rather than a 'no-take', area. This allows for certain fishing activities, including research fishing and directed finfish and Antarctic krill fishing, subject to compliance with the MPA's objectives⁷⁴ and prescribed conditions.⁷⁵ Hence, the proposed EAMPA includes restricted-use rather than non-use measures.

Proponents emphasise the EAMPA's potential to maintain the long-term resilience of Antarctic ecosystems and conserve representative areas of biodiversity, as well as to provide scientific reference areas – particularly as the region serves as foraging grounds for a range of predators and nursery grounds for key species such as Antarctic krill, toothfish and silverfish.⁷⁶ Since the EAMPA was initially proposed in 2012, it has attracted support from a broad range of co-proponents and has been refined in response to scientific discoveries and Member feedback.⁷⁷ For instance, the geographical scope of the proposal has been significantly narrowed from seven to three scientific representative zones,⁷⁸ decreasing the MPA's spatial coverage from 1.8 million km² to

73 Most recently, CCAMLR, "Report of the Forty-Second Meeting of the Commission" (2023) (Report CCAMLR-42), paras 5.5–5.35. On this, see also K. N. Scott, "MPAs in the Southern Ocean under CCAMLR" (2021) 9 *The Korean Journal of International and Comparative Law* 84, 100–102.

74 CCAMLR, "Report of the Forty-First Meeting of the Commission" (2022) (Report CCAMLR-41), para 5.22.

75 CCAMLR, "Draft conservation measure for an East Antarctic Marine Protected Area" (Submitted by Delegations of Australia, the European Union and its Member States, India, New Zealand, Norway, the Republic of Korea, Ukraine, the United Kingdom, the United States of America and Uruguay) (2023) Doc CCAMLR-42/40 (Draft CM for EAMPA). For example, krill fishing would be prohibited in the D'Urville Sea-Merti area, one of the three EAMPA zones.

76 Report CCAMLR-41 (n 74) paras 5.21–5.22; Report CCAMLR-42 (n 73) para 5.9.

77 Report CCAMLR-41 (n 74) para 5.28; Report CCAMLR-42 (n 73) 122, para 5.12.

78 Draft CM for EAMPA (n 75) Attachment A para 1. For a description of each area, see eg Australian Antarctic Division, Commonwealth of Australia, "Area Based Marine Conservation Planning in East Antarctica" (2023), available at <https://www.antarctica.gov.au/site/assets/files/57808/eampa_explainer_eng_final_v3_16_06.pdf> accessed 18 August 2024.

970,000 km².⁷⁹ Whilst the MPA does not have a designated duration, the Commission is to decide by consensus (upon request by one or more Members) whether the EAMPA is to be modified, replaced or to cease after 30 years.⁸⁰

4.1.2 Domain 1 MPA

The proposal for the Antarctic Peninsula region MPA, also known as 'Domain 1 MPA', was submitted in 2018 by Argentina and Chile.⁸¹ The Domain 1 MPA covers approximately 670,000 km² in the Western Antarctic Peninsula and South Scotia Arc region. This region is one of the most productive Antarctic regions, with 75% of the circumpolar Antarctic krill population occurring in it,⁸² and it is considered a biodiversity hotspot.⁸³ It is also particularly vulnerable to the impacts of climate change and already subject to increasing environmental variability, impacting krill populations.⁸⁴ The Domain 1 MPA, which would have a limited duration of 70 years,⁸⁵ currently comprises a no-take GPZ (representing over 60% of the MPA) and a krill fishing zone (KFZ) which includes important fishing areas around the Antarctic Peninsula, the South Shetland Islands, and the South Orkney Islands.⁸⁶ Hence, the current Domain 1 MPA proposal prohibits fishing activities, except for research fishing in the whole MPA (conducted in accordance with specified CMs and consistent with the MPA objectives) and directed krill fishing in the KFZ (during a prescribed fishing season and subject to conditions).⁸⁷ The current proposal has been significantly adjusted and streamlined since 2018,⁸⁸ as, for instance, a 'special fishery

79 Antarctic and Southern Ocean Coalition (ASOC), "East Antarctic MPA" (2024), available at <<https://www.asoc.org/campaign/east-antarctic-mpa/>> accessed 18 August 2024.

80 Draft CM for EAMPA (n 75) Attachment A para 18.

81 CCAMLR, "Proposal for a Conservation Measure establishing a Marine Protected Area in Domain 1 (Western Antarctic Peninsula and South Scotia Arc)" (Submitted by the Delegations of Argentina and Chile) (2018) Doc CCAMLR-XXXVII/31.

82 CCAMLR, "Revised proposal for a Conservation Measure establishing a Marine Protected Area in Domain 1 (Western Antarctic Peninsula and South Scotia Arc)" (Submitted by the Delegations of Argentina and Chile) (2023) Doc CCAMLR-42/26 (Rev proposal CM Domain 1), 2.

83 *ibid* 5.

84 CCAMLR, "Report of the Thirty-Ninth Meeting of the Commission" (2020) (Report CCAMLR-39), para 8.20.

85 Rev proposal CM Domain 1 (n 82) 13.

86 *ibid* 6, 19.

87 *ibid* 11.

88 Report CCAMLR-41 (n 74) para 5.11.

management zone', which allowed for directed krill fishing under different conditions, was removed and the KFZ was instead expanded.⁸⁹

The Domain 1 MPA is expected to "substantially increase the representativeness of MPAs in the Convention Area",⁹⁰ protect key life-cycle areas for krill and predators, and boost ecosystem resilience against climate change.⁹¹ Proponents also emphasise prospective future benefits for krill harvesting activities due to increased productivity and a potential 'spill-over' effect.⁹²

4.2 *Main Arguments of Opponents*

The States that oppose the adoption of new MPAs in the Convention Area have presented a variety of arguments, which often reflect, more or less transparently, these States' fishing interests and world vision. Indeed, without always explicitly acknowledging it, those States fear that non-use measures will interfere with their fishing interests, both present and future.⁹³ Several of the arguments presented below might be strategies to block progress on MPAs adoption rather than arguments in a good faith negotiation process, particularly as the opposing States have been criticised for failing to properly substantiate their concerns or engage in constructive discussions.

Such fishing interest is often presented under the guise of defending the 'rational use' objective of the CAMLR Convention. Russia and China in particular have frequently invoked that concept to oppose the current MPA proposals,⁹⁴ asserting that conservation and rational use are separate goals that ought to be balanced in MPA designation.⁹⁵ China has made it clear that they

89 ASOC, "Great Expectations: Moving towards consensus on CCAMLR MPAs in 2023" (2023) CCAMLR-SM-III/BG/03, 9.

90 CCAMLR, "Report of the Thirty-Seventh Meeting of the Commission" (2018), para 6.45; Report CCAMLR-42 (n 73) para 5.20.

91 Report CCAMLR-39 (n 84) para 8.20; Report CCAMLR-41 (n 74) para 5.18.

92 Report CCAMLR-41 (n 74) para 5.10.

93 For example, the desire to secure future access to fishing grounds is likely at the centre of the remaining opposition to the EAMPA proposal, since the region is not currently home to large fisheries and the proposal does not include areas fully closed to fishing (C. Brooks, "Why are Talks over an East Antarctic Marine Park Still Deadlocked?" (*The Conversation*, 2018), available at <<https://theconversation.com/why-are-talks-over-an-east-antarctic-marine-park-still-deadlocked-86681#:~:text=Competing%20national%20incentives%20among%20member,the%20bottom%20of%20the%20world.>> accessed 22 September 2024).

94 Jacquet et al (n 27) 29, 30–31.

95 Report CCAMLR-39 (n 84) paras 8.29, 8.31; see also M. Haward and A. Jackson, "Antarctica: Geopolitical Challenges and Institutional Resilience" (2023) 13 *The Polar Journal* 31, 42.

understand ‘rational use’ as an unrestricted right to fish.⁹⁶ Nonetheless, an in-depth analysis of the term, both pre-CCAMLR and as part of that regime, demonstrates that this is a misleading interpretation. Indeed, the analysis notes that “[n]owhere is there a statement that ‘rational use’ implies an implicit or unrestricted right to fish everywhere at all times, nor is there an endorsement of fishing at the cost of other objectives of the Convention”.⁹⁷

Second, China and Russia have rejected MPA proposals due to what they perceive as a lack of supporting scientific data,⁹⁸ including where proposals had already been certified by the CCAMLR Scientific Committee as constituting ‘best available scientific data’.⁹⁹ Notably, recent objections have referred to a lack of ‘sufficient data’ or ‘sound scientific evidence’,¹⁰⁰ with Russia even proposing to amend CCAMLR’s MPA Framework to incorporate this stricter standard.¹⁰¹ This proposed departure from the ‘best available science’ standard enshrined in Article IX(1)(f) of the Convention and applicable to all CMS has attracted significant criticism from other Members as failing to align with the precautionary approach and presenting an “unachievable barrier” to the adoption of MPAs.¹⁰² Members have expressed particular concern about the continued blocking of the Domain 1 MPA proposal which is supported by a significant amount of data.¹⁰³

In relation to this, both Russia and China have also persistently rejected MPA proposals on the basis that there is insufficient evidence that climate change

96 CCAMLR, “Report of the Second Special Meeting” (2013) (Report SM-II), para 3.34; CCAMLR, “Report of the Thirty-Third Meeting of the Commission” (2014) (Report CCAMLR-33), para 7.69.

97 Jacquet et al (n 27) 33. On a critical view of ‘rational use’ as justification for fishing, see D. Ainley and C. Brooks, “Exploiting the Southern Ocean: Rational Use or Reversion to Tragedy of the Commons” in A. Hemmings and D. Liggett (eds), *Exploring Antarctic Values* (Gateway Antarctica Special Publication Series 2013) 148–160.

98 Report CCAMLR-37 (n 90) para 6.34; CCAMLR, “Report of the Thirty-Eighth Meeting of the Commission” (2019) (Report CCAMLR-38), para 6.43; Report CCAMLR-41 (n 74) paras 5.15, 5.25–5.26; Report CCAMLR-42 (n 73) paras 5.15, 5.34. Other States have also expressed concerns regarding data availability (in particular Norway when it came to the Weddell Sea proposal prior to the division into phases in 2018). A major difference however is that these States’ concerns could be alleviated and were not irreconcilable with the precautionary approach.

99 Report CCAMLR-38 (n 98) para 6.45.

100 Report CCAMLR-39 (n 84) para 8.31; Report SM-II (n 96) para 3.34; Report SM-III (n 11) paras 2.12, 3.8–3.9.

101 Report SM-III (n 11) para 3.8.

102 *ibid*; Report CCAMLR-38 (n 98) para 6.17.

103 Report CCAMLR-41 (n 74) paras 5.11, 5.19.

presents a tangible threat to the relevant areas,¹⁰⁴ and a lack of clarity as to how the proposed MPAs would provide protection against climate change.¹⁰⁵ This has been countered by many other Members who emphasise that, whilst MPAs cannot prevent climate change, they are an important tool in supporting climate resilience and mitigation.¹⁰⁶ The proponents also note that requiring clear identification of threats to secure protection is contrary to CCAMLR's precautionary and ecosystem approaches enshrined in Article II.¹⁰⁷

Third, Russia is of the opinion that the CCAMLR MPA Framework must be amended before any further MPA can be established.¹⁰⁸ Indeed, it asserts that the Framework is "brief and does not contain enough procedural and implementation measures to manage a unified process for designating MPAs".¹⁰⁹ Proposed amendments include an agreed definition of an MPA,¹¹⁰ as well as the clarification of MPA proposal data requirements and of the criteria for assessing whether an MPA's objectives are achieved.¹¹¹ Whilst other Members have displayed a willingness to consider improvements to the MPA Framework, they have emphasised that this should not be considered a precondition for the adoption of the current MPA proposals, since the current Framework is "fit for purpose".¹¹²

Finally, it has also been argued, although to a lesser extent, that MPAs are used by proponent States as a political tool to assert sovereignty and exclude other non-claimant Members from the relevant regions. This assertion, raised by Russia,¹¹³ is founded on the fact that all MPA proposals have been led (at least

¹⁰⁴ Report CCAMLR-39 (n 84) para 8.29; Report CCAMLR-41 (n 74) paras 5.14, 5.34; Working Group on Ecosystem Monitoring and Management, "Report of the Working Group on Ecosystem Monitoring and Management 2023" (2023) WG-EMM-2023 (Report WG-EMM-2023), 239, para 7.11; Report CCAMLR-42 (n 73) para 5.16.

¹⁰⁵ Report CCAMLR-41 (n 74) para 5.26; Report WG-EMM-2023 (n 104) paras 7.11, 7.12; Report CCAMLR-42 (n 73) paras 5.14, 5.8, 5.26.

¹⁰⁶ Report CCAMLR-39 (n 84) para 8.23; Report CCAMLR-41 (n 74) paras 5.38, 5.27, 5.38; Report CCAMLR-42 (n 73) para 5.14, 6.7, 6.20.

¹⁰⁷ Report CCAMLR-40 (n 15) para 7.17; Report WG-EMM-2023 (n 104) para 7.11; Report CCAMLR-42 (n 73) paras 5.9, 5.14, 5.15; E. Nyman, "Protecting the Poles: Marine Living Resource Conservation Approaches in the Arctic and Antarctic" (2018) 151 *Ocean & Coastal Management* 193; Trathan (n 71).

¹⁰⁸ Report SM-III (n 11) paras 2.12, 3.2, 3.9, 4.29; Report CCAMLR-42 (n 73) para 5.31.

¹⁰⁹ Report CCAMLR-38 (n 98) para 6.15; Report CCAMLR-39 (n 84) para 8.29.

¹¹⁰ Report CCAMLR-38 (n 98) para 6.15; Report CCAMLR-39 (n 84) para 8.29; Report SM-III (n 11) para 3.2; Report CCAMLR-42 (n 73) para 5.30.

¹¹¹ Report SM-III (n 11) para 3.9; Report WG-EMM-2023 (n 104) para 7.11.

¹¹² Report SM-III (n 11) paras 1.19, 3.6; Report CCAMLR-42 (n 73) para 5.34.

¹¹³ Report CCAMLR-33 (n 96) para 7.65.

initially) by relevant claimant States.¹¹⁴ However as emphasised by many Members, the proposals are open for any Member to join as a co-proponent – with the current proposals attracting diverse ranges of supporters. Once established, MPAs are to be jointly managed, and the measures within MPAs will apply to all Members equally.¹¹⁵

5 Analysis and Way Forward

5.1 *Successes and Challenges*

It is worth asking whether CCAMLR MPAs can be considered successful, not only in attaining the stated goals in the relevant CCAMLR instruments, but also as much lauded conservation tools for the marine biodiversity of the Southern Ocean.

The CCAMLR MPAs impose actual obligations with (non-use) measures on State Parties, which have the potential to achieve conservation objectives. Obligations not to catch fish and/or krill, to refrain from certain transhipment activities, and clear rules regarding the implementation of exceptions are noteworthy in their stringency. This is in clear contrast to other high seas MPAs, in particular those in the North-East Atlantic (region under the mandate of the OSPAR Convention), which have conservation objectives but few concrete management measures in place to achieve them.¹¹⁶ Overall, it has been said that CCAMLR MPAs have the potential to build ecosystem-level climate resilience and adaptation to climate change by reducing human stressors, such as population depletion, food web disruption, habitat damage, pollution, and invasion of alien species.¹¹⁷ Other benefits of MPAs include addressing ongoing knowledge gaps by providing critical climate reference areas and baselines allowing for the monitoring of long-term impacts from human activities and climate change;¹¹⁸ increasing productivity of adjacent fisheries through a

¹¹⁴ Hughes and Grant (n 11) 48, Table 2.

¹¹⁵ Report CCAMLR-33 (n 96) paras 7.53, 7.65–7.66.

¹¹⁶ See the discussion by Klerk in chapter 4 of this volume.

¹¹⁷ CM 91–04 (n 13); Report SM-III (n 11) para 2.4; C. M. Brooks et al, “Challenging the ‘Right to Fish’ in a Fast-Changing Ocean” (2014) 33 *Stanford Environmental Law Journal* 289, 307; M. Lennan, “The High Seas. Adapting to Changes in Pelagic Ecosystems” in P. G. Harris, *Routledge Handbook of Marine Governance and Global Environmental Change* (Routledge 2022) 246.

¹¹⁸ CCAMLR, “Report of the Thirtieth Meeting of the Commission” (2011), para 7.4; Report SM-III (n 11) para 2.16.

spill-over effect;¹¹⁹ and contributing to climate change mitigation by protecting valuable nature-based carbon sequestration and storage services, including Antarctic krill.¹²⁰ In practice, CCAMLR MPAs seem to be fulfilling some of their promises: for example, a study of the impacts of the Ross Sea region MPA for Antarctic toothfish demonstrates that the no-take zones “are meeting their objectives with respect to Antarctic toothfish, which are to protect juvenile settlement areas on the Ross Sea Shelf, migration corridors for maturing individuals, and adult feeding areas on the Ross Sea slope”.¹²¹

Nonetheless, the CCAMLR situation in terms of substantive obligations is not perfect either. Indeed, in order for the relevant proposals to be adopted, they are structured in such a way as to exclude fishing grounds, which are usually also crucial areas of biodiversity. Even then, such proposals are not always acceptable to some CCAMLR Members, and further concessions are made. Whether the adopted MPAs are sufficient to achieve all the stated objectives remains to be seen. The usual problem in multilateral fora – especially those ruled by consensus – of having to compromise for a measure to be adopted means that, oftentimes, the content of a regulatory instrument is not such as to enable its success. For example, in the case of the Ross Sea region MPA, the size decreases were significant (reaching 40–50%) and boundaries were modified, with some ecologically significant ecosystem components excluded from the revised proposals, all in the name of compromise.¹²² Moreover, with the concession of a 35-year time limit in order to reach consensus, it is unclear whether such a protection period will be sufficient to cover the lifespan of many relevant species.¹²³

However, this risk of watered-down measures might appear, at present, a best-case scenario. Indeed, the current deadlock in adopting further MPAs has not been solved by ‘simply’ giving in a little more to fishing States. This situation means that, overall, CCAMLR has failed its own objectives of a representative

119 Report SM-III (n 11) paras 2.4, 2.16; C. M. Brooks et al, “Progress towards a Representative Network of Southern Ocean Protected Areas” (2020) 15(4) *PLOS ONE* e0231361; D. Laffoley et al, “Marine Protected Areas” in *World Seas: An Environmental Evaluation* (Elsevier 2019) 566.

120 Report SM-III (n 11) para 2.4; Cavan et al (n 6) 17; Laffoley et al (n 119) 554–566.

121 A. Grüss et al, “Evaluating the impacts of the Ross Sea region marine protected area for Antarctic toothfish (*Dissostichus mawsoni*) with a spatially-explicit population model” (2024) 249 *Ocean and Coastal Management* 106991.

122 ASOC, “A representative system of CCAMLR MPAs: Current proposals and beyond” (2016) CCAMLR-XXXV/BG/26; ASOC, “The Ross Sea Region Marine Protected Area: Current proposal and looking forward” (2015) CCAMLR-XXXIV/BG/27 (ASOC, “Ross Sea”).

123 ASOC, “Ross Sea” (n 122).

network of high seas MPAs by 2012¹²⁴ and may not be able to further contribute to the global target to conserve 30% of Earth (including marine areas) through protected areas by 2030.¹²⁵ If one includes the MPAs in areas under national jurisdiction, one reaches 12% of areas in the Convention Area being protected, but only less than 5% are no-take areas.¹²⁶

One can also point to a further challenge, related to the question of representativeness. Indeed, a recent study demonstrates that existing MPAs do not protect the full range of biodiversity in the Antarctic Ocean.¹²⁷ Even if the three proposed MPAs were adopted and included no-take zones, some areas would still be left unprotected.¹²⁸ While proposals have been developed – and in some cases adopted – in relation to Domains 1 (South Orkney Islands MPA; Antarctic Peninsula), 3 and 4 (Weddell Sea), 7 (East Antarctica), 8 (Ross Sea region MPA), there are also domains with no proposals.¹²⁹ Whether it would be worth the investment of time and resources to develop such proposals in the current situation where consensus cannot be achieved is questionable. It would nonetheless be necessary in order to achieve the representativeness objective of a network of CCAMLR MPAs. Moreover, the development of a proposal for Domain 9 in particular, which corresponds to the Convention Area sector with no claims,¹³⁰ would counteract the Russian argument that MPAs are used by proponent States as a political tool to support their territorial claims.

Another concern is that, as most non-use measures in the global commons, and definitely as most MPAs in the high seas, CCAMLR MPAs are largely single-sectoral only. The prohibitions of use relate to fishing and fishing-related activities, hence not tackling other uses of the Southern Ocean which also impact – or may impact – the Antarctic marine living resources under CCAMLR's mandate, let alone the whole marine environment. However, a number of other human activities are regulated with other non-use measures within the ATS, such as seal hunting and mining, with the Convention for the Conservation

124 CCAMLR, "Report of the Thirty-First Meeting of the Commission" (2012), para 7.91.

125 Respectively, CBD COP, "The strategic plan for biodiversity 2011–2020 and the Aichi Biodiversity Targets" (2010) Decision X/2, UNEP/CBD/COP/DEC/X/2, target 11; CBD COP, "*Kumming-Montreal Global Biodiversity Framework*" (2022) Decision 15/4, UN Doc.CBD/COP/DEC/15/4, target 3.

126 Brooks et al (n 119) 13.

127 *ibid* 14.

128 *ibid*.

129 If one takes into account the MPAs under national jurisdiction, only Domain 9 is not the target of an MPA or a proposal for one, see Brooks et al (n 119) 9.

130 On the perception of political motives behind proposals and the need for proposals across regional planning areas, see eg Hughes and Grant (n 11) 49–50.

of Antarctic Seals, and the mining ban under the Environmental Protocol to the Antarctic Treaty respectively.¹³¹ Other activities that fall outside of the regulatory scope of the ATS are also strictly regulated, with non-use measures in place, in particular whaling (with the International Whaling Commission's moratorium on commercial whaling and its Southern Sanctuary)¹³² and shipping with, amongst others, Special Areas under the International Convention for the Prevention of Pollution from Ships¹³³ and the International Code for Ships Operating in Polar Waters.¹³⁴ While there are non-use measures in relation to a number of uses of the Southern Ocean, one must keep in mind that the main threat to the marine ecosystem of Antarctica remains climate change¹³⁵ and that the regime attempting to regulate this issue is far from implementing strict non-use measures.¹³⁶

5.2 *Potential Way Forwards through the BBNJ Agreement*

The extended stalemate on MPAs within CCAMLR, which shows no signs of abating,¹³⁷ necessitates consideration of alternative avenues to resolve or circumvent the deadlock. In this context, and also in light of the limitations of single-sectoral MPAs, the recent adoption of the BBNJ Agreement on 19 June 2023 may present a promising way forward. The Agreement aims to “ensure the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, for the present and in the long term”.¹³⁸ As of September 2024, it was ratified by 13 States (including one CCAMLR Member

131 Brooks et al (n 56) 2–3. On the mining moratorium, see the discussion by Kempf in chapter 14 of this volume.

132 ICRW, art V(1)(c), and Schedule (as amended at the 68th Meeting) para 7(b); K. N. Scott, “Marine Protected Areas in the Southern Ocean” in E. J. Molenaar, A. G. Oude Elferink and D. R. Rothwell (eds), *The Law of the Sea and the Polar Regions: Interactions between Global and Regional Regimes* (Brill 2014) 113, 126. On the whaling moratorium, see the discussion by Jeffries and Latos in chapter 7 of this volume.

133 International Convention for the Prevention of Pollution from Ships as amended by the 1978 Protocol (MARPOL 73/78) (adopted 2 November 1973, entered into force 2 October 1983) 1340 UNTS 61.

134 International Code for Ships Operating in Polar Waters (adopted 21 November 2014) resolution MSC.385(94).

135 Chown et al (n 3) 158–159.

136 On non-use measures in the climate change regime, see the discussion by Guggisberg and Lennan in chapter 17 of this volume.

137 Report SM-III (n 11).

138 BBNJ Agreement, art 2.

and one Acceding State – Chile and Mauritius, respectively)¹³⁹ and will enter into force 120 days following ratification by sixty parties.¹⁴⁰

The BBNJ Agreement applies to ABNJ.¹⁴¹ Accordingly, upon its entry in force, the Agreement will apply to Antarctic areas comprising the high seas and the Area.¹⁴² The Agreement is particularly pertinent to the discussion of Antarctic MPAs, as Part III of the new Agreement seeks to establish a global legal framework for area-based management tools (ABMTs), including MPAs, in ABNJ.¹⁴³ The BBNJ Agreement establishes a Conference of the Parties (COP) which is vested with the powers, inter alia, to establish MPAs and to adopt emergency measures.¹⁴⁴ The Agreement also establishes an MPA designation process and criteria.¹⁴⁵ Moreover, in contrast to the CAMLR Convention, it provides for qualified majority voting in the event that consensus cannot be reached.¹⁴⁶ There is also a relatively constrained ability for Parties to ‘opt-out’ of ABMT decisions adopted by the COP under Part III.¹⁴⁷

The exact role of the BBNJ Agreement in directly establishing MPAs and related measures in the Antarctic is largely dependent on the interpretation of several key provisions governing the interaction of the Agreement with the existing legal framework governing ABNJ. This was the focus of extensive and heated debate during the negotiations,¹⁴⁸ driven by tensions between delegates

139 As of 29 September 2024. Signatures and ratifications are updated on UN Treaty Collection, “Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction”, available at <https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-10&chapter=21&clang=_en> accessed 22 September 2024.

140 BBNJ Agreement, art 68(1).

141 *ibid* art 3. This is subject to an exception under art 28(2) concerning environmental impact assessment obligations for activities within national jurisdiction with potential impact in ABNJ.

142 As defined in UNCLOS, arts 1(1) and 86. For discussions about the classification of maritime zones within the Convention Area, see eg C. C. Joyner, “The Antarctic Treaty and the Law of the Sea: Fifty Years On” (2010) 46 *Polar Record* 14, 15–16; P. Vigni, “Antarctic Maritime Claims: ‘Frozen Sovereignty’ and the Law of the Sea” in A. G. Oude Elferink and D. R. Rothwell (eds), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (Brill Nijhoff 2001).

143 BBNJ Agreement, Part III.

144 *ibid* arts 22, 24.

145 *ibid* arts 19–23.

146 *ibid* art 23(2).

147 *ibid* art 23(4)–(9).

148 International Institute for Sustainable Development, “Summary of the Fifth Session of the IGC on ILBI under the UNCLOS on the Conservation and Sustainable Use of Marine BBNJ” (2022) 25(240) *Earth Negotiations Bulletin*.

seeking to maintain the primacy of existing institutions, particularly RFMOs, and those advocating for stronger conservation measures through a reform of the 'status quo'.

Foremost, the Agreement is to be "interpreted and applied in a manner that does not undermine" relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies (IFBs) and that "promotes coherence and coordination with those instruments, frameworks and bodies".¹⁴⁹ In relation to ABMTs, this duty is further operationalised by paragraphs (1)(c) and (2) of Article 22 concerning decisions by the COP to establish ABMTs and adopt management measures. The former provision states that, where proposed measures fall within the competences of other IFBs, the COP may only make recommendations to promote the adoption of such measures. This is reinforced by Article 22(2) which reiterates the COP's obligation 'to not undermine' relevant IFBs and further stipulates that the COP must "respect the competences of" relevant IFBs. These directives are likely to extend to CCAMLR as a relevant IFB for the purposes of the BBNJ Agreement (including Part III),¹⁵⁰ although here again the exact definitions of IFB and 'relevant' IFB are subject to interpretation.

Despite the centrality of the directives to "not undermine" and "respect the competences" of existing IFBs to the future implementation of the BBNJ Agreement, there remains ambiguity as to the meaning of these provisions.¹⁵¹ The scope of the obligation not to undermine varies depending on whether the focus is on 'bodies' or 'instruments or frameworks'.¹⁵² An emphasis on the former would promote the continued primacy of IFBs and prevent any interference by the COP with existing regimes, while the latter may give the COP more flexibility provided that the effectiveness or objectives of existing regimes are

149 BBNJ Agreement, art 5(2).

150 This view is supported by an indicative list of relevant treaties prepared by the United Nations Division for Ocean Affairs and Law of the Sea (UNDOALOS, "Indicative List of Regional Treaties", available at <https://www.un.org/depts/los/biodiversity/prepcom_files/Indicative_list_of_regional_treaties.pdf> accessed 8 June 2024), as well as views expressed by various States during the treaty negotiations (on this see eg A. Langlet and A. B. M. Vadrot, "Not 'Undermining' Who? Unpacking the Emerging BBNJ Regime Complex" (2023) 147 *Marine Policy* 105372, 4).

151 E. J. Molenaar, "The High Seas Treaty: Implications and Opportunities for the Arctic" (2024) *WWF Global Arctic Programme*.

152 Z. Scanlon, "The Art of 'Not Undermining': Possibilities within Existing Architecture to Improve Environmental Protections in Areas beyond National Jurisdiction" (2018) 75 *ICES Journal of Marine Science* 405.

not compromised.¹⁵³ The meaning of ‘competence’ may also be subject to different interpretations, including legal competence (such as the jurisdiction or mandate of an IFB) or functional competence (ie the ability of an IFB to fulfil its mandates and functions).

Depending on the interpretation adopted, there may be legal scope for the COP to establish an MPA in the Antarctic under Article 22 of the Agreement. However, the scope of the specific activities that could be regulated under such an MPA would have to fall outside CCAMLR’s competence. This would significantly limit the effectiveness of any future Antarctic MPA established by the BBNJ COP, as it would likely be limited to regulating activities not related to fishing.

Alternatively, there is likely to be greater scope for the COP to establish interim, temporary emergency measures under Article 24 of the Agreement. This provision must still be interpreted in light of the overarching obligation not to undermine,¹⁵⁴ however it is unconstrained by the deferential approach to the ‘competences’ of relevant IFBs embodied in Article 22(1)(c) and 22(2). Accordingly, provided that the preconditions set out in Article 24 are met, an emergency measure could be adopted in ABNJ in the Antarctic regardless of whether it interferes with any of CCAMLR’s competences in relation to Antarctic marine living resources – including fishing.

Ultimately, the COP’s decision to establish MPAs and related measures in the Antarctic is also likely to be influenced by political considerations such as the future relationships that the COP, once established, will have – or seek to have – with IFBs, including CCAMLR. Promoting international cooperation and coordination (particularly in the use of ABMTs) is a critical component of the overarching objective of the BBNJ Agreement.¹⁵⁵ CCAMLR’s experience in designing, establishing, and implementing high seas MPAs can also be expected to be beneficial to the implementation of Part III of the Agreement. Hence, in practice, the COP is unlikely to risk jeopardising future cooperation with CCAMLR by establishing an Antarctic MPA in opposition to, or even without the full support of, the Commission.

Notwithstanding these potential legal and political barriers to the COP’s direct establishment of future Antarctic MPAs, the BBNJ Agreement deserves

153 A. Friedman, “Beyond ‘Not Undermining’: Possibilities for Global Cooperation to Improve Environmental Protection in Areas beyond National Jurisdiction” (2019) 76 *ICES Journal of Marine Science* 452.

154 BBNJ Agreement, art 5(2).

155 *ibid* arts 2, 8, 17(b).

consideration as a valuable tool to resolve the current MPA stalemate. The mere speculation that the BBNJ COP may play a future role in the establishment of future Antarctic MPAs and related measures may provide impetus for intensified diplomatic efforts to advance CCAMLR's pending MPA proposals.¹⁵⁶ Conversely, however, it is also likely to further politicise the issue of Antarctic high seas MPAs (as well as high seas MPAs more broadly) and ignite public debate about CCAMLR's progress and state of governance.¹⁵⁷ CCAMLR Members are likely to be wary of drawing further criticism to the ATS, which is already under pressure,¹⁵⁸ by prolonging the MPA stalemate. In this context, Members may decide to adopt additional MPAs to reduce this mounting scrutiny.

The BBNJ Agreement may also influence CCAMLR's governance of MPAs through the promotion of the Agreement's overlapping objectives, principles and standards within the Commission. CAMLR Members that are also parties to the BBNJ Agreement will be required to promote the adoption of measures within CCAMLR to support the implementation of ABMTs, MPAs and relevant measures established by the COP under Part III, as well as more broadly to work towards the Agreement's objectives when participating in CCAMLR decision-making.¹⁵⁹ Further, the COP's implementation of the precautionary and ecosystem approaches, enshrined in the Agreement's preamble,¹⁶⁰ and the 'best available science' standard for ABMT proposals¹⁶¹ may carry normative weight and influence the development of these concepts within CCAMLR.¹⁶² These concepts are central to CCAMLR's CMS and have recently been subject of

156 The perceived institutional competition can indeed be fierce, as was noticed when Australia proposed to list Patagonian toothfish on Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora in 2002 (on this, see eg S. Guggisberg, *The Use of CITES for Commercially-exploited Fish Species* (Springer 2016), 328–329 and 351–353).

157 Editorial, "Reform the Antarctic Treaty" (2018) 558 *Nature* 161.

158 For example, renewed interest in mineral activities, a perceived inability to address 'new' issues of relevance to Antarctica, such as climate change, tourism or bioprospecting, and more general problems in reaching consensus can be seen as causes for concern about the future of the ATS. The tense geopolitical climate is also influencing the ATS' functioning. On some of these issues, see the discussions by Kempf in chapter 14, and by Roura and Guggisberg in chapter 15 of this volume.

159 BBNJ Agreement, arts 8(2), 25(4).

160 *ibid* art 7(e)(f); CAMLR Convention, art II.

161 BBNJ Agreement, arts 7(i), 19(3); CAMLR Convention, art IX(1)(f).

162 R. E. Kim, "The Likely Impact of the BBNJ Agreement on the Architecture of Ocean Governance" (2024) 165 *Marine Policy* 106190.

debate in the context of MPA proposals, therefore strengthening the potential link between the BBNJ Agreement and the CCAMLR regime.

6 Conclusion

CCAMLR, as part of its mandate to conserve Antarctic marine living resources, has adopted many novel conservation and management tools that have served as examples worldwide. In 2009, it adopted the first MPA fully in the high seas and then, in 2016, the largest one. Both these ABMTs include binding non-use measures prohibiting fishing, except in certain specific cases. These exceptions are generally focused on research fishing and exploratory fishing, which are both subject to other CCAMLR rules. The default situation is one where use is prohibited, but the large scope of these exceptions blurs the line between non-use and restricted-use measures.

Nonetheless, despite these successes, issues remain with the existing MPAs, particularly as they were watered down in order to become acceptable by consensus, and even more so with the three proposals that are on the table. While the Ross Sea region MPA could be adopted in 2016 thanks, *inter alia*, to compromises and high-level diplomacy, the MPA adoption process has, *de facto*, been deadlocked since. This is due to the growing polarisation of States' views between those that seek increased environmental protection and those that focus on the 'rational use' of resources. This issue is compounded by a regime dominated by consensus-based decision-making, where a single State's opposition blocks the adoption of a measure for all.

The BBNJ Agreement can be a potential tool in resolving the Antarctic MPA impasse. Firstly, it may present an alternative legal pathway for the establishment of MPAs and related measures in the Antarctic. Further, it is also likely to indirectly influence CCAMLR's future establishment of MPAs through regime interaction, especially at institutional and normative levels. The implications of the BBNJ Agreement for CCAMLR can be expected to become a highly topical issue, particularly as this has already been raised during a special CCAMLR meeting focused on MPAs¹⁶³ and in several State declarations made upon signing and ratifying the BBNJ Agreement.¹⁶⁴

The difficulties faced by CCAMLR in adopting new MPAs might, unfortunately, be contributors to and/or signals of wider issues within that regime

¹⁶³ Report SM-III (n 11) para 1.18.

¹⁶⁴ UN Treaty Collection (n 139) (Chile, United Kingdom of Great Britain and Northern Ireland).

and the whole ATS more broadly. The stability and legitimacy of Antarctic governance may depend on whether States are soon able to resolve their disagreements on the role of science and recognise that climate change is a fundamental threat to the region, which cannot continue to be ignored.

Acknowledgments

The author would like to thank Matilda Kelly for her precious research assistance, as well as Erik Molenaar and Catherine Blanchard for their constructive comments on early versions of this contribution.

The Antarctic Treaty System and the Antarctic Mineral Moratorium

Current Status and Coming Challenges

Nicolas Kempf

1 Introduction

In June 2023, the Antarctic Treaty Consultative Parties, ie those who can participate in the decisions taken in the Antarctic Treaty Consultative Meetings (ATCM), adopted a resolution celebrating 25 years since the entry into force of the Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol).¹ In this resolution, the Parties reiterated their commitment not to carry out any activities relating to Antarctic mineral resources, other than scientific research. However, in light of the enormous untapped resources of the Southern continent and Ocean, such statement is only partially reassuring.

The mining moratorium is provided for at Article 7 of the Environmental Protocol. It is a non-use measure with a wide scope of applicability, which imposes a potentially unlimited general prohibition on the commercial use of the mineral resources of Antarctica and of the Southern Ocean. However, it includes an exception for scientific research. Since the definition of this term is a matter for each Party, this can lead to heated debates. In recent years, the frequency of international reminders that the moratorium is still in force and does not have a fixed end-date has increased. While nothing in the Environmental Protocol provides for its automatic expiry, and the ban on the exploitation of Antarctic mineral resources is therefore not limited in time, an amendment procedure does exist from 2048 onwards (ie 50 years after entry into force). Hence, concerns about the potential lifting of the current moratorium on mining in Antarctica might well be founded.

This contribution discusses the reasons for and conditions of the adoption of such non-use measure, before turning to an assessment of its effectiveness and of its future. Section 2 therefore focuses on the historical background to the

1 Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol) (adopted 4 October 1991, entered into force 14 January 1998) 2941 UNTS 5778.

development of the Antarctic Treaty System, emphasising the factors that led to the adoption of the moratorium. In particular, the position and role of third Parties to the Antarctic Treaty, as well as civil society and the international community are examined. Section 3 then addresses the content of the moratorium itself: its geographical scope, its minimum duration, as well as its material extent. Such elements are subject to diverging interpretations, and they have been, and still are, debated. Finally, section 4 provides an assessment of the moratorium's effectiveness. Even if it is still in force and working, it is showing some cracks. Divergent interests of both stakeholders and third Parties in the regime are increasingly surfacing, at the risk of weakening the whole system, and therefore the moratorium.

2 Context and Factors Leading to the Moratorium's Adoption

The Antarctic Treaty² and the regime that was built on it, the Antarctic Treaty System (ATS), are generally credited with regulating the Southern continent and Ocean on the basis of a number of pillars: peaceful use, freedom of scientific research, and environmental protection. This account, while not completely erroneous, is a gross oversimplification of an evolution that has not been so linear. It is therefore useful to look back at the stages of the ATS' development in order to put them into perspective. This contextualisation naturally begins with the Antarctic Treaty itself, followed by the development of the ATS towards conservation of the Southern environment. The ATS Parties' attitude towards the mineral resources of the Southern region will then be the next focus, before coming to the factors that led to the adoption of the Protocol in 1991, which contains the moratorium on mineral resource activities.

2.1 *The 1959 Antarctic Treaty*

Antarctica is regularly given many superlatives. This is not surprising; it is the continent of extremes *par excellence*, and the continent itself is located at the 'end' of the globe, at the South Pole, far from the other continents and from maritime routes. This isolation and the difficulties of polar navigation probably explain why the continent was explored relatively late. Of course, it is not excluded that the continent could have been visited before the arrival of

² Antarctic Treaty (Antarctic Treaty) (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71.

Western navigators,³ but if these visits took place, the rigor of the place did not allow a perennial installation.

When Westerners sailed in the Southern Ocean in the 19th Century, their main purpose was to harvest marine living resources, that is, seals and whales. Later on, during the 20th Century, territorial claims which were formulated by States such as Argentina, Australia, Chile, France, Norway, New Zealand, and the United Kingdom were also directly linked to the monopolisation of and access to the marine living resources of the area.⁴

These claims were not unanimously recognised. Since they were sometimes overlapping, they were sources of tension, which increased shortly after the Second World War. Different proposals were made to determine the status of the Antarctic continent.⁵ The series of collaborations that took place during the International Geophysical Year (IGY), in 1957–1958, allowed interested States to realise that science, or its trappings, could be the ideal glue to help establish a regime for the white continent.⁶ In 1959, the Antarctic Treaty was concluded by the twelve nations active, within the framework of the IGY, in Antarctica or in the region.⁷ The twelve original Parties included the seven States that had previously made territorial claims, also known as the Claimants, as well as five non-Claimants: Belgium, Japan, South Africa, the Soviet Union, and the United States.

The Antarctic Treaty, a relatively short instrument, is supported by its Article IV, “the agreement to disagree”, which freezes the territorial dispute in Antarctica. According to this provision and while the Treaty is in force, no future action may be construed as reinforcing or undermining the previously stated claims, and no new claims shall be made. Other important provisions of the Antarctic Treaty relate to peaceful use, including the prohibition of military measures and nuclear explosions, and to scientific cooperation, with Article II promoting the freedom of scientific investigation in Antarctica and cooperation towards that end. In short, the Antarctic Treaty froze the territorial dispute, defined the regime applicable to the Antarctic continent and the

3 K. Dodds, *The Antarctic: A Very Short Introduction* (OUP 2012) 23 mentions that Maoris believed a white continent was lying south to current New Zealand long before Europeans first explored the area.

4 See eg E. J. Sahurie, *The International Law of Antarctica* (New Haven Press 1992) 171.

5 See eg R.-J. Dupuy, “Le Statut de l’Antarctique” (1958) 4 *AFDI* 196.

6 On the IGY as a founding myth, see S. V. Scott, “Ingenious and innocuous? Article IV of the Antarctic Treaty as imperialism” (2011) 1(1) *The Polar Journal* 51, 52.

7 A remarkable achievement in the face of increasing tensions between the Eastern and the Western Blocs, according to some authors. See eg W. Sullivan, *The International Geophysical Year* (Carnegie Endowment for International Peace 1959) 323.

surrounding Southern Ocean, and set out the two pillars – peaceful use and scientific cooperation – on which the system was subsequently built.

2.2 *The ATS' Development towards Environmental Conservation*

The Antarctic Treaty provides for the Parties to meet “at suitable intervals and places” to consult and adopt measures. Article IX lists subjects for Parties to consider at these meetings. This list, according to which measures adopted during ATCMs may, *inter alia*, “relate to the protection and conservation of the fauna and flora of Antarctica”⁸ contains the Treaty’s only mention of the environment. This relatively isolated provision has in fact served as a catalyst for the development of the ATS.

The Agreed Measures adopted in 1964,⁹ which created various environmental tools, including the possibility to designate specially protected areas, represent the first major measures for the conservation of Antarctic fauna and flora.¹⁰ A Convention for the Conservation of Antarctic Seals (CCAS) was then adopted in 1972,¹¹ before the conclusion, in 1980, of the Convention on the Conservation of Antarctic Marine Living Resources (CAMLRL Convention).¹² This latter instrument was innovative in several aspects, notably because it contains the basis of an ecosystem approach, ie an approach that takes into account the different components of ecosystems and their interactions, and that emphasises the importance of understanding relevant ecological processes before decisions are taken.¹³

With the adoption of the CAMLR Convention several years before the Brundtland Report¹⁴ or the Rio Conference,¹⁵ the ATS Parties ranked among the forerunners of environmental conservation, which then surfaced as the third pillar of the Antarctic edifice. The adoption of the Environmental Protocol, and of the mining moratorium therein, could therefore appear as a logical

8 Antarctic Treaty, art IX.

9 ATCM, “Agreed Measures for the Conservation of Antarctic Fauna and Flora” (adopted 1964, entered into force 1982), Recommendation III–VIII, ATCM III, 1964, Brussels.

10 But see A. Antonello, “Nature conservation and Antarctic diplomacy, 1959–1964” (2014) 4(2) *The Polar Journal* 335.

11 Convention for the Conservation of Antarctic Seals (CCAS) (adopted 1 June 1972, entered into force 11 March 1978) 1080 UNTS 175.

12 Convention on the Conservation of Antarctic Marine Living Resources (CAMLRL Convention) (adopted 29 May 1980, entered into force 7 April 1982) 1329 UNTS 47.

13 See eg CAMLR Convention, art I(1) and I(3).

14 G. H. Brundtland, “Our Common Future” Report of the World Commission on Environment and Development (20 March 1987) UN Doc A/42/427.

15 United Nations, “Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992” (1992) UN Doc A/CONF.151/26 (Vol I).

development of the ATS. Such an inference is, however, an over-simplification. Both instruments related to marine living resources might indeed have been partially based on environmental concerns, but they were also – if not mainly – resource management regimes: the 1972 CCAS was a response to the depletion of Antarctic seals populations, while the 1980 CAMLR Convention was a mean to tackle issues relating to increasing krill fishing within the Southern Ocean.¹⁶ Similarly, the Protocol was adopted both to address environmental concerns and to solve a specific issue, namely the international community reconsideration of the ATS' role, if not even existence, in reaction to increasing mining discussions within the system (see below under 2.4).

2.3 *The ATS and Mineral Resources*

Already in the period leading to the adoption of the Antarctic Treaty, Antarctic mineral resources were part of the discussion.¹⁷ The absence of a specific provision relating to such topic cannot be attributed to a lack of interest, but rather to uncertainty as to these resources' availability and envisaged exploitation difficulties. Thereafter, the ATS' apparent evolution towards an enhanced protection of the Antarctic environment did not prevent Parties from reflecting on the development of a legal regime for the exploitation of Antarctic mineral resources.

The matter was discussed at various ATCMs in the 1970s, and in an increasingly supportive manner. The main concern was to develop a legal framework that would allow for the exploitation of mineral resources, and, pending the development of such a framework, to recommend that States refrain from mining activities.¹⁸ After negotiations in the 1980s, a Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) was concluded in June 1988.¹⁹ CRAMRA was to enter into force upon 16 ratifications by Consultative Parties, provided that these had been present at the final negotiation meeting

16 On these instruments' focus on resource management, see A. Howkins, *Frozen Empires: An Environmental History of the Antarctic Peninsula* (OUP 2017) 174; and A. Antonello, *The Greening of Antarctica: Assembling an International Environment* (OUP 2019) 75.

17 See eg P. C. Jessup, "Sovereignty in Antarctica" (1947) 41(1) *The American Journal of International Law* 117, 118; H. J. Taubenfeld, "A Treaty for Antarctica" (1961) 33 *International Conciliation* 245, 263; and R. L. Johnstone and S. Joblin, "Non-Living Resources at the Poles" in K. Scott and D. Vanderzwaag (eds), *Research Handbook on Polar Law* (Edward Elgar Publishing 2020) 250.

18 See eg ATCM, "Antarctic mineral resources", Recommendation IX-1, ATCM IX, 1977, London.

19 Convention on the Regulation of Antarctic Mineral Resource Activities (adopted 2 June 1988, not in force) (1988) 27 ILM 868 (CRAMRA).

of CRAMRA and included all seven Claimants, as well as both States asserting a basis of claim in Antarctica: Russia and the United States.²⁰ It failed, however, to gather the necessary support; the governments of Australia and France indeed announced that they did not intend to ratify it (see below under 2.4.3. for reasons of such rejection). These two States proposed, instead, to negotiate a new instrument dealing solely with the environmental protection in Antarctica. Belgium and Italy joined this coalition soon thereafter, and the Consultative Parties to the ATS agreed to set up new negotiations.²¹

Although the first submitted draft of the future Environmental Protocol did not include the proposal to establish a moratorium on the exploitation of Antarctic mineral resources, such intention was evident in the speeches made by some delegations. The head of the Australian delegation, for instance, stated that:

it will also be necessary to prohibit some activities which can be seen as potentially having a seriously detrimental effect on the environment. These include those activities already prohibited by the Antarctic Treaty and, in Australia's view, minerals activities other than scientific research. Australia's view that such minerals activities should be banned is unambiguous.²²

A recommendation was adopted at the Paris ATCM of 1989 in which representatives took note of proposals made by Australia and France, and recommended to their governments that "a Special Antarctic Treaty Consultative Meeting be held in 1990 to explore and discuss all proposals relating to the comprehensive protection of the Antarctic environment and its dependent and associated ecosystems".²³ Only four negotiating sessions were necessary, over the course of a year, between November 1990 and October 1991, to reach an agreement and thus to conclude the Environmental Protocol, which was adopted in 1991.²⁴

20 CRAMRA, art 62(1). The mention of "all the States necessary in order to establish all of the institutions of the Convention in respect of every area of Antarctica" necessarily refers to all Claimants. A clarification can also be found in the Final Act of the Negotiating Conference. See Final Report, SATCM IV-12, 1989, Wellington, 41.

21 ATCM, "Comprehensive Measures for the Protection of the Antarctic Environment and Dependent and Associated Ecosystems", Recommendation XV-1, ATCM XV, 1989, Paris.

22 Interim report, SATCM XI-1, 1990, Viña del Mar, 28.

23 ATCM (n 21).

24 C. Redgwell, "Environmental Protection in Antarctica: The 1991 Protocol" (1994) 43(3) *ICLQ* 599, 604.

This new addition to the ATS, unlike CRAMRA, was globally welcomed by the international community, even though the adoption of the Protocol did not immediately put an end to the existing criticism against the ATS.²⁵ The Environmental Protocol intends to cover environmental protection in Antarctica comprehensively. It designates the Antarctic continent and its dependent and associated ecosystems as a natural reserve, devoted to peace and science, thus incorporating the three pillars of the ATS.²⁶ It establishes a systematic planning of all activities, which are subject to environmental impact assessments and various procedures.²⁷ Finally, Article 7 establishes a moratorium on mineral activities, stating that “any activity relating to mineral resources, other than scientific research, shall be prohibited”. In accordance with relevant provisions, the Environmental Protocol entered into force in January 1998.

2.4 *Factors which Led to the Moratorium*

The widespread agreement on the need to conclude an instrument dealing with environmental protection in Antarctica, its quick negotiation, and the inclusion of a provision establishing a moratorium on mineral resource activities contrast with the previous long winding route leading to the conclusion of CRAMRA. A number of combined factors may explain this change, including the heated debates at the United Nations General Assembly (UNGA), criticism from civil society, and questions raised by some of the governments that had signed CRAMRA themselves.

2.4.1 The ATS at the UNGA

The 1970s saw a steep increase in interest towards mining and seabed mining in particular, at the ATS and within the international community in general. Although the potential wealth of the seabed had been known since the return of the *HMS Challenger* expedition in 1876, this interest did not increase significantly until a century later, following various studies,²⁸ including one presenting the seabed from an economic perspective as an exploitable and potentially very fruitful resource.²⁹ This study, quoted by Arvid Pardo in his

25 See for instance Peter Beck, who focuses on critics before the UNGA. Although he acknowledges “a loss of momentum of the critical campaign” following the Protocol’s adoption, he also highlights deeper issues remaining about “the nature and extent of the UN’s future role in Antarctic affairs”. P. J. Beck, “Twenty years on: the UN and the ‘Question of Antarctica’ 1983–2003” (2004) 40 *Polar Record* 205, 208–209.

26 Environmental Protocol, art 2.

27 *ibid* arts 3, 8, and Annex 1.

28 See eg H. Scales, *The Brilliant Abyss* (Bloomsbury Sigma 2021) 235.

29 J. L. Mero, *The Mineral Resources of the Sea* (Elsevier 1965).

famous 1967 speech, was followed by several others.³⁰ It is in this context that the UNGA started discussing the status of Antarctica and its governance, and that the 'Question of Antarctica', as it was called, started appearing in certain UN documents.³¹

In a 1983 Declaration, the Non-Aligned States noted that "the Antarctic continent is of considerable environmental, climatic, scientific and, potentially, economic importance to the world" and that "the exploration of Antarctica and the exploitation of its resources should be carried out for the benefit of all mankind and in harmony with the protection of the Antarctic environment".³² Against the mounting pressure to bring the governance of Antarctica within the auspices of the UN, ATS Parties attempted to defend the role of the ATS. In particular, during debates that took place in 1983 and at subsequent UNGA sessions, they invoked the political success that such regime represented at the time, as an example of peaceful cooperation between the two blocs at the heart of the Cold War. However, these efforts were unsuccessful.

Moreover, following the recent adoption of the United Nations Convention on the Law of the Sea (UNCLOS), the Non-Aligned States demanded the application of the Common Heritage of Mankind (CHM).³³ They also criticised the ATS as a club that arrogated to itself the right to dispose of Antarctic mineral resources.³⁴ In response, the Parties to the ATS argued that their regime provided environmental stewardship and that transparency and membership had increased. However, these arguments could not be appreciated due to the then-ongoing negotiations to develop a regime for the exploration and exploitation of Antarctic mineral resources, negotiations which would ultimately lead to CRAMRA.³⁵ In light of the continuous and unabating pressure from the

30 See eg Department of International Economic and Social Affairs, "Sea-Bed Mineral Resource Development: Recent Activities of the International Consortia" (1980) UN Doc ST/ESA/107.

31 See eg UNGA, "Report of the United Nations Conference on the Human Environment" (4 October 1981) UN Doc A/35/416.

32 UNGA, "Final Declaration, 7th Meeting of the Non-Aligned States, Jakarta" (1983) UN Doc A/38/132-S/15675, Annex, section III, paras 122–123.

33 See eg A. De Marffy, "L'Antarctique: Quatre ans de débat à l'ONU" (1987) 2 *Espaces et ressources maritimes* 3; C. C. Joyner, *Governing the Frozen Commons* (University of South California Press 1998) 235.

34 On this criticism, see for instance D. R. Rothwell, "The IPY and the Antarctic Treaty System: Reflections 50 Years Later" in J. Shadian and M. Tennberg (eds), *Legacies and Change in Polar Sciences* (Routledge 2009) 125, 131; or J. Verbitsky, "Just transitions and a contested space: Antarctica and the Global South" (2014) 4(2) *The Polar Journal* 319, 323.

35 Further amplified by a US geological survey suggesting the presence of oil and gas in commercial quantities in Antarctica. See Dodds (n 3) 120.

UNGA, only a resolutely disruptive argument – a ban on mining activities – was likely to restore the ATS to its previous position, where it was considered to be the legitimate regime for Antarctic governance.

2.4.2 The ATS and Civil Society

The adoption of the Antarctic moratorium on mining can also be linked to international civil society's actions.³⁶ Greenpeace, especially, was very active on the 'Question of Antarctica' during the 1980s. It tried to weight on CRAMRA's negotiations and to push ATS Parties to abandon mineral resources exploitation plans through various lobbying campaigns. Its temporary installation of a base in Antarctica, from 1987 to 1991, and the "World Park Antarctica" campaign that went with it, which advocated for the creation of a protected area, were widely publicised and firmly established the topic of environmental protection in Antarctica in the media discourse.³⁷

The publication of certain reports during the same period, in particular "Our Common Future", the report of the World Commission on Environment and Development, also contributed to a more global dissemination of the theme of environmental conservation, notably through the then rapidly accepted notion of sustainable development. The Commission itself referred to Antarctica in its report and presented the ATS above all as a regime designed to ensure environmental conservation.³⁸

Environmental awareness also grew in the wake of maritime environmental disasters. Just as the sinking of the *Torrey Canyon* off the coast of England in March 1967 led to an important legal response, the sinking of the *Exxon Valdez* off the coast of Alaska in March 1989 had a major international impact on civil society. Indeed, it acted as a dire reminder of the dangers that extractive activities posed to the environment.³⁹ Despite colossal emergency resources, the environmental consequences proved to be far-reaching. Such resources would

36 See eg R. A. Herr, "The changing roles of non-governmental organisations in the Antarctic Treaty System" in O. S. Stokke and D. Vidas (eds), *Governing the Antarctic – The Effectiveness and legitimacy of the Antarctic Treaty System* (CUP 1996) 91, 98.

37 See for instance J. N. Barnes, "Environmental protection and the future of the Antarctic: new approaches and perspectives are necessary" in G. Triggs (ed), *The Antarctic Treaty Regime: Law, Environment and Resources* (CUP 1987) 150; or R. Davis, "The Durability of the 'Antarctic Model' and Southern Ocean Governance" in T. Stephens and D. Vanderzwaag (eds), *Polar oceans governance in an era of environmental change* (Edward Elgar Publishing 2014) 287, 303.

38 Brundtland (n 14) para 81.

39 D. Abdel-Motaal, *Antarctica: the Battle for the Seventh Continent* (ABC-CLIO 2016) 104; See also A. Gillepsie, "Antarctica: Environmentalist's victory or hidden agendas?" (1993) 11 *Research Papers in Law – University of Nottingham* 1, 18.

be impossible to mobilise in a location as remote as the Southern Ocean. Fortunately, they were not needed in January 1989 when the *Bahia Paraíso* ran aground off the coast of the Antarctic Peninsula, resulting in a relatively minor oil spill. The event was nonetheless used by environmental NGOs throughout the world to promote the need to protect the Antarctic environment and to designate the area as a natural reserve,⁴⁰ thereby increasing pressure on the ATS.

2.4.3 The ATS and Its Own Members

As mentioned previously, the demise of CRAMRA led to the call for the negotiation of an environment-focused instrument. Hence, the reasons that motivated the former treaty's rejection by some of its very own signatories – all also ATS Parties – are directly relevant to the subsequent adoption of the moratorium. Different reasons can be advanced for their rejection of CRAMRA.

First, the pressure exerted by Australian domestic civil society on the Australian government was efficient following the previously mentioned shipwrecks. Election results in Tasmania in May 1989 for instance showed that people were increasingly attentive to environmental considerations. Antarctic affairs were thus then seen as likely to have a significant impact on elections' outcomes.⁴¹ This led Parties not traditionally associated with environmental concerns to support motions not to ratify CRAMRA.⁴² Such domestic political reasons can also be advanced when it comes to France, where the government quickly supported the Australian government's shift, and similarly announced its intention not to ratify CRAMRA, in part because of a breakthrough of the Green party in recent elections, and of future elections then coming up.⁴³

Environmental concerns, whether genuine or strategic, were not the only reasons that prompted the governments of Australia and France to reject CRAMRA and to support a mineral moratorium. Economic considerations

40 See eg A. Brown, "New Proposal: The Natural Park" in J. Verhoeven, P. Sands and M. Bruce (eds), *The Antarctic Environment and International Law* (Graham Trotman 1990) 97; or C. Redgwell, "Antarctica – wilderness park or Eldorado postponed?" (1992) 1(1) *Environmental Politics* 137, 139.

41 A. Bergin, "The Politics of Antarctic Minerals: The Greening of white Australia" (1991) 26(2) *Australian Journal of Political Science* 216, 221.

42 S. Blay and B. M. Tsamenyi, "Australia and the Convention for the Regulation of Antarctic Mineral Resource Activities (CRAMRA)" (1990) 26 *Polar Record* 195, 198.

43 See C. Sulikowski, "The French Connection: the role of France in the Antarctic Treaty System" in A.-M. Brady (ed), *The Emerging Politics of Antarctica* (Routledge 2012) 173; or J. Martin-Nielsen, "Undecided dreams: France in the Antarctic, 1840–2021" (2021) 57 *Polar Record* e32, 11.

played an important role as well. In particular, it was not in some States' interest to allowing mining activities in Antarctica. For instance, such newly created Antarctic industry would have directly competed with the Australian mining industry,⁴⁴ especially because of envisaged public subsidiaries to foreign mining industry.⁴⁵ Furthermore, Claimants did not manage to secure rights to economic benefits in the form of royalties or taxes, which had a double financial consequence. First, it meant that they had no specific incentive to ratify the newly drafted regime, as they would not derive any direct economic benefit from it. Secondly, it could be argued that Claimants even had an incentive not to ratify CRAMRA, as accepting mining activities across the continent and its surrounding ocean could mean a risk to jeopardise their sovereign claims, and therefore potential future economic gains.⁴⁶

This last argument refers once again to the question of sovereignty. Under CRAMRA, Claimants and non-Claimants would have had a specific role as they would have necessarily been members of the Regulatory Committees and would therefore have had a seat at the decision-table over decisions relating to mineral exploration and exploitation activities in the Antarctic.⁴⁷ Indeed, Article 29 provided that Regulatory Committees shall consist of 10 Members. Each Committee shall include four members "which assert rights or claims, including the member or members, if any", "which assert rights or claims in the identified area", as well as "six members which do not assert rights or claims", including "the two members [...] which assert a basis of claim in Antarctica", that is, Russia and the United States. The decision-making procedure was mainly based on a two-thirds majority.⁴⁸ Hence, the Claimants did not have the individual veto that they relied on in other matters of ATS governance, making it impossible for them to de facto control activities in their claimed zones. Moreover, if and once mining activities were allowed to proceed, the special status of Claimants would have been further affected; mining activities by other States would indeed have been tantamount to recognising that Claimants do not have exclusive rights over mineral resources. This impression could have furthermore been accentuated when it came to prospection activities. Indeed, although not conferring any right over Antarctic mineral resources,⁴⁹

44 L. M. Elliott, *International Environmental Politics – Protecting the Antarctic* (St Martin's Press 1992) 168.

45 Abdel-Motaal (n 39) 108.

46 See eg Gillespie (n 39) 18.

47 CRAMRA, art 29(2). See also C. C. Joyner, "The Evolving Antarctic Minerals Regime" (1988) 19 *Ocean Development & International Law* 73, 79.

48 CRAMRA, art 32.

49 *ibid* art 37(1).

prospecting, under CRAMRA, would not have been subject to Regulatory Committee's decisions,⁵⁰ leaving the relevant Claimant uninvolved. Proceeding with mining could therefore have been perceived as a "watering down of sovereign claims" through internationalisation,⁵¹ and eventually be interpreted as a form of renunciation of claims.

In summary, the factors that led to the rejection of CRAMRA and its subsequent replacement by the 1991 Protocol, and thus by its flagship measure, the moratorium on mineral resource activities other than scientific research, are manifold. In addition to pressure by the UNGA, awareness-raising campaigns by the civil society, environmental concerns leading to changes in the domestic political scenes, and economic considerations, issues related to sovereign claims by Claimants were, once again, of crucial importance.⁵²

3 Content of the Moratorium

The adoption of the Environmental Protocol in 1991 represents a major step in the ATS' evolution as it put an end to then imminent exploitation intentions. More generally, through this new instrument, the whole regime's priorities shifted towards the environmental protection of Antarctica. The essence of the whole moratorium can be found in the Article 7 of the Protocol, which states that "any activity relating to mineral resources, other than scientific research, shall be prohibited".

3.1 *Spatial Application*

The prohibition on mineral resource activities applies to land and maritime areas alike. The moratorium's geographical scope of application on land is clear; its seaward limit can, however, be debated.⁵³ Indeed, according to the Protocol's first Article, "Antarctic Treaty area' means the area to which the provisions of the Antarctic Treaty apply in accordance with Article VI of that Treaty",⁵⁴ ie the area south of 60° South Latitude, including all ice shelves.⁵⁵ No rule however provides that the whole Protocol shall apply to such area. On

⁵⁰ *ibid* art 37(2).

⁵¹ C. van der Lugt, "An international environmental regime for the Antarctic: critical investigations" (1997) 33 *Polar Record* 223, 224.

⁵² See Redgwell (n 24) 601.

⁵³ See eg K. R. Wood, "The Uncertain Fate of the Madrid Protocol to the Antarctic Treaty in the Maritime Area" (2003) 34 *Ocean Development & International Law* 139.

⁵⁴ Environmental Protocol, art 1.

⁵⁵ Antarctic Treaty, art VI.

the contrary, some provisions specify that they apply to the Antarctic Treaty area, leaving the question of the spatial scope of application open when such element is not specified.

Article 6, for instance, requires Parties to cooperate “in the Antarctic Treaty area”. Other provisions, such as Article 2, seem to indicate a broader spatial scope. It reads as follows: “the Parties commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science”.

The provision enunciating the moratorium on mineral resource activities does not contain any precision as to its extent. It can therefore be interpreted as applying either to the area south of 60° South Latitude, or to a wider area encompassing dependent and associated ecosystems, and reaching, as the CAMLR Convention does, the Antarctic Convergence, or even to a narrower area, which could be limited to the Antarctic continental shelf.⁵⁶

This last possible interpretation raises the general and long-debated issue of how certain rules apply at sea in the Southern region. Article VI of the Antarctic Treaty, to which the Protocol refers, provides that “nothing in the present Treaty shall prejudice or in any way affect the rights, or the exercise of the rights, of any State under international law with regard to the high seas within that area”. This provision specifies that the Antarctic Treaty and its subsequent regime do not apply independently of other rules, especially rules relevant to maritime areas. Which of these rules apply has been, and still is, a debated question,⁵⁷ as it necessarily implies taking position with regard to territorial claims in the Antarctic. Indeed, maritime areas depend on territorial sovereignty, but the Antarctic Treaty froze territorial issues before extended maritime spaces’

56 See for instance D. R. Rothwell, “Polar environmental protection and international law: the 1991 Antarctic Protocol” (2000) 11(3) *European Journal of International Law* 591, 595–596; or D. Vidas, “The Protocol on Environmental Protection to the Antarctic Treaty: A Ten-Year Review” (2002) 10 *Yearbook of International Cooperation on Environment and Development* 51, 52.

57 This issue has been addressed by numerous authors. See, among others, A. Boyle, “Globalism and regionalism in the protection of the marine environment” in D. Vidas (ed), *Protecting the Polar Marine Environment* (CUP 2000) 19; J. Crawford, “The Antarctic Treaty after 50 years” in D. French, M. Saul and N. D. White (eds), *International Law and Dispute Settlement, New Problems and Techniques* (Hart Publishing 2012) 271; D. R. Rothwell, “Polar Oceans Governance in the 21st Century” (2012) 26 *Ocean Yearbook* 343; G. Triggs, “The Antarctic Treaty System: some jurisdictional problems” in G. Triggs (ed), *The Antarctic Treaty Regime: Law, Environment and Resources* (CUP 1987) 88; or P. Vigni, “The Interaction between the Antarctic Treaty System and the Other Relevant Conventions Applicable to the Antarctic Area” (2000) 4 *Max Planck Yearbook of United Nations Law* 481.

consolidation. Whether these areas represent extensions of a claim within the meaning of Article IV of the Antarctic Treaty is widely discussed.⁵⁸ Relevant here for the spatial application of the moratorium is the question of the existence of a maritime region, within the ATS' scope, belonging to the international seabed area. CRAMRA did envisage such possibility.⁵⁹ Its Article 5 provided that it regulates mineral resource activities taking place "in the seabed and subsoil of adjacent offshore areas up to the deep seabed",⁶⁰ and specified that deep seabed "means the seabed and subsoil beyond the geographic extent of the continental shelf as the term continental shelf is defined in accordance with international law".⁶¹ In short, in law of the sea terms, CRAMRA applied to the equivalent of the Outer Continental Shelf's limits and not to the Area. The Environmental Protocol, for its part, is silent on that question.

3.2 *Duration and Amendment*

The Environmental Protocol – and therefore the moratorium – does not contain a specific deadline, but it does provide for a minimal duration after its entry into force.

Article 23 specifies that it shall enter into force "on the thirtieth day following the date of deposit of instruments of ratification, acceptance, approval or accession by all States which are Antarctic Treaty Consultative Parties at the date on which this Protocol is adopted".⁶² At the time of adoption, there were 26 Consultative Parties. The Protocol entered into force in January 1998, 30 days after the last of these States – Japan – ratified it.

Article 25 goes on to state that a review conference shall be held as soon as possible at the request of any of the Consultative Parties, provided that 50 years have elapsed since the Protocol entered into force.⁶³ Such request therefore cannot be presented before January 2048.

58 See eg T. Stephens, "An icy reception or a warm embrace? The Antarctic Treaty System and the international law of the sea" in A. D. Hemmings, K. Dodds and P. Roberts (eds), *Handbook on the Politics of Antarctica* (Edward Elgar Publishing 2017) 439; or E. J. Molenaar, A. G. Oude Elferink and D. R. Rothwell, "Interactions between Global and Regional Regimes: Trends and Prospects" in E. J. Molenaar, A. G. Oude Elferink and D. R. Rothwell (eds), *The Law of the Sea and the Polar Regions, Interactions between Global and Regional Regimes* (Martinus Nijhoff Publishers 2013) 389.

59 Molenaar, Oude Elferink and Rothwell (n 58) 394.

60 CRAMRA, art 5(2).

61 *ibid* art 5(3).

62 Environmental Protocol, art 23(1).

63 *ibid* art 25(2).

Article 25 furthermore provides for specific rules for amending the moratorium. Such an amendment can only be adopted if “a binding legal regime on Antarctic mineral resource activities that includes an agreed means for determining whether, and, if so, under which conditions, any such activities would be acceptable” is in force. This regime, article 25 goes on, “shall fully safeguard the interests of all States referred to in Article IV of the Antarctic Treaty”.⁶⁴ If an amendment of the moratorium were proposed at a review conference, it would therefore have to include a binding legal regime, such as the one that was established by CRAMRA, and, just as this convention did, it would have to preserve the territorial *status quo*.

The same provision also specifies that an amendment proposed at a review conference “shall be adopted by a majority of the Parties, including 3/4 of the States which are Antarctic Treaty Consultative Parties at the time of adoption of this Protocol”.⁶⁵ The Protocol currently has 42 Parties, and had 26 Consultative Parties at the time of its adoption. Such amendment would therefore need to be adopted by a minimum of 22 States, 20 of which must be among the 26 Consultative Parties that adopted the Protocol in 1991.

Finally, if such an amendment to the moratorium were adopted but did not enter into force within three years of the date of its adoption, a Party could then choose to withdraw from the Protocol. Such withdrawal would be effective two years after notification.⁶⁶ This implies that a withdrawal could only be effective somewhere after January 2053, and probably much later, judging by the different steps required. A notification would first have to be sent, a date and venue for the review conference would have to be defined, a mining regime would have to be negotiated, that regime would have to be adopted by a qualified majority, ratification procedures would have to be followed, and only if such procedures did not allow the amendment to enter into force after three years could a Party notify its future withdrawal, which would then take effect two years later.

3.3 *Material Scope*

The Protocol prohibits mineral resource activities, ‘other than scientific research’. While the moratorium’s material scope is, *prima facie*, very encompassing, the question of which activities, exactly, are prohibited remains unsettled. This is due in part to the absence of clarity as to what exactly constitutes ‘mineral resource activities’ in the Protocol. Mineral resource activities are

64 *ibid* art 25(5)(a).

65 *ibid* art 25(3).

66 *ibid* art 25(5)(b).

generally understood to encompass exploitation activities, as well as other preliminary steps, usually referred to as exploration and prospecting activities,⁶⁷ but these terms are not defined in the Environmental Protocol. The lack of clarity as to the moratorium's material scope is also related to the complex relationship between science and commercial activities.

The moratorium clearly prohibits exploitation activities, but it does not provide a precise definition as to what 'exploitation' consists of. Such activities were broadly defined in the 1988 CRAMRA. 'Development', according to CRAMRA, "means activities, including logistic support, which take place following exploration and are aimed at or associated with exploitation of specific mineral resource deposits, including pilot projects, processing, storage and transport activities".⁶⁸ If one turns to UNCLOS,⁶⁹ exploitation activities are not precisely defined either. In its 2011 advisory opinion, the Seabed Disputes Chamber of the International Tribunal for the Law of the Sea (ITLOS) inferred from different provisions that exploitation includes the activities of:

drilling, dredging, coring, and excavation; disposal, dumping and discharge into the marine environment of sediment, wastes or other effluents; and construction and operation or maintenance of installations, pipelines and other devices related to such activities.⁷⁰

The moratorium also prohibits exploration activities. According to CRAMRA, these are:

activities, including logistic support, aimed at identifying and evaluating specific mineral resource occurrences or deposits, including exploratory drilling, dredging and other surface or subsurface excavations required to determine the nature and size of mineral resource deposits and the feasibility of their development, but excluding pilot projects or commercial production.⁷¹

67 *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, Advisory Opinion, ITLOS Case 17, 2011, 10, para 98.

68 CRAMRA, art 1(10).

69 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3.

70 ITLOS Advisory opinion 2011 (n 67) para 82 and 87. The Seabed Disputes Chamber especially referred to UNCLOS art 145(1), UNCLOS Annex III art 17(2)(f), and UNCLOS Annex IV art 1(1). See also Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (22 July 2013) ISBA/19/C/17, regulation 1(3)(a).

71 CRAMRA, art 1(9).

These activities were included in the definition of 'activities in the Area' given by the ITLOS Seabed Disputes Chamber in its 2011 advisory,⁷² and by the International Seabed Authority (ISA) in its different regulations.⁷³ Exploration mainly differs from exploitation in scale, as such activities mean the searching for resources, the use and testing of techniques, and the carrying out of various studies, but do not include commercial extractive activities.

The moratorium, finally, also extends to prospecting. According to CRAMRA, these activities include logistic support, and are "aimed at identifying areas of mineral resource potential for possible exploration and development".⁷⁴ They consist of "field observations, the use of remote sensing techniques and collection of surface, seafloor and sub-ice samples. Such activities do not include dredging and excavations, except for the purpose of obtaining small-scale samples, or drilling, except shallow drilling into rock and sediment".⁷⁵ Both UNCLOS and the regulations adopted by the ISA admit that a prospector may "recover a reasonable quantity of minerals, being the quantity necessary for testing and not for commercial use".⁷⁶ Prospecting activities are therefore less invasive than exploration and exploitation activities. They do not necessarily involve extractive activities but include estimation of the composition, sizes and distributions of deposits and their economic values,⁷⁷ and are "often treated as the preliminary phase of exploration in mining practice and legislation".⁷⁸

Due to its aim, the moratorium's prohibition can be interpreted as encompassing a broad definition of mineral activities. Under the current moratorium on mineral resource activities, then, a Party could not commence exploitation activities itself or grant a permit to a company aiming at exploiting mineral resources in Antarctica for commercial purposes. Furthermore, such prohibition also extends to prior necessary activities such as prospecting and exploration activities. Here though, the line between some of these activities and purely scientific ones is blurred, and difficulties arise.

72 ITLOS Advisory opinion 2011 (n 67) para 82.

73 See eg Exploration regulations for polymetallic nodules (n 70) reg 1(3)(b).

74 CRAMRA, art 1(8).

75 *ibid.*

76 UNCLOS, Annex III art 2(2); and Exploration regulations for polymetallic nodules (n 70) reg 2(4).

77 Exploration regulations for polymetallic nodules (n 70) reg 1(3)(e).

78 ITLOS Advisory opinion 2011 (n 67) para 98.

Indeed, scientific investigations are a prerequisite for mining activities.⁷⁹ Although CRAMRA did not define scientific research activities, it recognised the relationship between such activities and prospecting.⁸⁰ It is also acknowledged by the ISA,⁸¹ and by Article 249 of UNCLOS, where marine scientific research projects “of direct significance for the exploration and exploitation of natural resources” are considered.⁸² The link between scientific research activities and other mineral resource activities is obvious, as such activities necessarily rely on initial scientific investigations. Distinguishing these types of activities, however, is not effortless. Prospecting activities, on the one hand, are not necessarily invasive, while scientific activities, on the other hand, can include “drilling [...], the use of explosives or the introduction of harmful substances into the marine environment”,⁸³ and might involve “the construction, operation or use of artificial islands, installations and structures”.⁸⁴ These activities, therefore, do not differ in nature and might closely resemble each other in degree.⁸⁵ The distinction is left to the discretion of the State authorising the activity, and necessarily generates varying and conflicting interpretations.⁸⁶

In summary, the moratorium on mineral resource activities is a remarkable and important measure prohibiting use. When it comes to the details of such prohibition, in particular its geographical scope and its material scope, though, there is room for widely divergent interpretations.⁸⁷

79 On the link between scientific research and economic activities, see A. D. Nuttall, “National Antarctic programmes – The politics-science interface” in M. Nuttall, T. R. Christensen and M. J. Siegert (eds), *The Routledge Handbook of the Polar Regions* (Routledge 2018) 294, 294.

80 CRAMRA, art 29(3)(a).

81 ISA, “Draft regulations on exploitation of Mineral resources in the Area. Consolidated text” (2024) ISBA/29/C/CRP.1, reg 3(f)(v).

82 UNCLOS, art 249(2).

83 *ibid* art 246(5)(b).

84 *ibid* art 246(5)(c).

85 See P. De Cesari, “Scientific Research in Antarctica – New Developments” in F. Francioni and T. Scovazzi (eds), *International Law for Antarctica* (Kluwer Law International 1996) 413, 420.

86 See, for instance, debates and statements on Russia’s intentions, by some Western governments and scholars: P. Carter, A. Brady and E. Pavlov, “Russia’s “smart power” foreign policy and Antarctica” (2016) 6(2) *The Polar Journal* 259; but see also scholars criticising what they termed “polar orientalism”: K. Dodds and M. Nuttall, *The scramble for the poles: the geopolitics of the Arctic and Antarctic* (Polity Press 2016) 145.

87 For opposing interpretations, see for instance A. J. Tony Press, “The Antarctic Treaty System: Future Mining Faces Many Mathematical Challenges” (2015) 7(1) *The Yearbook of Polar Law* 623; and L. V. Ferrada, “Five factors that will decide the future of Antarctica” (2018) 8 *The Polar Journal* 84, 100.

4 Assessment of the Moratorium's Effectiveness and Potential Challenges

4.1 *The Moratorium since Its Adoption*

No mineral exploitation scheme is currently in place in the Antarctic region. It can therefore be advanced that the non-use measure is efficient. Such effectiveness derives from both internal and external acceptance and compliance.

The Protocol was quickly agreed upon and adopted after less than a year of negotiations. Such rhythm inevitably contrasts with the negotiations of CRAMRA in the preceding decade, and indicates a broad acceptance within the ATS. Furthermore, although it took seven years for all States who were Consultative Parties to the Antarctic Treaty in 1991 to adhere to the Protocol, Parties also agreed that "pending entry into force of the Protocol [...], current constraints [ie States voluntarily not mining] on Antarctic mineral resource activity shall continue".⁸⁸ Hence, this delay cannot be attributed to difficulties regarding the acceptance of the moratorium, but rather to the complexity of domestic procedures. Finally, the moratorium's adoption also had a direct effect on Parties' policies, with the Russian government, for instance, deciding to redefine its strategic priorities in Antarctica and to design less resource-oriented scientific research projects.⁸⁹ Internally, therefore, the moratorium had initially reached wide acceptance and compliance.

The moratorium also represents a success at the global level. Firstly, over the years, the Protocol gained new members, and currently has 42 Parties, which indicates an increasing acceptance. Moreover, its adoption coincides with reduced external pressures onto the ATS as a regime, as the once heated discussions at the UNGA have gradually diluted and faded. The UNGA's initial reaction was lukewarm, as a resolution was adopted stating that:

any move at drawing up an international convention to establish a nature reserve of world park in Antarctica and its dependent and associated ecosystems must be negotiated with the full participation of the international community⁹⁰

and insisting that the Protocol "has not taken into consideration the call of the international community to ban permanently prospecting and mining in

⁸⁸ Final Act, SATCM XI-4, 1991, Madrid, 109.

⁸⁹ Carter, Brady and Pavlov (n 86) 266.

⁹⁰ UNGA Res A/RES/46/41/A-B (1991), GAOR 46th Session Supp 49, para 7.

Antarctica".⁹¹ In 1994, however, the annual resolution on the 'Question of Antarctica' no longer contained any reference to a permanent ban, nor to negotiating a treaty involving the international community as a whole, but simply called on the Parties to the Antarctic Treaty "to consider becoming Parties as soon as possible to the Protocol on Environmental Protection to the Antarctic Treaty, and so bring the Protocol into force".⁹² The inclusion of the Antarctic issue on the agenda of the UNGA was then progressively spaced out, and references to the Protocol were limited to the UNGA "noting with satisfaction the entry into force of the Protocol on Environmental Protection to the Antarctic Treaty on 14 January 1998".⁹³ From 2005 onwards, Antarctica ceased to feature on the UNGA agenda.⁹⁴ Such evolution therefore indicates a growing acceptance of the ATS, including the moratorium within the more general international community. Finally, no third-State activity contrary to the moratorium has been reported and there seems to be no suspicion of such activity.

It is not insignificant that the pressure on the ATS was gradually lifted following the adoption of the Protocol and the moratorium it contains. The demand of the Non-Aligned States was that Antarctica – its resources, but also access to it, the results of scientific research carried out there, and its environment – should cease to be the preserve of a secretive club of former colonial powers, and that it should benefit humanity as a whole. Initial limited measures, such as publishing ATCM reports and inviting third States to attend to meetings as observers had been insufficient to reverse the tide.⁹⁵ Only strong symbolic environmental measures, such as the designation of Antarctica as "a natural reserve, devoted to peace and science",⁹⁶ and of course the adoption of the moratorium on activities related to Antarctic mineral resources, were able to convince the international community to let the ATS be. The moratorium has been an efficient measure to reduce pressures on both the ATS and on mineral resources in Antarctica, it has kept its relevancy until today, and it has framed many governmental activities in Antarctica since its adoption, refocusing them towards scientific research.

91 *ibid* para 6.

92 UNGA Res A/RES/49/80 (1994) GAOR 49th Session Supp 49, para 8.

93 UNGA Res A/RES/57/51 (2002) GAOR 57th Session Supp 49, preamble, para 6.

94 UNGA Res A/RES/60/47 (2006) GAOR 60th Session Supp 49, para 5. See also Beck (n 25).

95 On these measures, see for instance Davis (n 37) 287.

96 Environmental Protocol, art 2.

4.2 *Current Challenges*

Despite its apparent effectiveness, the moratorium faces different challenges. One of these challenges is the renewed interest in Antarctic mineral resources, and the danger this poses to the moratorium. Other challenges are more broadly looming on the ATS, of which the Protocol is part, and represent therefore indirect threats.

4.2.1 The Gradual Return of Mineral Issues to Antarctic Affairs

The submission of information to the Commission on the Limits of the Continental Shelf (CLCS) by the Claimants in the early 2000s may have given the impression that the Parties to the ATS, and in particular Claimants, were not only seeking to extend their hold over territories, but had also begun to prepare to exploit the Antarctic seabed.⁹⁷

Claimants provided the CLCS information which is relevant for the extension of their Antarctic continental shelf, which is a maritime zone traditionally used for mineral activities. Such submissions were only preliminary requests or declarations of intent, and most Claimants explicitly requested the Commission not to process this information for the moment.⁹⁸ Nonetheless, the submissions provoked a number of reactions. In particular, it had the effect of fuelling or reactivating the mistrust of certain governments, whether or not they were ATS' Members, as to the intentions of the Claimants. The latter invoked in vain mandatory deadlines and the obligation they had to present this partial information in order not to abandon a possible right.⁹⁹ They also highlighted the fact that the Commission would not examine their request for the time being since it refuses to consider a request involving a land or maritime dispute.¹⁰⁰ Notwithstanding these arguments, the widely disseminated information regarding the submissions and the publication of maps (particularly in the request of the Australian government, which claims a large part of

97 See eg T. Stephens, "Polar continental shelves: Australian and Canadian challenges and opportunities" in T. Stephens and D. Vanderzwaag (eds), *Polar Oceans Governance in an Era of Environmental Change* (Edward Elgar Publishing 2014) 146, 149.

98 With the noticeable exception of Argentina, all Claimants referred to "the circumstances of the area south of 60 degrees South latitude and the special legal and political status of Antarctica under the provisions of the Antarctic Treaty" and requested the Commission not to take any action for the time being. See eg UN, "Continental Shelf Notification by Chile" (2002) CLCS.89.2022.LOS; See also A. D. Hemmings and T. Stephens, "The extended continental shelves of sub-Antarctic Islands: implications for Antarctic governance" (2010) 46(4) *Polar Record* 312, 316.

99 SPLOS/72 (2001).

100 CLCS, "Rules of Procedure of the Commission on the Limits of the Continental Shelf" (2008) CLCS/40/REV.1, Annex I para 5.

the Southern continent), together with the general awareness that the moratorium might end post-2048, contributed to raise concerns, both with some governments and within the civil society, as to the future of mineral activities in Antarctica.

Furthermore, Antarctic mineral resources, even if their exploitation is not on the agenda under the current moratorium, have not completely disappeared from ATCM discussions, and in fact tend to be mentioned more and more regularly.

Thus, at the 2001 ATCM, the Russian delegation presented a document outlining certain research carried out in Antarctica and defended itself from carrying out prospecting activities in the face of the remarks made by certain delegations, assuring that the research carried out were only of a scientific nature.¹⁰¹ The Russian delegation then reaffirmed its compliance with the provisions of the Protocol, and therefore with the ban on activities relating to Antarctic mineral resources, other than scientific research, at the next ATCM.¹⁰² In 2011, the Russian delegation once again presented a document outlining its research program, on which occasion it asserted that one of the aim of the activities carried out was to strengthen Russia's economic capacity, thanks to "complex investigations of Antarctic mineral, hydrocarbon and other natural resources".¹⁰³ Here too, the Russian delegation assured that this research was 'purely scientific' and complied with the mineral moratorium. In 2019, the same delegation presented a paper in which it stated that the future of Antarctica is likely to be shaped by, *inter alia*, a "growing interest towards a more intensive use of Antarctic resources, including the issue of the 'postponed' utilisation of mineral resources of the region", and added that despite the moratorium, "there is no denying that given dramatic fluctuations of prices for non-renewable resources at global markets there persists interest to Antarctica", and called for its control.¹⁰⁴

Although the Russian delegation was the only one to address the issue of Antarctic mineral resources so directly, the Chinese delegation also made pointed remarks. In 2017, it presented a document summarising a meeting at which different members of the ATS had been invited to discuss the management of various growing activities, such as tourism, bioprospecting and scientific research. On that occasion, the Chinese delegation referred extensively to the need to strike a balance between protection and utilisation of the Southern

101 Final Report, ATCM XXIV, 2001, St. Petersburg, 126.

102 Final Report, ATCM XXV, 2002, Warsaw, 125.

103 Final Report, ATCM XXXIV, 2011, Buenos Aires, 61.

104 WPO57, ATCM XLII, 2019, Prague.

continent. It also referred to ecological and sustainable development, to the “freezing of mineral resources development” as well as to the need to “unleash the potential and values” of Antarctica.¹⁰⁵ Overall, although the Chinese and the Russian delegations are the ones who addressed the mineral issue in the most direct fashion, various national scientific programmes have developed Earth sciences research over recent years, which could indicate a growing interest beyond these two States.¹⁰⁶ There are competing views as to whether these avenues of research are prospecting in disguise or genuine research.¹⁰⁷

Numerous declarations were adopted by the ATS in response to the reactions the submissions to the CLCS and these statements provoked within and beyond the ATS. Thus, in 2009, a declaration was adopted by the ATCM for the 50th anniversary of the Antarctic Treaty, in which the Parties reaffirmed their “commitment to Article 7 of the Protocol [...] which prohibits any activity relating to minerals, other than scientific research”. In 2016, to celebrate the 25th anniversary of the Protocol, a resolution and a declaration were adopted to reaffirm the moratorium in the face of those, “many in the public and media”, “who incorrectly believe that the Protocol expires in 2048”. In this resolution, the representatives also declared “their firm commitment to retain

105 IPI75, ATCM XL, 2017, Beijing.

106 A. Hemmings for instance mentions a general “resurgence of earth sciences” in Antarctica, and suspects that Russia and China could represent “convenient stalking horses, behind which the generic interests hope to sit without attracting attention”. See A. D. Hemmings, “Antarctic politics in a transforming global geopolitics” in A. D. Hemmings, K. Dodds and P. Roberts (eds), *Handbook on the Politics of Antarctica* (Edward Elgar Publishing 2017) 507, 515; see also A. D. Hemmings, “Considerable values in Antarctica” (2012) 2 *The Polar Journal* 139, 145.

107 See J. Jabour, who recalls that the “Protocol does not preclude scientific research” and considers that “[t]he geological structure of Antarctica is just as interesting to study as its biological aspects, so to accuse parties of ‘prospecting’ is pointless when such research is permitted” (J. Jabour, “Why has there been a ‘Long Peace’ in Antarctica” (2015) 7(1) *The Yearbook of Polar Law* 632, 642–643). Some authors are more suspicious. See for instance M. Boulègue, “Five Eyes strategic interests in Antarctica: implications of contemporary Russian and Chinese strategy” (2023) 13(1) *The Polar Journal* 71, 75; or N. Liu and C. Jiliang, “China and the Future of the Antarctic Mining Ban” (The Interpreter, Lowy Institute, 8 October 2021), available at <<https://www.lowyinstitute.org/the-interpreter/china-and-future-antarctic-mining-ban>> accessed 28 July 2024. Others, while not being as adamant, admit that doubts can be raised as to the future of Antarctic minerals. See generally Johnstone and Joblin (n 17) 269; A. Brady, “The past in the present: Antarctica in China’s national narrative” in A. D. Hemmings, K. Dodds and P. Roberts (eds), *Handbook on the Politics of Antarctica* (Edward Elgar Publishing 2017) 284, 297; or S. Chaturvedi, “The future of Antarctica – Minerals, bioprospecting, and fisheries” in M. Nuttall, T. R. Christensen and M. J. Siegert (eds), *The Routledge Handbook of the Polar Regions* (Routledge 2018) 403, 411.

and continue to implement this provision as a matter of highest priority”.¹⁰⁸ A similar declaration was adopted on the 60th anniversary of the conclusion of the Antarctic Treaty in 2019, while two other declarations were adopted in 2021, to mark the 60th anniversary of the entry into force of the Treaty and the 30th anniversary of the signing of the Protocol. Finally, in 2023, a resolution with similar content was also submitted to celebrate the 25th anniversary of the Protocol’s entry into force.¹⁰⁹

These statements are being adopted with increasing frequency, with the stated aim to disabuse the many people who are under the impression that the Protocol will expire in 2048 and thereby remedy to what the Parties describe as a ‘misunderstanding’.¹¹⁰ However, these reiterated statements are unconvincing. As ‘remote and very unlikely’ the possibility that the moratorium will be overturned is,¹¹¹ at least according to the Parties to the Antarctic Treaty, it remains an option. The statements do not change the situation as they are nothing more than non-binding, political declarations,¹¹² which contain no new commitment by the Parties. If anything, the repetition and the increasing rate at which these declarations are being adopted is rather a source of worry, especially when read in conjunction with the positions taken both by the governments of the Claimants with regard to an extension of the continental shelf off the territories they claim in Antarctica and by certain Parties such as Russia and China. Under the moratorium currently in force, mineral resources can certainly not be exploited by the Parties to the Protocol, but the rules mentioned above explicitly provide for the possibility of amending this instrument after the initial 50-years period. At that point in time, exploitation might be open for debate. No one can predict the future, but the identity of the governments at the origin of the statements’ proposal indicates a slowly decreasing support for the moratorium. The above-mentioned 2019 resolution was proposed by all the Consultative Parties to the Antarctic Treaty, with the exception of four States (Brazil, China, Ecuador and Russia). The last declaration, adopted in 2023, was proposed by the same Parties, except South Africa which

108 ATCM, “Confirming ongoing commitment to the prohibition on Antarctic mineral resource activities, other than for scientific research; support for the Antarctic Mining Ban”, Resolution 6 (2016), ATCM XXXIX, 2016, Santiago.

109 WPO55, ATCM XLV, 2023, Helsinki.

110 WPO38, ATCM XXXIX, 2016, Santiago.

111 *ibid.*

112 This position is also upheld by various authors, whose affiliation with governmental institutions is however established. See for instance Y. Frénot, “Le système du Traité sur l’Antarctique : une gouvernance unique pour la paix, la science et la protection de l’environnement” (2019) 123(3) *Stratégique* 61; or Tony Press (n 87) 623.

had now joined the second group. Without falling into any form of alarmism or catastrophism, doubts persist as to the future of the moratorium after 2048.

4.2.2 Other Cracks in the ATS

While territorial claims continue to haunt the ATS, other issues have also come to dominate the regime, ranging from a legal and institutional framework that does not create incentives for compliance; to potential deadlocks in certain bodies of the ATS that could threaten the whole system; to the challenge for the ATS to take on new issues and hence remain relevant for the future.

Since the inception of the ATS, States Parties have for instance been grappling with the question of monitoring and compliance. Monitoring mechanisms within the ATS mostly rely on Parties' voluntary self-reporting. As stated in the Environmental Protocol, States Parties must inform each other of measures taken to comply with that instrument.¹¹³ While the Antarctic Treaty establishes an inspection scheme which enables Consultative Parties "to designate observers to carry out any inspection" "in order to promote the objectives and ensure the observance of the provisions of the present Treaty",¹¹⁴ this mechanism has been – and still is – little used.¹¹⁵ Violations are even more seldom reported, let alone punished.¹¹⁶ In that respect, one must note the absence of a dedicated committee that would review States Parties' compliance with the relevant rules – and, if needed, adopt facilitative or corrective measures in response to a violation. While this light monitoring and compliance framework might have been sufficient in the past, it could prove a weakness in the current period, which is characterised not only by increasing activities and regulations, but also increasing divergent interests and tensions within the ATS. Indeed, it could highlight governance difficulties within the ATS, and its ability to frame

¹¹³ Environmental Protocol, art 13.

¹¹⁴ Antarctic Treaty, art VII.

¹¹⁵ In 2022–2023, for instance, only one inspection has been reported, by the United Kingdom, on a UK-managed site, while Sune Tamm highlighted that prior to the Environmental Protocol's entry into force, the United States realised ten inspections, making it "the most active party in inspecting during that period". See IPO46, ATCM XLV, 2023, Helsinki; and S. Tamm, "Peace vs. compliance in Antarctica: inspections and the environment" (2018) 8(2) *The Polar Journal* 333, 340. Some authors noted that the creation of an inspection scheme was nonetheless an important achievement in the Antarctic Treaty's implementation context. See eg J. Jabour, "The Utility of Official Antarctic Inspections: Symbolism without Sanction" in D. Liggett and A. D. Hemmings (eds), *Exploring Antarctic Values*, (University of Canterbury Press 2013) 90, 91.

¹¹⁶ K. Bastmeijer, "Introduction: The Madrid Protocol 1998–2018. The need to address 'the Success Syndrome'" (2018) 8(2) *The Polar Journal* 230, 236.

activities in the Southern region, with such a low compliance pull, could well be questioned.

Moreover, the issue of third States and their behaviour vis-à-vis the rules of the ATS remains crucial. Various theories and doctrines have been proposed, according to which the ATS could be, for instance, an objective regime, or that its rules shall be applied as *lex specialis*.¹¹⁷ Ultimately, though, Parties seem to recognise that compliance with the various instruments and the measures developed pursuant to them cannot be demanded of third States, and that the surest way to ensure it is to encourage such States to join the ATS.¹¹⁸ This policy of openness and inducement has worked relatively well, since it has in part reduced the tensions of the 1980s and 1990s. The Antarctic Treaty now counts 56 Parties, 29 of which having a privileged Consultative status. The same policy has enabled the CAMLR Convention to reach 37 Parties, 27 of which having a member's status.

The increased number of Parties to the CAMLR Convention and evolution in the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) membership, however, has contributed to a host of other challenges which might well endanger the whole ATS. In particular, it has resulted in a certain shift in interests and subsequent polarisation of opinions. The focus increased, on the one hand, on the development of Southern Ocean's fisheries and, on the other hand, on the process to designate marine protected area (MPA). In 2011, CCAMLR adopted Conservation Measure 91-04, which provided for the establishment of a MPA network. Despite such declared will, however, very little progress has been made. In addition to the 2009 South Orkney Islands South Shelf MPA,¹¹⁹ the Ross Sea region MPA was established in 2016,¹²⁰ but not without difficulty. All other projects are currently under review,¹²¹ but it seems unlikely that the necessary consensus will be reached in the foreseeable future. Some States are accusing others of voluntarily slowing down this

117 See eg D. R. Rothwell, "The polar regions and the law of the sea" in R. C. Powell and K. Dodds (eds), *Polar Geopolitics? Knowledges, Resources and Legal Regimes* (Edward Elgar Publishing 2014) 19, 26; or B. Simma "The Antarctic Treaty as a Treaty Creating an 'objective Regime'" (1985-6) 19 *Cornell International Law Journal* 189.

118 See eg Final Report, ATCM IX, 1977, London, para 14.

119 CCAMLR, "Conservation measure 91-03 (2009) Protection of the South Orkney Islands southern shelf" (2009) CM 91-03.

120 CCAMLR, "Conservation measure 91-05 (2016) Ross Sea region marine protected area" (2016) CM 91-05.

121 See the discussion conducted by Teschke and Konijnenberg in chapter 12 of this volume.

process in order to give priority to the exploitation of fisheries.¹²² At every turn, some delegations point to their preferences for use, while others defend the principles of precaution and the aim of environmental conservation.¹²³ If current difficulties persist, and Parties are no longer able to agree on conservation measures, CCAMLR's future could be in question. The failure of such a major component of the ATS might not immediately bring the whole regime down but it would represent a heavy blow nonetheless. It would highlight Parties' inability to agree on one major Antarctic issue and could reopen the 'Question of Antarctica', among other issues. This can be seen as a waterfall issue of indirect but real potential effect on the ATS.

Finally, Parties to the ATS also have difficulties embracing new issues. The increasing interest in bioprospecting, and its necessary regulation, is characteristic of these difficulties.¹²⁴ This issue has been on ATCMs' agenda for several years and a recommendation was issued as early as 2005,¹²⁵ but discussions have stalled,¹²⁶ and no concrete action has been taken to date. Similarly, and although the issue is not new, the increase of tourism in Antarctica is also an issue which the ATS has had trouble addressing. The sinking of a tourist ship in November 2007 highlighted the pollution risks that these activities represent for the Southern continent and its surrounding waters,¹²⁷ without triggering further concrete action either. The ATS' weak response to certain global issues,¹²⁸ such as climate change, is also characteristic of this regime's

122 See H. Osterblom and O. Olsson, "CCAMLR – an ecosystem approach to the Southern Ocean in the Anthropocene" in A. D. Hemmings, K. Dodds and P. Roberts (eds), *Handbook on the Politics of Antarctica* (Edward Elgar Publishing 2017) 408, 415.

123 This is not uncontroversial either, as 'conservationists' States are also pursuing their own national agenda. Claimants, for instance, have been accused of using conservation policies to uphold their territorial claims. See eg R. L. Johnstone, "Colonisation at the Poles: A Story of Ineffective Occupation" (2022) 13(1) *The Yearbook of Polar Law* 93.

124 C. C. Joyner, "Potential Challenges to the Antarctic Treaty" in P. A. Berkman et al (eds), *Science Diplomacy Antarctica, Science, and the Governance of International Spaces* (Smithsonian Institution Scholarly Press 2011) 97.

125 ATCM, "Biological prospecting in Antarctica", Resolution 7 (2005), ATCM XXVIII, 2005, Stockholm.

126 See eg J. N. Barnes, "The Antarctic Treaty System: Perspectives of Environmental Nongovernmental Organizations on Addressing Key Issues" in P. A. Berkman et al (eds), *Science Diplomacy* (Smithsonian Institution Scholarly Press 2011) 277, 279.

127 See eg D. R. Rothwell, "Law enforcement in Antarctica" in A. D. Hemmings, D. R. Rothwell and K. N. Scott (eds), *Antarctic Security in the Twenty-First Century* (Routledge 2012) 135.

128 On the ATS' difficulties to grasp new issues, see M. Zhang, M. Haward and J. McGee, "Marine plastic pollution in the polar south: Responses from Antarctic Treaty System" (2020) 56 *Polar Record* e36.

diminished capacity to effectively take on new issues¹²⁹ and reflective of a general polarisation of views – or of rhetoric – between those States claiming to embrace environmental protection and those States openly wishing to pursue economic development. Since the start of the war in Ukraine, the difficulty to reach consensus on a number of questions has dramatically increased and the ATS' ability to function is endangered. All these challenges to the ATS necessarily represent challenges to the Environmental Protocol, and therefore to the moratorium.

5 Conclusion

The ATS owes its existence to the territorial claims of certain States during the first half of the 20th Century, and its successive evolutions cannot be analysed without bearing in mind the permanent search for a territorial compromise. The main pillars of the regime – science, peaceful use and environmental protection – were chosen and developed precisely because they reflected situational means of perpetuating this territorial *status quo*. Environmental protection was gradually developed within the ATS during a period when this concern developed on the international scene, through, for example, the publication of the Brundtland Report, or the adoption of the Rio Declaration. Negotiations of a mining regime for Antarctica coincided with strong external pressures on the ATS, and the subsequent adoption of the Protocol can therefore be seen as a response to these pressures.

The non-use measure contained in the Protocol has indeed acted as an effective stabiliser for the ATS. In 1991, the ATS had thus found a new breath. However, despite this effectiveness, the moratorium contains various grey areas, and the current or looming challenges for the ATS, whether real or perceived as such, represent a real threat to this stability.

The moratorium's spatial application is a long-debated issue. Although it was regularly and eagerly dismissed as being a purely academic debate until recently, mineral discussions in various forums have given this issue renewed relevance. A further weakness stems from the grey areas which remain as to the moratorium's material scope. In particular, no definition of 'mineral resources activities', 'exploitation', 'exploration', or 'prospecting' is provided and no clarification is given as to what amounts to scientific activities, which are permitted.

129 See eg S. Chaturvedi, "The Antarctic climate security dilemma and the future of Antarctic governance" in A. D. Hemmings, D. R. Rothwell and K. N. Scott (eds), *Antarctic Security in the Twenty-First Century* (Routledge 2012) 257.

Last but not least, the non-use measure is not necessarily permanent. No matter how difficult the procedural conditions might appear to meet, the potential lifting of the moratorium is left to political considerations, since no scientific condition has been included in the steps listed in Article 25.¹³⁰ Since the insertion of such provision allowing for later modification of the prohibition of mineral resources activities¹³¹ certain States have expressed their clear interest for Antarctic mining, Claimants have filed preliminary submissions with the CLCS, and the ATCM response has been of frantically adopting declarations without any binding legal effect. All these developments demonstrate that the appetite for the mineral resources of the Southern region, if it had ever disappeared, has returned. To remain effective and relevant, the ATS will have to demonstrate a deeper unity on different issues. Among these, it will somehow have to address the growing polarisation between States claiming to support the moratorium and States who might ultimately push for its lifting, even if they are not yet doing so explicitly. The position of States attending ATCMs on deep-seabed mining and in the current moratorium debate within the ISA could be indicative on the probability of future mining in Antarctica.

130 For a different perspective on future mining probabilities, see Tony Press (n 87) 623.

131 At the last-minute request of the United States, to which their approval of the Protocol was conditioned. See Gillepsie (n 39) 23; and Redgwell (n 24) 609.

Non-use Measures in Antarctic Tourism Regulation

Ricardo M. Roura and Solène Guggisberg

1 Introduction

Tourism into Antarctica might seem a marginal activity but it has in fact had a remarkable growth in the last few decades, with a record of over 120,000 tourists in the 2023–2024 season.¹ While this remains a very small number of tourists compared to major global tourism destinations, Antarctica is also an area of the world which is most distinctive, not only in its remoteness and relatively untouched nature, but also in the way in which it is governed. In an area that States designated as a “natural reserve, devoted to peace and science”,² one can wonder how, and to what extent, the uncontrolled growth and expansion of tourism must be accepted.

The historical record of the Antarctic Treaty Consultative Meetings (ATCMs), the annual meeting of the Antarctic Treaty Consultative Parties (ATCPs) that govern the Antarctic jointly, shows that States were aware of this commercial activity from early on and took some measures to address specific concerns.³ However, this record does not demonstrate a clear willingness of Parties to put an end, or strict limits, to the development of Antarctic tourism.⁴ While tourism has developed increasingly fast, particularly since the 1990s, responses by

1 IAATO, *IAATO Overview of Antarctic Vessel Tourism: The 2023–2024 Season, and Preliminary Estimates for 2024–25*, ATCM 46 (2024), IP102 rev1.

2 Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol) (adopted 4 October 1991, in force 14 January 1998) 2941 UNTS 5878, art 2.

3 ATCM, “Regulation of Antarctic Tourism” (1966) Recommendation IV–27; ATCM, “Regulation of Antarctic Tourism” (1970) Recommendation VI–7; ATCM, “Special protection for new islands” (1970) Recommendation VI–11.

4 The literature on Antarctic tourism is expansive, and many articles summarise the history of this activity and its regulation, see eg C. J. Bastmeijer and N. Gilbert, *Proactive Management of Antarctic Tourism: Time for a Fresh Approach*, ATCM 42 (2019), IP26; C. J. Bastmeijer et al, “Regulating Antarctic Tourism: The Challenge of Consensus-Based Decision-Making” (2023) 117(4) *American Journal of International Law* 651–676; D. Cajiao et al, “Tourists’ Motivations, Learning, and Trip Satisfaction Facilitate Pro-environmental Outcomes of the Antarctic Tourist Experience” (2022) 37 *Journal of Outdoor Recreation and Tourism* 100454; D. Liggett and E. Stewart, “Sailing in Icy Waters: Antarctic Cruise Tourism Development, Regulation and Management”, in C. Weeden and R. Dowling (eds), *Cruise Ship Tourism* (CABI 2017), 484–504.

ATCPs have been comparatively slow, relative to the attention it has received in annual ATCMs. The general assessment has been that the regulation of tourism by the ATCM has lagged behind tourism developments.⁵ This contrasts with the Antarctic Treaty System (ATS) generally being proactive, as it has in particular been for basic environmental management (regulated),⁶ sealing (inactive but still subject to restrictions and catch limits),⁷ fishing (active and subject to restrictions and catch limits),⁸ and mineral resource activities (banned).⁹ When it comes to tourism indeed, while tour operators and tourists must meet certain operational and behavioural requirements, they are generally able to carry on with their activities largely unimpeded. Most regulatory measures addressing Antarctic tourism activities up to the early 2000s have been said to represent “conditions that do not substantially restrict Antarctic tourism initiatives”.¹⁰ Over twenty years later, this assessment is still largely valid.

The primary proposition of this chapter hence is that, although Antarctic tourism is subject to a body of regulation, existing non-use measures relevant to tourism remain rare and often very specific in their scope of application. At present, they are only used to minimise some discrete effects of tourism, particularly in certain locations, rather than to impose hard limits on tourism, its growth and/or diversification. This chapter explores the development, challenges to adoption, and content of non-use measures regulating Antarctic tourism. It focuses on the question of the factors, including decision-making procedures, that have influenced the adoption of non-use measures and analyses the existing measures’ actual impact on the future of tourism development. To do so, this chapter draws on an examination of the series of measures agreed by the ATCM that are relevant for tourism; the record of discussions about tourism and tourism measures, as reflected in publicly available ATS documents;¹¹ and observations conducted through long-term

5 C. J. Bastmeijer and R. M. Roura, “Regulating Antarctic Tourism and the Precautionary Principle” (2004) 98 *American Journal of International Law* 763–781; Cajiao et al (n 4); Liggett and Stewart (n 4).

6 ATCM, “Agreed Measures for the Conservation of Antarctic Fauna and Flora” (1964) Recommendation III–VIII. See also the Environmental Protocol.

7 Convention for the Conservation of Antarctic Seals (adopted 11 February 1972, entered into force 11 March 1978) 1080 UNTS 175.

8 Convention on the Conservation of Antarctic Marine Living Resources (adopted 1 August 1980, entered into force 7 April 1982) 1329 UNTS 47.

9 Environmental Protocol, art 7.

10 Bastmeijer and Roura (n 5) 777.

11 These include in particular discussion documents submitted to ATCMs, final reports of these meetings, and relevant legal instruments adopted by the ATCMs, see ATS, “Antarctic Treaty database”, available at <<https://www.ats.aq/devAS/ToolsAndResources>

participation as expert/observer to Antarctic Treaty fora where tourism was discussed. After a presentation of Antarctic tourism, its development, and its regulation (section 2), the relevant non-use measures are presented and analysed (section 3).

Based on the typology developed in chapter 2 by Guggisberg, tourism in Antarctica is envisaged as a primarily commercial activity that uses Antarctic space as resource.¹² Hence, it is an additive use, where people, energy, and substances that are not originally present in that spatial context are added to the Antarctic, temporarily but recurrently. Such use has both potential and actual impacts on the marine and terrestrial domains of Antarctica, as will be outlined below. While not departing from the conceptual framework of this book, it is nonetheless worth noting that tourism is a complex activity and that its relation to space can be perceived as more than simply 'additive'. Tourism can also be 'reductive', in that by adding people and activities to certain spaces it may reduce some of their original attractiveness or values, for instance through 'wear and tear' or crowding. Antarctic tourism may also diminish the sense of "remoteness and a relative absence of both people and indications of past and present human presence or activity" that characterises a wilderness.¹³ In addition, the contrast between the situation before and after the establishment of tourism in a certain area may be apparent to, and resented by, other users of the same area, such as scientists.¹⁴ Consequently, tourism might also be regarded as 'intrusive' in wilderness areas – or perhaps 'incursive'.¹⁵

2 Antarctic Tourism

As it will be examined in section 2.1, the concept of Antarctic tourism is not without its controversies, but it remains clear that this industry has been in

/AntarcticTreatyDatabase?lang=e> accessed 20 September 2024; and ATS, "Meeting Documents Archive", available at <<https://www.ats.aq/devAS/Meetings/DocDatabase?lang=e>>, accessed 20 September 2024.

12 See the discussion by Guggisberg in chapter 2 of this volume.

13 T. Tin, A. D. Hemmings and R. M. Roura, "Pressures on the Wilderness Values of the Antarctic Continent" (2008) 14(3) *International Journal of Wilderness* 7–12.

14 This sentiment is reflected in some of the earlier concerns Antarctic Treaty Parties had about tourism operations. See eg Recommendation IV–27 (1966) (n 3) and Recommendation VI–11 (1970) (n 3).

15 Each tourism visit could be described as an 'incursion' to the visited space – a temporary action but repeated multiple times by single or multiple operators.

significant expansion since the early 1990s. Its regulation falls under the purview of the ATS (2.2), but has also been addressed by industry self-regulation (2.3).

2.1 *The Nature of Antarctic Tourism*

2.1.1 Definition

Tourism is both a business and an activity. A dictionary definition of tourism is “[o]rganised touring; operations of tours as business; provisions of things and services that attract tourists”, while a tourist is a “[p]erson who makes a tour, traveller, esp. for recreation”.¹⁶

In the Antarctic context, ambiguities about the concepts of tourism and tourist exist.¹⁷ Generally, ‘tourism’ and ‘tourist’ tend to be defined implicitly by exclusion from government activities, and almost always in connection with non-governmental activities, regardless of what these might be. In some perspectives “all forms of recreational activity in Antarctica, including commercial tourism activities as well as the recreational activities of national program personnel” are regarded as tourism.¹⁸ In contrast, some Parties prefer to keep a distinction between tourists and their national programmes’ staff. The term ‘visitor’ is sometimes used to refer to any human in Antarctica, but, as currently used in the ATS, it “does not include scientists conducting research within such sites, or individuals engaged in official governmental activities”.¹⁹ Both mainstream commercial tourism and other non-governmental activities are bound by tourism and other applicable regulation adopted by the ATCM.²⁰

For the purpose of the current chapter, Antarctic tourism is defined as “all human activities either mainly pursuing recreational and/or educational purposes or unequivocally catering for those who engage in recreational and/or

16 *The Concise Oxford Dictionary of Current English* (6th ed, OUP 1976).

17 C. M. Hall and M. E. Johnson (eds), *Polar Tourism: Tourism in the Arctic & Antarctic Regions* (Wiley & Sons 1995); C. M. Hall and J. Saarinen, “Polar Tourism: Definitions and Dimensions” (2010) 10 *Scandinavian Journal of Hospitality and Tourism* 448–467, 453; E. J. Stewart, D. Draper and M. E. Johnston, “A Review of Tourism Research in the Polar Regions” (2005) 58 *Arctic* 383–394. Different Parties and stakeholders hold different views on concepts such as ‘tourism’, ‘tourist’ and ‘visitor’. Nuances relate to, for example, the type of activity conducted; whether the focus of the activity is leisure or work; the commercial or private/non-commercial nature of the operations; and the non-governmental or governmental affiliation of the organisers.

18 United Kingdom, *Strategic Vision of Antarctic Tourism for the Next Decade*, ATCM 32 (2009), WP10.

19 ATCM, “Site Guidelines for Visitors” (2009) Resolution 4.

20 C. Murray and J. Jabour, “Independent Expeditions and Antarctic Tourism Policy” (2004) 40 *Polar Record* 309–317.

educational activities in the Antarctic Treaty area south of 60° S[outh].²¹ This definition succinctly encompasses Antarctica as a destination region; the human groups linked to the tourism industry as either service providers or customers; and the distinct recreational (and sometimes educational) focus of many tourism activities. The bulk of what can be regarded as Antarctic tourism corresponds to this definition.

2.1.2 Development and Potential Impacts

Tourism in the Antarctic region predates the adoption of the Antarctic Treaty and has been a matter of discussion at ATCMs since early on. Only a few tourism ships travelled to the Antarctic region in the late 1950s and through the 1960s, and for several decades only a few hundred tourists visited the region each season, bar a gap in the early 1960s. Over the subsequent decades, tourism in Antarctica has expanded considerably, particularly from the 1990s and, in parallel, has become a significant agenda item for the ATCM as well as a polarising issue.

People are drawn to visit Antarctica for many different reasons,²² which have often involved its aesthetics, its archetypical natural features (often referred to as 'iconic'), its history and cultural heritage, and increasingly its wilderness. The Antarctica emptiness itself may indeed be regarded as a tourism attraction: preserving the "illusion of wilderness"²³ is important for polar tourism as it invokes a sense of discovery and reinforces the notion that tourists are part of an expedition.²⁴ Even the scientific value of Antarctica is of interest as a marketable attraction: visiting Antarctic research stations, listening to lectures about Antarctic science, science-themed expeditions, and hands-on participation in 'citizen science' projects are all often included in the tourism menu.²⁵ Facing significant changes resulting from anthropogenic

21 D. Haase, *Tourism in the Antarctic: Modi Operandi and Regulatory Effectiveness*, Doctoral Thesis (University of Canterbury 2008), at 47–48.

22 For instance, Cajiao et al (n 4) clustered survey responses by Antarctic tourists into four motivation types: experience and learning, adventure into Antarctica, social bonding, and trip of a lifetime, with different groups of tourists prioritising one of these motivations.

23 K. de Korte, "A Tourist in the Arctic", in N. Boschman, L. Hacquebord and J. W. Veluwenkamp (eds), *Het Topje van de Ijsberg. 35 Jaar Arctisch Centrum (1970–2005)* (Barkhuis 2005), 79–82.

24 M. Nuttall, "Narratives of History, Environment and Global Change. Expeditioner-tourists in Antarctica", in C. M. Hall and J. Saarinen (eds), *Tourism and Change in the Polar Regions: Climate, Environment and Experiences* (Routledge 2010), 204–214.

25 Visits to research stations have been part of the tourism experience from the earlier days (see eg R. K. Headland, "Historical Development of Antarctic Tourism" (1994) 21(2) *Annals of Tourism Research* 269–280). Citizen science is a more recent addition and is

climate change, Antarctic tourism has also emerged as a 'last chance' tourism destination.²⁶

The location and characteristics of Antarctica have shaped tourism developments. The Antarctic coastline is located 3,000 km or more from the closest continent, except in the case of the Antarctic Peninsula, where distances are significantly shorter.²⁷ Antarctic tour operations also include visits to the Ross Sea region and limited visitation to East Antarctic destinations.²⁸ While the earlier Antarctic expeditions tended to focus on visits to active stations, they have since expanded to include visits to historic sites and natural attractions.²⁹ The traditional cruising model where tourists sleep on-board the vessel and make landings during the day still dominates in Antarctic tourism. However, the modalities of transport and tourism activities continue to evolve and increase, creating possibilities for new behaviours and new interactions with the environment.³⁰ They currently include cruise-only itineraries without landings for large ships,³¹ fly-sail operations, yacht cruising, and adventure tourism – often linked to 'deep field' activities in the Antarctic interior, each with their own variations

sometimes used to improve the image of tourism as an Antarctic activity (see eg S. Blacker, A. H. Kimura and A. Kinchy, "When Citizen Science is Public Relations" (2021) 51(5) *Social Studies of Science* 780–796).

- 26 A. Varnajot et al, "Toward Antarcticification? Tourism and Place-making in Antarctica" (2024) 47(1) *Polar Geography* 49–70.
- 27 R. M. Roura, *The Footprint of Polar Tourism: Tourist Behaviour at Cultural Heritage Sites in Antarctica and Svalbard* (Barkhuis 2011).
- 28 J. Jabour, "Strategic Management and Regulation of Antarctic Tourism", in T. Tin et al (eds), *Antarctic Futures* (Springer 2014), 273–286.
- 29 R. Naveen et al, "Zodiac Landings by Tourist Ships in the Antarctic Peninsula Region, 1989–99" (2001) 37 *Polar Record* 121–132; J. Splettstoesser, D. Landau and R. K. Headland, "Tourism in the Forbidden Lands: The Antarctica Experience", in T. V. Singh (ed), *New Horizons in Tourism. Strange Experiences and Stranger Practices* (CABI 2004), 27–36.
- 30 Y. Makanse, "Contextualising Antarctic Tourism Diversification: Tourism Management Implications from Multinational Policy Debates" (2024) 14 *The Polar Journal* 1–44, presented in SCAR, ATCM 46 (2024), IP172 rev1.
- 31 The largest ship to cruise Antarctic waters within the northern limit of pack ice was once reported to be the *MS Golden Princess* in January 2007, carrying 2,425 passengers and about 1,000 crew (see eg E. Bertram, C. Gunn, and B. Stonehouse, "The Cruise of *MS Golden Princess* in Antarctic Waters, January 2007" (2008) 44(2) *Polar Record* 177–180). The IMO ban on the use and carriage of Heavy Fuel Oil in the Antarctic Treaty area, which came into effect in 2011, impacted on the use of vessels carrying more than 500 passengers (IAATO, *IAATO Overview of Antarctic Tourism: 2011–12 Season and Preliminary Estimates for 2012–13 Season*, ATCM 35 (2012), IP39). However, large ships are far from having disappeared from Antarctic tourism operations: 18 out of 94 IAATO Member vessels operating in 2024 carry more than 500 passengers, nine of those carry more than 1,000 passengers, including three which exceed the *MS Golden Princess* with 3,000 or more passengers.

in *modus operandi* and menu of activities. Conversely, non-landing overflights were once in vogue but have been largely discontinued, at least for now.

Tourism has grown significantly since the early 1990s, rising ten-fold from about 7,500 tourists in the early 1990s to 75,000 in the 2019–2020 season.³² Tourism growth has also been periodically slowed down by events originating outside Antarctica, such as the 2008 financial crisis, a ban on the use and carriage of Heavy Fuel Oil from 2011 and, more recently, the COVID-19 pandemic, with almost no visitors in 2020–2021.³³ Overall, continued tourism growth concentrated in some locations raised concerns about tourism impacts as well as potential ‘Antarctic overtourism’ – of course, not the kind of overtourism experienced in the most visited destinations of the world, but a form of overtourism applicable to the tourism modalities in parts of the Antarctic region.³⁴ For a wide range of reasons rooted in the characteristics of the region and the governance regime applicable to the Southern Ocean and continent, what might be tolerable in other parts of the world in terms of impacts may not be acceptable in Antarctica. Tourism developments after the COVID-19 pandemic revealed strong growth, exceeding 100,000 Antarctic tourists in a season for the first time, and raising once again the possibility of ‘Antarctic overtourism’ at least in some locations. Indeed, during the 2022–2023 season, the industry association, the International Association of Antarctica Tour Operators (IAATO), reported 104,897 tourists travelling with their operators. Growth is only continuing, and the 2023–2024 season is reported to have reached a record of 122,072 tourists.³⁵

In addition to a continuing growth in number, other factors contribute to the potential impacts of tourism in Antarctica, in particular concentration of tourism in some areas, expansion to new areas, and diversification of, for example, modes of travel and activities.³⁶ Recreational visits to Antarctica are limited to the austral summer (late October to early April) and are geographically

32 IUCN, “Impacts of Tourism in Antarctica” (2023) *IUCN Issues Briefs*, available at <https://iucn.org/sites/default/files/2023-06/iucn-issues-brief_impacts-of-tourism-in-antarctica_3.pdf> accessed 20 September 2024.

33 D. Liggett et al, “The Future of Sustainable Polar Ship-based Tourism” (2023) e21 *Cambridge Prisms: Coastal Futures* 1–12.

34 Indicators of Antarctic overtourism may include eg “frequent encounters with other tourist groups or cruise ships, cumulative effects at landing sites, and a degraded wilderness experience by visitors” (R. M. Roura, “Antarctic Tourism and Overtourism” (2019) 6 *Antarctic Affairs* 7–18, 15).

35 ATCM 46, IP102 rev1 (n 1). This figure, however, does not include tourists potentially travelling with non-IAATO member operators or in private/non-commercial expeditions. It is also exclusive of the staff involved in the expeditions.

36 See eg Bastmeijer and Gilbert (n 4) and references therein.

mostly located in the North-West part of the Antarctic Peninsula. Hence, while Antarctica is vast, most tourism takes place in the most accessible – and comparatively small – part of the continent. For shipborne tourism, spatial concentration drives an expansive search for new landing sites within a certain geographic range which is circumscribed by the distance a ship can travel within a time-limited itinerary. In terms of diversification, the range of activities offered to visitors has increased, with kayaking being joined by marathons, mountaineering, helicopter supported skiing, or luxury camping. While some activities are more common than others, the number of activities performed in Antarctica as part of tourism operations reaches several dozens.³⁷

The effects of (over)tourism in Antarctica are multifaceted³⁸ and have concerned Parties to the Antarctic Treaty from early on. Worries have been expressed in relation to the (potential) impacts of tourism on scientific research and the environment, the implications for eventual search and rescue operations, jurisdictional disputes, political uses of tourism in territorial claims, and the establishment of private property in Antarctica.³⁹ For example, when it comes to scientific research, tourism activities might overburden a science station that is visited and might, in the field, be disruptive of ongoing investigations.⁴⁰ As to the actual cumulative impacts of tourism on the environment, studies have so far been largely inconclusive.⁴¹ However, with a fragile – and, until now, relatively protected – environment, there is no doubt that increased and repetitive human presence can contribute to imbalances or damage in several ways, including through ‘wear and tear’,⁴² impacts on

37 Makanse (n 30).

38 See eg D. Liggett et al, “From Frozen Continent to Tourism Hotspot? Five Decades of Antarctic Tourism Development and Management, and a Glimpse into the Future” (2011) 12(2) *Tourism Management* 357–366.

39 Bastmeijer and Roura (n 5); Liggett et al (n 38).

40 France, *Establishment of “Areas of Special Tourist Interest”*, ATCM 29 (2006), WP18.

41 Stewart, Draper and Johnston, (n 17) 386, found that there is minimal conclusive empirical evidence of negative impacts. However, there is no comprehensive and systematic assessment framework of human impact on Antarctica, hence there is no baseline or monitoring to evaluate impacts (on this, see also R. Hofman and J. Jatko, “Assessment of the Possible Cumulative Environmental Impacts of Commercial Ship-Based Tourism in the Antarctic Peninsula Area” *Proceedings of a Workshop held in La Jolla, California, 7–9 June 2000* (National Science Foundation); P. Tejedo et al, “What Are the Real Environmental Impacts of Antarctic Tourism? Unveiling their Importance Through a Comprehensive Meta-analysis” (2022) 308 *Journal of Environmental Management* 114634).

42 vsg 2 *Barrientos Island (Aitcho Islands)*, adopted in 2005, was modified in response of reports that repeated tourism visitation had caused track development ca. 500 m long in moss beds in the central part of the island (ATCM, “Barrientos Island – Aitcho Islands visitor Site Guidelines” (2012) Resolution 5).

wildlife,⁴³ and the introduction or spreading of non-native species or even – potentially – diseases.⁴⁴

2.2 *Regulation of Antarctic Tourism*

Antarctica is jointly managed by States under an international legal system known as the Antarctic Treaty System and based on the 1959 Antarctic Treaty. The ATS is understood as the Antarctic Treaty, the Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol) which was signed in 1991 – as well as two other treaties related to marine living resources, which are not relevant to the present discussion – and the instruments in effect under these treaties. Governance and management decisions for tourism and other matters are made by the ATCM with the advice of its Working Groups and advisory bodies such as the Committee for Environmental Protection.

As of September 2024, there are 57 Parties to the Antarctic Treaty, of which 29 are ATCPs and hence have decision-making powers,⁴⁵ and 42 to the Environmental Protocol.⁴⁶ The ATCM is the annual gathering in which the ATCPs, non-ATCPs and others, such as IAATO, meet to exchange information and ATCPs can adopt additional regulatory instruments.⁴⁷ These instruments, originally named Recommendations, were, in 1995, subdivided into Decisions, which are focused on internal organisational matters; Resolutions, which are hortatory; and Measures, which are intended to be legally binding once approved by all ATCPs.⁴⁸ The adoption of any instrument at ATCMs must be based on consensus, usually understood as an absence of objection, and hence meaning that any State with decision-making power can block the adoption of regulations.⁴⁹

Within the ATS, no treaty or dedicated section thereof exclusively focuses on tourism. However, tourism has periodically been the subject of an ATCM Working Group partly or fully dedicated to its discussion. Tourism is regulated in part by the Antarctic Treaty and the Environmental Protocol when their provisions are relevant, and in part by further instruments adopted by the ATCM.

43 C. M. Flynn et al, “Penguins in the Anthropause: COVID-19 Closures Drive Gentoo Penguin Movement Among Breeding Colonies” (2023) 286 *Biological Conservation* 110318.

44 SCAR et al, *Update on High Pathogenicity Avian Influenza in Antarctica*, ATCM 46 (2024), WP47 rev1.

45 Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71, art IX(2).

46 ATS, “Parties”, available at <<https://www.ats.aq/devAS/Parties?lang=e>> accessed 20 September 2024.

47 Antarctic Treaty, art IX(1).

48 ATCM, “Recommendations Divided into Measures, Decisions and Resolutions” (1995) Decision 1.

49 Antarctic Treaty, art IX(4); on this see eg Bastmeijer et al (n 4); C. C. Joyner, “Recommended Measures Under the Antarctic Treaty: Hardening Compliance with Soft International Law” (1998) 19 *Michigan Journal of International Law* 401–443.

In particular, the Environmental Protocol is the main treaty-based source of obligations related to Antarctic tourism as it applies to most human activities in Antarctica, tourism included. The Environmental Protocol designates Antarctica “as a natural reserve, devoted to peace and science” and expresses the Parties’ commitment “to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems”.⁵⁰ Tourism regulation is indirectly addressed in various Annexes to the Environmental Protocol, which focus on the conduct of prior environmental impact assessments (EIAs),⁵¹ the protection of fauna and flora,⁵² waste management,⁵³ the prevention of marine pollution from ships,⁵⁴ and area protection and management.⁵⁵ An Annex on liability for environmental emergencies – in part motivated by the case of tourism, such as an emergency involving a cruise ship – was adopted in 2005 but it is not in force yet.

There are also a series of instruments adopted by ATCPs during ATCMs that are relevant for the governance of Antarctic tourism. A search in the Antarctic Treaty Database for instruments related to ‘Tourism and Non-Governmental Activities’ yields a total of 55 instruments. Thirty-seven of these are current, while the others have been repealed.⁵⁶ Apart from six Decisions, which are directed at internal ATCM matters, 31 other instruments remain (see Table 15.1). These include some legally binding Recommendations adopted as early as 1966, as well as several non-binding Resolutions adopted in recent decades. The two Measures that have been agreed upon in relation to tourism are still not in force, thus not yet legally binding. In addition to the instruments listed in the table, a certain number of instruments not focused on tourism are also relevant to the regulation of the activity, like Resolution 4 (2018) and its annexed guidelines on the operation of drones.⁵⁷

50 Environmental Protocol, art 2.

51 *ibid* Annex I.

52 *ibid* Annex II.

53 *ibid* Annex III.

54 *ibid* Annex IV.

55 *ibid* Annex V.

56 All can be found in the Antarctic Treaty database (n 11).

57 ATCM, “Environmental Guidelines for Operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica” (2018) Resolution 4. This overview of Antarctic tourism regulation, including Table 15.1, is grounded in the authors’ prior scholarship and writing. Roura’s contribution includes presentations delivered at non-use measures workshops convened in 2023 and 2024 from which this chapter derives, which were informed on his research, including Bastmeijer and Roura (n 5). Guggisberg’s contribution includes a recent publication on the governance of Antarctic tourism, which served as a textual basis for this section (E.-L. Alvarez Ortega and S. Guggisberg, “Governance of Antarctic Tourism: From Private Actors to the Antarctic Treaty System, and Back”, in D. Ioannides, A. Varnajot and M. Vereda (eds), *Polar Tourism and Communities: Experiences, Knowledge Building, Challenges and Opportunities* (CABI 2025), 43–59).

TABLE 15.1 Current ATCM Recommendations, Resolutions and Measures on tourism and non-governmental activities

Instrument	Subject
Resolution 2 (2024)	General Guidelines for Visitors to the Antarctic
Resolution 4 (2023)	Urgent Measures to Be Taken with Respect to Certain Tourist and Non-governmental Activities
Resolution 2 (2022)	Site Guidelines for Visitors
Resolution 5 (2022)	Permanent Facilities for Tourism and Other Non-governmental Activities in Antarctica
Resolution 6 (2022)	Revised Standard Post Visit Report Form
Resolution 4 (2021)	General Guidelines and Site Guidelines Checklist for Visitors to the Antarctic
Resolution 9 (2021)	Voluntary On-board Observer Operational Framework for Vessel-based Tourism in the Antarctic Treaty Area
Resolution 10 (2021)	Post Visit Site Report Form for Tourism and Non-governmental Activities in Antarctica
Resolution 6 (2017)	Guidelines on Contingency Planning, Insurance and Other Matters for Tourist and Other Non-governmental Activities in the Antarctic Treaty Area
Resolution 6 (2014)	Toward a Risk-based Assessment of Tourism and Non-governmental Activities
Resolution 7 (2014)	Entering into Force of Measure 4 (2004)
Resolution 5 (2012)	Barrientos Island – Aitcho Islands Visitor Site Guidelines
Resolution 9 (2012)	The Assessment of Land-based Expeditionary Activities
Resolution 10 (2012)	Yachting Guidelines
Measure 15 (2009)	Landing of Persons from Passenger Vessels
Resolution 7 (2009)	General Principles of Antarctic Tourism
Resolution 6 (2008)	Maritime Rescue Coordination Centres and Search and Rescue in the Antarctic Treaty Area
Resolution 4 (2007)	Ship-based Tourism
Resolution 5 (2007)	Long-term Effects of Tourism
Measure 4 (2004)	Tourism and Non-governmental Activities
Resolution 3 (2004)	Tourism and Non-governmental Activities
Resolution 6 (1999)	Non-consultative Parties and the Environmental Protocol
Resolution 3 (1997)	Tourism Reporting Form
Resolution 3 (1995)	Tourist Reporting
Recommendation XVIII-1 (1994)	Guidelines for Tourism

TABLE 15.1 Current ATCM Recommendations, Resolutions and Measures on tourism and non-governmental activities (*cont.*)

Instrument	Subject
Recommendation x-8 (1979)	Tourist Regulation
Recommendation VIII-9 (1975)	Statement of Accepted Practices in Tourism
Recommendation VII-4 (1972)	Effects of Tourist Activity
Recommendation VI-7 (1970)	Regulation of Antarctic Tourism
Recommendation VI-11 (1970)	Special Protection for New Islands
Recommendation IV-27 (1966)	Regulation of Antarctic Tourism

ALL THESE INSTRUMENTS ARE AVAILABLE AT <[HTTPS://WWW.ATS.AQ/INDEX_E.HTML](https://www.ats.aq/index_e.html)> ACCESSED 20 SEPTEMBER 2024

2.3 *Role of IAATO*

The internal regulations of the Antarctic tourism industry association are another important source of (informal) measures applicable to tourism. Established by tour operators in 1991, IAATO is an industry organisation that has developed many regulatory requirements for its members. These requirements include bylaws which provide a basic framework and set of principles for the conduct of tourism, and a broad range of complementary guidelines applicable to different aspects of tourism operations. IAATO has also set processes to manage the flow of tourism through a ‘scheduler’ in which operators can book in advance visits to a site. It should be noted that these measures apply only to tour operators that are members of IAATO. In general, IAATO membership constitutes the bulk of the Antarctic tourism industry, however this has not always been the case – and there is no guarantee that it will continue to be so in the future.

As rules adopted by a private organisation are only applicable to its members, IAATO measures are not considered for this analysis. However, the role of this association as a self-regulator of Antarctic tourism and the influence of its rules on instruments adopted at the ATCM must not be underestimated. Indeed, IAATO has participated at most ATCMs since the association was established in 1991. There, it has reported on the development of tourism and carefully advocated that its self-regulation achieved the objective of keeping impacts of tourism minor and transitory. Several IAATO rules have been fully or partly codified into instruments adopted by the ATCM.⁵⁸

58 On this see also eg Alvarez Ortega and Guggisberg (n 57).

3 Non-use Measures

As noted earlier, tourism is both a business and an activity; in the present context, use and non-use measures focus on regulating the tourism activity, primarily in Antarctica, rather than on regulating the business itself. Activity regulation involves some type of control on the basic elements that enable Antarctic tourism to exist as an industry, for example the means of transport of tourists, the activities offered to passengers and conducted by them, environmental regulation requirements, and in particular the selection of spaces where tourism requires additional regulations or cannot take place.

As used here in the context of Antarctic tourism, non-use measures refer to multi-scalar measures adopted by the ATCM and aimed to prevent – or limit if there are exceptions to a prohibition – interactions between tour operators/tourists and the sites or features that serve as potential tourism attractions, and which could be damaged or diminished through that interaction. This is achieved through the adoption of binding or non-binding instruments establishing conditions, restrictions or prohibitions on access, activity or behaviour. Non-use measures relevant to Antarctic tourism fall generally into two main categories: measures concerning access to certain spaces (3.1), and measures that address specific activities, behaviours, or ways of undertaking tourism (3.2). In both categories, the existing non-use measures are presented, before turning to alternative regulatory paths that have not been (fully) followed, at least so far. While not exhaustively examining each measure which could qualify as a non-use measure, this analysis intends to provide a comprehensive and representative overview of trends.

3.1 *Spatial Management*

3.1.1 Existing Measures

A range of spatial measures focus on restricting entry into certain areas, with some explicitly addressing tourism while others are more general in their scope of application. Most of these spatial management tools include non-use measures, in that some areas are off limit. The basic set of spatial management tools is provided for under Annex v of the Environmental Protocol on Area Protection and Management: they are Antarctic Specially Protected Areas (ASPAs), Antarctic Specially Managed Area (ASMAs), and Historic Sites and Monuments (HSMs) – some of which are the descendants of earlier spatial management tools.⁵⁹ These binding spatial management tools are complemented by

59 For an overview of these spatial management tools see R. M. Roura, “Spatial Protection Tools as Indicators of the ‘Health’ of the Antarctic Treaty System” (2023) 89 *The Geographical Journal* 25–39. Spatial management tools predating the adoption of Annex v

non-binding Visitor Site Guidelines (vsgs).⁶⁰ Of note is that area definition varies for these different tools: the boundaries of ASPAS and ASMAs are fully and precisely defined, including sometimes zones therein where certain activities are prohibited or restricted, with varying influence on visitation. In contrast, HSMs and vsgs are spatially identified by a single set of coordinates.⁶¹ The relation between these various spatial management tools has been likened to a ‘Russian doll’, where larger areas can contain smaller areas of different categories (see Table 15.2).⁶²

The spatial management tools envisioned in the Environmental Protocol, in particular ASPAS and ASMAs, are established by means of binding Measures which include Management Plans for each of the areas. These areas are chosen, respectively based on “outstanding environmental, scientific, historic,

TABLE 15.2 Basic Antarctic spatial protection and management tools

Category	Purpose and characteristics	Application to tourism
Antarctic Specially Protected Areas (ASPAs)	– Protect certain areas or values therein. – Entry is prohibited except under permit. – An ASPA may consist of single or multiple sites and include a marine component. – Zoning provisions may apply within the ASPA. – Legally binding (adopted by ATCM Measure). – Most ASPAs are ≈1–10 km².	– ASPAs are customarily off-limits to tourism. – However, some ASPAs contain protected historic sites for which permits for tourism visits can be issued, eg ASPA 157 <i>Backdoor Bay</i>, <i>Cape Royds</i> contains Shackleton’s ‘Nimrod’ hut.

included Specially Protected Areas (SPAs) and Special Sites of Scientific Interest (SSSIs). These were renamed ASPAs once Annex V entered into force in 2002. Following ATCM 46 (2024) there are 78 ASPAs (numbered 101–182), 6 ASMAs (numbered 1–7), and 91 HSMs (numbered 1–96).

60 At the closing of ATCM 46 (2024), there were 44 VSGs numbered 1–45 which had been previously adopted (ATCM, “Site Guidelines for Visitors” (2022) Resolution 2). The latest versions of the VSGs can be found on the Antarctic Treaty Secretariat website, available at <<https://www.ats.aq/devAS/Ats/VisitorSiteGuidelines?lang=e>> accessed 20 September 2024.

61 Although HSMs and VSGs are identified only as a point in the map, obviously visits to those locations occur in a discrete area around those coordinates.

62 Roura (n 59).

TABLE 15.2 Basic Antarctic spatial protection and management tools (*cont.*)

Category	Purpose and characteristics	Application to tourism
Antarctic Specially Managed Areas (ASMAs)	– Assist in the planning and co-ordination of activities, avoid possible conflicts, improve cooperation or minimise environmental impact. – Entry does not require a permit. – An ASMA may contain one or more ASPAs and historic sites and include a marine component. – Zoning provisions may apply within the ASMA. – Legally binding (adopted by ATCM Measure). – Current ASMAs range in size from $\approx 150\text{--}26,000\text{ km}^2$.	– Visitation to ASMAs is allowed, depending on their management plan. Coordination with ASMA managers may be required. – Within ASMAs, access to ASPAs and some specific zones may be restricted eg: – ASMA 2 <i>McMurdo Dry Valleys</i> is mostly off limits to tourism except a small ‘visitor zone’. – ASMA 4 <i>Deception Island</i> has four primary sites where tourism landings take place. Aside ASPAs and some restricted zones, tourism elsewhere in the ASMA is not explicitly prohibited. – ASMA 5 <i>Amundsen-Scott South Pole Station</i> is divided in operations, scientific, and restricted zones. The latter two are off limits to tourism. Visits must be coordinated with station authorities.
Historic Sites and Monuments (HSMs)	– Historic conservation: designated HSMs cannot be damaged, removed or destroyed. – An HSM may also be designated as an ASPA. – Legally binding (adopted by ATCM Measure).	– Visitation to HSMs is generally allowed. Entry or other uses may be prohibited, restricted or conditioned depending on the case. – While some HSMs are buildings or structures with ‘interior’ and ‘exterior’ parts (eg HSM 38 <i>Snow Hill Swedish hut</i>), others are not (eg HSM 82 <i>Monument to the Antarctic Treaty</i>). – Many HSMs are not currently subject of tourism uses as they are in locations that are remote, underwater, or currently unknown, eg respectively, HSM 4 <i>Pole of Inaccessibility station building</i>, HSM 93 <i>Wreck of ‘Endurance’</i>, and HSM 80 <i>Amundsen’s tent</i>.

TABLE 15.2 Basic Antarctic spatial protection and management tools (*cont.*)

Category	Purpose and characteristics	Application to tourism
Visitor Site Guidelines (VSGs)	– Manage tourism visits at some sensitive or frequently visited sites. – Non-binding (adopted by ATCM Resolution).	– Sites with listed VSGs can be used for tourism. Most VSGs were established as a reaction to ongoing visitation, ie at sites where tourism was already taking place. – VSGs may include informal zoning provisions establishing different modalities of use, eg VSG 6 <i>Hannah Point</i> has a landing area, a closed area, a guided walking area, and a free roaming area. – VSGs may be established for sites not covered by other spatial management tools, or be linked to certain ASPAs, ASMAs, HSMs, or a combination. This establishes different levels of protection to tourism use, eg – VSG 17 <i>Whalers Bay</i> includes HSM 71 <i>Whalers Bay</i> and is nested in ASMA 4 <i>Deception Island</i>. – VSG 21 <i>Cape Royds</i> relates to the above-mentioned ASPA 157 <i>Backdoor Bay, Cape Royds</i>, which contains HSM 15 <i>Shackleton's 'Nimrod' hut</i>. – VSGs may be modified in response to management changes, eg Torgersen Island within ASMA 7 was divided into a Restricted Zone and Visitor Zone to compare visitation effects on penguins at either side. The Visitor Zone was listed as VSG 26 <i>Torgersen Island</i> in 2010. Due to a steep decline in penguin populations (not necessarily linked to visitation) the entire island was designated a Restricted Zone in 2022, and VSG 26 was de-listed.^a

a ATCM, “Final Report of the Forty-fourth Antarctic Treaty Consultative Meeting” (2022), paras 88–89; Resolution 2 (2022) (n 60)

aesthetic or wilderness values, or any combination of those values, or ongoing or planned scientific research”⁶³ and in order “to assist in the planning and co-ordination of activities, avoid possible conflicts, improve cooperation between Parties or minimise environmental impacts”.⁶⁴

There are currently 78 ASPAs in place. Entry into ASPAs is prohibited, except if the competent national authority grants a permit.⁶⁵ Generally, tourism is not explicitly mentioned in ASPA management plans as an activity for which permits can be issued – such activities rather include compelling scientific research and essential management. However, the situation is different for ASPAs that include historic sites also protected by HSMS, such as the ‘Heroic Era’ huts in the Ross Sea region. In those instances, ASPAs have been established around pre-existing HSMS to provide additional protection to the immediate surroundings of the historic features and to the features themselves. For instance, the Management Plan for ASPA 155, where Scott’s *Terra Nova* hut is located, explicitly provides that tourism is one of the activities on the basis of which a permit can be issued, provided that it does not conflict with the ASPA’s objectives.⁶⁶ As to HSMS themselves, they do not qualify as non-use measures, as they can generally be visited, although they should not be “damaged, removed or destroyed”.⁶⁷ When located within an ASPA, some HSMS (essentially some of the historic huts) have management plans that condition how visits should be carried out, including some restrictions on, for example, total numbers of visitors annually or at any given time in the area and inside the hut, and what behaviour is allowed or not in and around them.

An analysis of pre-Environmental Protocol protected areas suggests that some of those areas were partly designated in response to frequent tourism to some research stations, and concerns that visitation by tourists could extend to nearby sensitive areas or interfere with long term scientific research.⁶⁸ More recently, some ASPAs might have been established, in part, to prevent or limit future tourism access to some areas. For instance, ASPA 177 *Léonie Islands, Ryder Bay, and south-east Adelaide Island*, a multi-site ASPA designated in 2021, is located near two year-round research stations but has not been visited much in the past. Several of the sites “are included within ASPA No. 177 to ensure conservation of the environmental values contained therein and therefore should

63 Environmental Protocol, Annex v, art 3(1).

64 *ibid* Annex v, art 4(1).

65 *ibid* Annex v, art 3(4).

66 ATCM, “Antarctic Specially Protected Area No 155 (Cape Evans, Ross Island): Revised Management Plan” (2021) Measure 13, 7(1).

67 Environmental Protocol, Annex v, art 8(4).

68 ATCM 29 (2006), WP18 (n 40).

be subject to as little human visitation and impact as possible [...] (although essential science should be permitted)".⁶⁹ The ASPA also protects "an area of aesthetically outstanding and largely unvisited wilderness". Although cruise tourism currently concentrates further north in the North-West Antarctic Peninsula, visitor landings have taken place in 22 sites in the Adelaide Island region between 2015–2016 and 2023–2024, with over 15,000 visitors in total.⁷⁰ Some 'visitable' sites were included within the ASPA before they turned into regular tourism landing sites, arguably to proactively protect them from tourism impacts. This and some earlier examples suggest that the ASPA tool, in addition to protecting specific sites for their intrinsic values, can purposefully be used to manage the number and location of tourism landings in certain parts of Antarctica.

ASMAS function differently, in that entry is allowed, except when provided otherwise in the management plan. There are currently six ASMAS. Some restrictions are applicable to tourism, in that zoning requirements may prevent access to certain areas, either to tourists or to most visitors. At the South Pole (ASMA 5 *Amundsen-Scott South Pole Station*), for example, tourists arriving in the area are not allowed within the base and can only camp at a certain distance from it. The ASMA also has a restricted 'clean' zone of about 20,000 km² adjacent to the station, established for scientific reasons, where no entry at all is allowed. ASMA 2 *McMurdo Dry Valleys* is off limits to tourist operations, except in one dedicated 'Visitor Zone', which is only accessible by helicopter. This visitor zone

is designated in order to manage visits by tourists or non-governmental expeditions to the Area within a defined area where the exceptional aesthetic and wilderness values of the McMurdo Dry Valleys can be appreciated at the same time as ensuring that potential impacts by tourist visits on other values present within the Area, particularly scientific and environmental values, are minimized.⁷¹

Another type of spatial management tool, this time specific to tourism and other recreational visits, are vsgs. Established by way of listing in a

69 ATCM, "Antarctic Specially Protected Area No 177 (Léonie Islands and South-East Adelaide Island, Antarctic Peninsula): Management Plan" (2021) Measure 20.

70 A list of Most Visited Sites can be found on the Antarctic Treaty Secretariat website, "Most visited sites", available at <<https://eies.ats.aq/Report/ShipBasedByMostVisitedSitesRpt?yearF=2022&yearT=2023&period=2&filter=1&title=Most%20Visited%20Sites>> accessed 20 September 2024.

71 ATCM, "Antarctic Specially Managed Area No 2 (McMurdo Dry Valleys, Southern Victoria Land): Revised Management Plan" (2015) Measure 18.

non-binding Resolution adopted by the ATCM,⁷² they describe how activities can be conducted in some of the most sensitive and/or frequently visited sites. VSGs may include zones with different uses such as landing areas, free roaming areas, guided walking areas, and closed areas. Many of the currently listed 44 VSGs include zones that are off limits because of the presence of sensitive features or for safety reasons. For example, at VSG 16 *Devil Island – Vega Island*, a vegetation patch located behind a penguin colony is closed to visitors to avoid disturbing wildlife and trampling the vegetation. Similarly, VSG 18 *Half-Moon Island* includes two closed areas where nesting, breeding or burrowing by different seabird species occurs. Furthermore, walking around one of these closed areas “is discouraged, given the restricted space available on the narrow beach, especially during high tide”. Some VSGs have also precautionary temporal restrictions or an upper limit on the number of visitors that can land daily, which de facto results in access restrictions to some sites within a 24-hour time frame. Most HSMS contained within ASPAs, described earlier, are also the subject of VSGs that summarise (or complement) spatial and behavioural requirements included in the ASPAs’ management plans.

Other non-entry zones include a prohibition of landing for tourists on new islands formed by geological processes in the Antarctic Treaty Area,⁷³ the prohibition to enter Antarctic research stations without permission,⁷⁴ as well as the requirement that a specific area in Mt. Erebus on Ross Island, which has been designated a tomb following a major aviation accident in 1979, be “left in peace”.⁷⁵ These ad hoc areas were established by the ATCM early on, even though tourism was not yet a major Antarctic activity.

3.1.2 Non-implemented Measures

In the 1970s, ATCPs considered to mostly close Antarctica to tourism by allowing landing only in Areas of Special Tourist Interest (ASTIs). Recommendation VIII–9 (1975) recommends that governments “request all organizers of tourist groups, except in an emergency, to: [...] (b) land only within the Areas of Special Tourist Interest listed or defined in Annex B to this Recommendation”. This Recommendation entered into force in 1982 and is still current. However,

72 First adopted in ATCM, “Site Guidelines for Visitors” (2005) Resolution 5, and revised at most ATCMs since. Resolution 2 (2022) (n 60) is the latest version of the list. Updated versions of each VSG can be found online (n 60).

73 Recommendation VI–11 (1970) (n 3).

74 ATCM, “Statement of Accepted Practices in Tourism” (1975) Recommendation VIII–9.

75 ATCM, “Mount Erebus Declared a Tomb” (1981) Recommendation XI–3. Most of the 257 victims were tourists in a no-landing sightseeing overflight.

no action was taken at the following two ATCMs to list such sites in Annex B.⁷⁶ In 1981, Argentina submitted a draft for Annex B with a list of nine ASTIS,⁷⁷ but several Parties questioned the ASTI approach, planning instead to further study the issue and reconsider it at the following ATCM.⁷⁸ In reality, there were no further discussions of ASTIS for over two decades. Indeed, it appears that several Parties might have reconsidered the restrictive nature of ASTIS, making clear instead that:

tourism was one of the legitimate uses of Antarctica and that the relevant regulations should tend to harmonize this use with other peaceful activities in Antarctica, in particular the scientific activities and that they should also tend to assure the compatibility of touristic activities with the need to protect the environment of Antarctica.⁷⁹

The idea of ASTIS was promoted anew by France in 2005 and 2006⁸⁰ – and rejected again. According to France's proposal in 2006, these areas could serve to avoid usage conflicts as tourism can impact scientific research, to limit the impact of this activity on the environment, as well as to enable the study of cumulative environmental impacts of tourism on Antarctica.⁸¹ Several delegations, however, expressed concerns about this approach: some did not think that additional rules were needed, considering even that “the development of specialist tourist sites could be regarded as exploitation rather than preservation” and another delegation worried that ASTIS could lead to permanent land-based infrastructure.⁸²

The implementation of ASTIS, instead of stopping certain kinds of operations, would have restricted access to all regions of Antarctica except those contained in the list of designated areas. In a way, it would have reversed the approach currently in place under Annex v of the Environmental Protocol,

76 See ATCM, “Report of the Ninth Consultative Meeting” (1977), para 12. At ATCM 10 (1979), Recommendation x–8, entitled “Tourist Regulation” and which includes a “Statement of Accepted Practices and the Relevant Provisions of the Antarctic Treaty” to be inserted in Annex A of Recommendation VIII–9, was adopted, but nothing happened in relation to Annex B.

77 Argentina, *Areas of special tourist interest*, ATCM 11 (1981), WP27.

78 ATCM, “Report of the Eleventh Consultative Meeting” (1981), para 16.

79 ATCM, “Final Report of the Thirteenth Antarctic Treaty Consultative Meeting” (1985), para 70.

80 See France, *Consolidation of Regulations on Tourism and Non-Governmental Activities in Antarctica*, ATCM 28 (2005), IP12; ATCM 29 (2006), WP18 (n 40).

81 ATCM 29 (2006), WP18 (n 40).

82 ATCM, “Final Report of the Twenty-ninth Antarctic Treaty Consultative Meeting” (2006), para 174.

according to which access is in principle allowed everywhere, except in some areas with a special status. Instead of implementing ASTIS, the ATCM chose VSGs as an alternative option, even if they are non-binding, only cover a fraction of the most visited sites (which increase in number faster than VSGs are developed and agreed),⁸³ and keep the status quo that all of Antarctica is in principle open to tourism,⁸⁴ except if an explicit measure provides otherwise.

Recently, the Netherlands and other co-sponsors presented a working paper entitled “Urgent measures to be taken with respect to certain tourist and non-governmental activities”.⁸⁵ One of the four proposed measures was that governments require operators not to “land [...] in sites that are not covered by ATCM or IAATO site-specific guidelines and/or ATCM management plans and/or visits to sites that have never been visited by tourists or other non-governmental activities”. While this measure was not adopted, it would have functioned in a comparable way to ASTIS. Indeed, landing would only have been allowed in sites that are positively identified as previously visited and therefore as ‘open for visits’.

3.2 *Activities or Action-Focused*

3.2.1 Existing Measures

Other non-use measures of relevance here prohibit certain courses of action or activities, often regardless of their location in the Antarctic Treaty Area. While a few of them are focused on tourism, especially in the form of VSGs or general tourism guidelines (a predecessor of VSGs, with rules that are not site specific) preceded by the “Do not use [...]” or “Do not [...]” instructions,⁸⁶ many are general and only partially or tangentially apply to tourism activities. Overall, these measures can be categorised according to what they aim to protect, in particular the environment, historic sites and monuments, science, wilderness, and human life or health and safety.

83 As of July 2024, the Antarctic Treaty Secretariat listed 486 sites that have been visited in the past five years by sea, including 44 sites for which there are site guidelines. The list includes some relatively large areas used for cruising (eg the Lemaire Channel) as well as discrete sites where landings take place. At least 40 locations in the Antarctic interior have been visited in the past five years.

84 Most of Antarctica is naturally inaccessible or exceedingly remote, at present, for regular, non-specialised tourism. However, these factors are not insurmountable barriers for individuals and entities with suitable skills or resources. In this sense, most of Antarctica is theoretically open for visitation.

85 France and Netherlands, *Urgent Measures to Be Taken with Respect to Certain Tourist and Non-governmental Activities*, ATCM 45 (2023), WP19.

86 See eg ATCM, “General Guidelines and Site Guidelines Checklist for Visitors to the Antarctic” (2021) Resolution 4, or its gender-neutral update ATCM, “General Guidelines for Visitors to the Antarctic” (2024) Resolution 2; and earlier versions in ATCM, “Guidelines for Tourism” (1994) Recommendation XVIII-1, and Recommendation X-8 (1979) (n 76).

A first group of non-use measures is intended to support environmental protection. Measures of a general applicability prohibit the introduction of certain substances into the Antarctic Treaty Area and hence the additive use of that space. According to the Environmental Protocol's Annexes III and IV, products such as non-sterile soils shall not be introduced into the environment,⁸⁷ oil or oily mixture and noxious liquid substances shall not be discharged into the sea,⁸⁸ and plastics or other garbage shall not be disposed of into the sea.⁸⁹ More detailed and additional rules include the prohibition of littering on land, open burning, and smoking except in designated areas.⁹⁰ Then, the protection of wildlife is at the centre of further non-use measures, such as the prohibition to take or harmfully interfere with wildlife, to feed wildlife, or introduce any plant or animals into the Antarctic;⁹¹ and the establishment of rest periods, ie closed times, in certain sites subject to vsgs, for wildlife.⁹² Finally, a range of environmental non-use measures prohibits the use of certain vehicles (helicopters and drones in particular) in areas with concentrations of wildlife.⁹³ Use of helicopters in such areas is only forbidden for recreational purposes.⁹⁴ Interestingly, this recently-adopted prohibition requires operators to discontinue activities that had previously been permitted, approved or at least tolerated.

A second group of non-use measures focuses on historic sites and monuments. Historic huts and structures shall generally not be used, except, in some instances, for touristic, recreational and educational purposes⁹⁵ – hence making tourism an exception to the non-use measures. However, visitors shall not damage, remove, destroy or change a historic site, monument, or artefact. Items of potential historical value shall not be touched or disturbed.⁹⁶ Some vsgs include specific prohibitions as to how historic sites and monuments can

87 Environmental Protocol, Annex III, art 7.

88 *ibid* Annex IV, arts 3–4.

89 *ibid* Annex IV, art 5.

90 See in particular Resolution 4 (2021) (n 86) Annex 1; Recommendation XVIII–1 (1994) (n 86) Attachment.

91 Resolution 4 (2021) (n 86) Annex 1; Recommendation XVIII–1 (1994) (n 86) Attachment; see also Recommendation X–8 (1979) (n 76) Attachment.

92 See eg Resolution 5 (2012) (n 42) and vsg 13 *Brown Bluff* (first adopted in ATCM, “Site Guidelines for Visitors” (2007) Resolution 1, with updated version online (n 60)).

93 ATCM, “Urgent Measures to Be Taken with Respect to Certain Tourist and Non-governmental Activities” (2023) Resolution 4; Resolution 4 (2021) (n 86) Annex 1; Resolution 4 (2018) (n 57).

94 Resolution 4 (2023) (n 93).

95 Resolution 4 (2021) (n 86) Annex 1.

96 Recommendation XVIII–1 (1994) (n 86) Attachment.

be visited, such as no sitting on chairs or furniture, no overnight stays – indeed, the original purpose of those features that are now protected by non-use measures.⁹⁷ Of note is that designated HSMS are only a fraction of Antarctic heritage, the rest either not yet discovered or found – but still subject to interim protection⁹⁸ – or in a limbo between waste and historic feature.

A third group of non-use measures aims at ensuring that science is not negatively affected by visitation, including tourism. It is prohibited that visitors interfere with or remove scientific equipment or markers, or disturb experimental study sites, field camps, or stored supplies.⁹⁹ Visitors are also to avoid sites of special scientific interest – initially one of several early spatial management tools, now subsumed into ASPAS.¹⁰⁰ Finally, certain VSGs prohibit disembarkation during certain times, when staff of National Antarctic Programs (NAPS) are at work in the area.¹⁰¹

A final group of non-use measures can be characterised as contributing to the continued wilderness value of Antarctica – but is also related to environmental protection. Landings are not allowed from vessels with more than 500 passengers on board,¹⁰² as are any off-ship activities,¹⁰³ such as inflatable boat excursions or kayaking. It is also prohibited to paint, engrave names or make other graffiti on any surface in Antarctica, and one is not allowed to take souvenirs of any kind.¹⁰⁴ Finally, since 2022, it is not permitted to build any permanent structure or facility exclusively for tourism, such as a hotel.¹⁰⁵

Although the ATCM has agreed on measures directly related to human health and safety that apply to the conduct of tourism (eg Measure 4 (2005) on insurance and contingency plans, which is not yet effective), most of their provisions are more requirements that should be met – for instance provisions for insurance and contingency plans – than non-use measures. However, some of the non-use measures discussed above include a health and safety component. For instance, the requirement not to land passengers from ships carrying

97 VSG 24 *Horseshoe Island* (first adopted in ATCM, “Site Guidelines for Visitors” (2009) Resolution 4, with updated version online (n 60)).

98 ATCM, “Guidelines for handling pre-1958 historic remains” (2001) Resolution 5.

99 Resolution 4 (2021) (n 86) Annex 1; Recommendation XVIII-1 (1994) (n 86) Attachment.

100 Recommendation X-8 (1979) (n 76) Attachment.

101 See eg VSG 14 *Snow Hill Hut* (first adopted in ATCM, “Site Guidelines for Visitors” (2007) Resolution 1, with updated version online (n 60)).

102 Resolution 4 (2021) (n 86) Annex 1; ATCM, “Landing of Persons from Passenger Vessels” (2009) Measure 15 (not yet in force); ATCM, “Ship-based Tourism” (2007) Resolution 4.

103 Resolution 4 (2023) (n 93).

104 Resolution 4 (2021) (n 86) Annex 1; Recommendation XVIII-1 (1994) (n 86) Attachment.

105 ATCM, “Permanent Facilities for Tourism and Other Non-governmental Activities in Antarctica” (2022) Resolution 5.

more than 500 passengers contributes to safer operations as larger vessels tend to have a low ice-class category.

3.2.2 Insufficient and/or Unadopted Measures

Some of the above-mentioned measures appear to be compromise solutions – or, perhaps, first steps towards stricter measures – which leave the potential issues caused by Antarctic tourism partially unaddressed. A stark illustration of this is related to the regulation of tourism (semi-)permanent infrastructure, such as hotel accommodation or airline terminals.

In 2004, the question of land-based tourism, including the issue of permanent and semi-permanent infrastructure, was brought up at the ATCM. The concerns raised

included environmental impacts, protection of wilderness values and consistency with Antarctica's designation as a 'natural reserve devoted to peace and science', possible jurisdictional issues, the assertion of private property rights, and the possible assertion of rights of usufructuary benefits through regular permitting.¹⁰⁶

The following year, Australia, promoting further regulation of tourism infrastructure to protect the intrinsic values of Antarctica, proposed a new Measure, according to which:

Parties shall not authorise the development of any new permanent or semi-permanent infrastructure for the conduct or support of tourism or other non-government activities in Antarctica.

Further, if tourism or other non-government activities are conducted in a way which is inconsistent with principles of the Protocol, then those activities shall be modified, suspended or cancelled.¹⁰⁷

When Australia's working paper was presented to the ATCM, it was acknowledged "that tourism was not a prohibited activity in Antarctica, but that the issue of land-based tourism involving permanent infrastructure in the Antarctic needed to be addressed".¹⁰⁸ However, some countries were opposed to the adoption of new regulation and some favoured the option of controlling those

¹⁰⁶ ATCM, "Final Report of the Twenty-Seventh Antarctic Treaty Consultative Meeting" (2004), para 195; see also New Zealand, *'Land-Based' Tourism in Antarctica*, ATCM 28 (2005), WP12.

¹⁰⁷ Australia, *Protection of Antarctica's Intrinsic Values: Policy on Non-governmental Activities*, ATCM 28 (2005), WP38.

¹⁰⁸ ATCM, "Final Report of the Twenty-Eighth Antarctic Treaty Consultative Meeting" (2005), para 169; see also ATCM 28 (2005), WP38 (n 107).

activities through existing tools such as EIAs.¹⁰⁹ At the next ATCM, in 2006, discussions continued but no conclusion was reached and no instrument was adopted.¹¹⁰

Land-based tourism did not disappear from the agenda. In 2007, Resolution 5 (2007) *Long-term effects of tourism* was adopted. This Resolution expresses concerns about the effects of land-based tourism facilities developments, even if somewhat obliquely without naming them.¹¹¹ Some new semi-permanent tourism camps had by then been established in Antarctica, with the implicit or explicit approval of national competent authorities.¹¹²

Fast forward to 2022, the debate about (semi-)permanent tourism infrastructure was back on the agenda, with long discussions about the definitions of permanent facilities and very similar concerns being raised.¹¹³ Resolution 5 (2022) was finally adopted, and reads:

Recommend that their Governments make every effort to prevent, and not authorise, permit or approve, the construction and/or exploitation of any structure or facility exclusively for tourism and other non-governmental activities to be operated in Antarctica over multiple seasons, where its construction, operations or removal is expected to have more than a minor or transitory impact on the Antarctic environment and its dependent and associated ecosystems, or the intrinsic natural wilderness and historical values of Antarctica. Examples include, but are not restricted to, buildings, wharves and jetties, and graded runways on exposed ground.¹¹⁴

While this measure was a major step forward, and work on the issue continues, it also quickly became evident that confining the prohibition to structures

109 Final Report ATCM (2005) (n 108) paras 170–171.

110 ATCM, “Final Report of the Twenty-ninth Antarctic Treaty Consultative Meeting” (2006), paras 161–172. Non-governmental environmental organizations present at the ATCM 29 suggested that the US had blocked agreement (ECO, “US blocks tourism agreement” (2006), available at <<https://www.asoc.org/wp-content/uploads/2021/12/ATCM-Volume-XXIX-Number-5.pdf>> accessed 20 September 2024).

111 ATCM, “Long-term Effects of Tourism” (2007) Resolution 5.

112 The documentary record suggests that some semi-permanent camps have been in operation since 2006, reportedly permitted by a relevant national competent authority. However, the earliest EIA available for these operations appears to have been submitted in 2013 (White Desert LTD, “White Desert Initial Environmental Evaluation (IEE) Update Report 2020” (2020), in ATS, “EIA Database”, available at <<https://www.ats.aq/devAS/EP/EIAList?lang=e>> accessed 20 September 2024).

113 Netherlands, *Report of the Intersessional Contact Group on Permanent Facilities for Tourism and Other Non-Governmental Activities in Antarctica*, ATCM 44 (2022), WP36.

114 Resolution 5 (2022) (n 105).

“exclusively for tourism and other non-governmental activities” is largely insufficient. In particular, it does not address the larger question of infrastructure *supporting* tourism.¹¹⁵ As part of its work, an Intersessional Contact Group on permanent facilities for tourism developed an “inventory of existing permanent and semi-permanent infrastructure currently used or co-used for tourism and other non-governmental activities”.¹¹⁶ In that process, it was noted that “there is often a mix of governmental and NGO [sic] activities, which may hinder governance responses”.¹¹⁷ The proposal for a new Resolution, in 2023, aiming to address some of these co-uses was unsuccessful. The interconnection between NAPs and tourist operators using the same infrastructure might explain the limited progress in regulation.¹¹⁸

Another group of measures that would have contributed to protecting the wilderness value of Antarctica – as well as the environment – was proposed by France and the Netherlands in 2023, partly unsuccessfully. Indeed, they brought forward four ‘no regret’ measures that would have called Parties to discourage:

- overnight camping in the top-20 most visited sites;
- any off-ship activities in Antarctica from vessels carrying more than 500 passengers (additionally to the landing prohibition of Measure 15 (2009)), to ensure these activities are real ‘cruise only’ activities;
- helicopter or any other motorized land vehicle use for tourism and other non-governmental activities, except in case of emergencies and for the purpose of enhancing human safety;
- site visits that are not covered by ATCM or IAATO site-specific guidelines and/or ATCM management plans and/or visits to sites that have never been visited by tourists or other non-governmental activities.¹¹⁹

While the second measure was adopted with different wording but an equivalent level of restriction and the third was watered down to a prohibition applicable in areas with concentrations of wildlife,¹²⁰ the other two were simply put aside.

115 Netherlands, *Infrastructure Supporting Tourism and Other Non-governmental Activities in Antarctica*, ATCM 45 (2023), WP4.

116 *ibid.*

117 *ibid.*

118 See eg ASOC, *Tourism and the Growth of Air-cruising in the Antarctic Peninsula*, ATCM 46 (2024), IP150, highlighting different ways in which the use of a landing strip managed by a NAP is interconnected with an expanding fly-sail operation in the Antarctic Peninsula.

119 ATCM 45 (2023), WP19 (n 85).

120 Resolution 4 (2023) (n 93).

3.3 *Analysis*

3.3.1 Limited Non-use Measures Specifically for Tourism

Measures applicable to tourism are either specifically aimed at that activity or have a larger scope of applicability and are partially or tangentially relevant to tourism. The first category includes many of the measures that limit specific activities or actions, as these rules regulate how tourism is supposed to take place – and reversely which tourism behaviours are off-limit in Antarctica. The vsgs are also tourism-focused. While the ‘Do/Do not measures’ might be said to be among the more restrictive measures in place in terms of preventing certain kinds of visitor interactions (including tourists), vsgs are still, to a large extent, a ‘user guide’ for certain Antarctic sites showcasing both *what* to visit and *how* to minimise impacts during the visit. As part of this, vsgs may contain some limited elements of non-use measures, which vary from site to site.

These tourism-focused measures are often very specific and discrete – and could be described as piece-meal.¹²¹ They are, in many cases, also heavily qualified and found in non-binding instruments, ie Resolutions, which only have a hortatory nature. The two Measures that focus on tourism and could be binding are not yet in force – and only Measure 15 (2009) includes a non-use measure related to the prohibition of landing from vessels carrying more than 500 passengers. Resolutions relevant to tourism often include words such as “[r]ecommend that their Governments make every effort”,¹²² or, in the case of non-use measures included in the Annex to a Resolution,

Recommend to their Governments that:

1. They *circulate widely and as quickly as possible* the Guidance for Visitors to the Antarctic, and the Guidance for Those Organising and Conducting Tourism and Non-governmental Activities in the Antarctic annexed to this Recommendation.
2. They *urge those intending to visit or organise and conduct* tourism and non-governmental activities in the Antarctic to act in accordance with the attached guidance consistent with the relevant provisions of their applicable national law.¹²³

The second category, regulations that are not specific to tourism but applicable nonetheless to these activities, covers spatial management tools such as ASPAS and ASMAs. These include major non-use components as they create some

¹²¹ Bastmeijer et al (n 4) 657.

¹²² Resolution 5 (2022) (n 105).

¹²³ Recommendation XVIII-1 (1994) (n 86) (emphasis added).

non-entry areas and zones. However, these measures have a limited scope, as a whole: in general terms, for instance, a recent assessment suggests that “the footprint of tourism in the Antarctic Peninsula is currently much larger than the area protected in ASPAs, and this footprint is increasing”.¹²⁴ The other group of measures relevant here are the environmental restrictions found in the Environmental Protocol’s Annexes, in particular the prohibitions on introduction and discharge of certain substances into the Antarctic. The non-use measures in this second category have, in many cases, binding force as they are found in a treaty or in Measures. Hence, the stronger measures applicable to tourism generally seem to be successfully adopted when tourism restrictions are a secondary effect of regulation developed for other reasons.

Overall, the non-use measures in place act more as basic management measures to restrict certain negative interactions between tourists and Antarctica than as measures aiming to comprehensively limit tourism, its growth and/or diversification. Generally speaking, non-use measures directly targeting tourism on a more regional scale, such as ASTIs or the early 2000s proposal relative to infrastructure, have not succeeded. What has sometimes been achieved are compromise solutions, often related to (perceived) acute problems. This issue is not limited to non-use measures but applies to the regulation of Antarctic tourism in general: of the outstanding questions related to growth and diversification already identified in 2011–2012, many have indeed not been addressed by any instruments, whether they include non-use measures or not.¹²⁵

3.3.2 Reasons for this State of Play

The minimal regulation of Antarctic tourism at the ATS level, whether through restricted-use or non-use measures, is due to a range of factors. Underlying them, though, is the polarisation of ATCPs, between those that support tourism and prefer to delegate tourism management to the industry, and those that would support tourism regulation and more oversight from Parties. These

¹²⁴ ASOC, *Developing a Systematic Approach to Addressing the Footprint of Tourism*, ATCM 46 (2024), 1P152. A preliminary study, based on the methodology of L. R. Perterra et al (“High Resolution Spatial Mapping of Human Footprint across Antarctica and Its Implications for the Strategic Conservation of Avifauna” (2017) 12 *PLOS ONE*), suggests that the area of ‘moderate’ tourism influence in the Antarctic Peninsula (4,083 km²) is more than three times larger than the area protected within ASPAs in that region (1,266 km²). Beyond tourism, “Antarctic biodiversity is poorly protected by reserves, and those reserves are threatened” (J. D. Shaw et al, “Antarctica’s Protected Areas Are Inadequate, Unrepresentative, and at Risk” (2014) 12(6) *PLOS Biology* e1001888).

¹²⁵ See Bastmeijer et al (n 4); Netherlands, *Report of the Intersessional Contact Group ‘Outstanding Questions’ on Antarctic Tourism*, ATCM 35 (2012), WP27 rev1.

groups are not able to reach consensus on tourism regulation and the outcome is that tourism management measures are not adopted, or at least not those that contain strict and binding measures.

In all, two broad narratives about Antarctic tourism have commonly been at play at ATCMs and beyond. For some Parties, tourism is sustainable, whilst other Parties have regarded it as a resource activity and as an intrusive force in wilderness areas. The following exchange from the Final Report of ATCM 32 (2009) illustrates this point: during a tourism discussion, some Parties stated that, “when properly managed, tourism in Antarctica should be welcomed”, while also noting the need for tourism to meet some conditions such as minimise environmental impact, maximise the safety of operations and avoid interfering with science.¹²⁶ Some other Parties, responding to that statement, retorted that “the absolute priority of the Treaty is Antarctic scientific research and environmental protection and that tourism should not be encouraged but rather strictly regulated”.¹²⁷ While the acceptability of tourism in Antarctica is not presently much questioned, this basic positioning underlies Parties’ views on tourism policy, ie whether existing tourism regulation itself is sufficient to manage the current levels and types of tourism, and whether Parties should support soft measures such as guidelines/user guides or hard restrictive regulations.

According to the procedural rules in place at ATCMs, any proposal for a regulatory instrument needs consensus to be adopted. This means that, if any ATCP objects to a proposal, it fails. The existing degree of polarisation about tourism and the type of solution that might be required makes it very difficult to reach this high bar. So, while tourism developments in Antarctica trigger the inclusion of many tourism-related issues in the ATCM agenda, only a fraction of those issues emerge as actual instrument. Beyond the polarisation of views regarding tourism’s place in Antarctica, the reasons for lack of consensus have been said to also include concerns about how to fit new requirements into domestic implementing legislation, issues related to sovereignty claims, or other international relations tensions that weigh on the traditional spirit of cooperation in Antarctica.¹²⁸

Another related factor in the arguably under-regulated state of Antarctic tourism at the intergovernmental level is the role of IAAATO. Although not directly involved in decision-making, the tourism industry has become an influential

126 ATCM, “Final Report of the Thirty-second Antarctic Treaty Consultative Meeting” (2009), para 182, as quoted in Roura (n 27) 11.

127 Final Report ATCM (2009) (n 126) para 183.

128 *ibid* para 223.

participant in Antarctic governance discussions, with representatives in its own delegation as well as in some powerful national delegations. IAATO has from earlier on been praised as “a model of self-regulation”, for example by the United Kingdom.¹²⁹ In many ways, support for self-regulation has had the effect of slowing down the impetus for States to regulate this activity. While IAATO might have reasons for self-regulation that parallel the rationales for regulation within the ATS, such as human safety and environmental protection, its regulatory actions also consider its role as an industry association. There are indeed topics that IAATO has always stayed clear from, such as limiting numbers of overall visitors to Antarctica. This is problematic as some Parties view IAATO industry rules as a functioning alternative to intergovernmental measures. In light of the required consensus at the ATCM, only one ATCP needs to hold such opinion for the status quo to remain.

The nature of Antarctic tourism is arguably an additional factor. The ATCM regards tourism as a non-governmental activity, distinct from those of NAPs. This is evidenced in the traditional use of ‘tourism and non-governmental activities’ in agenda items, tourism instruments, and working groups. However, there is a degree of cross-pollination both ways, for instance with respect to air-supported tourism, which relies on NAP infrastructure,¹³⁰ logistic support to NAP activities by the tourism industry, and a reported increase in scientific activities on board tourist vessels.¹³¹ Coupled to the factors listed above, these complex interactions might create further obstacles to the regulation of tourism.

4 Conclusion

The various measures applicable to Antarctic tourism fall somewhere in a continuum between limited forms of restricted-use and non-use – with an emphasis on the former. Indeed, most tourism activities are allowed almost everywhere in Antarctica, under some conditions, with a discrete number of

129 United Kingdom, *Antarctica Tour Operators Form Association*, ATCM 16 (1991), IP20.

130 See eg ASOC, *Implementing the Madrid Protocol: A Case Study of Fildes Peninsula, King George Island*, ATCM 30 (2007), IP136; ASOC, *Tourism and the Growth of Air-cruising in the Antarctic Peninsula*, ATCM 46 (2024), IP150 (air-cruise tourism); Norway, *The 2009 Norwegian Antarctic Inspection Under Article VII of the Antarctic Treaty*, ATCM 33 (2010), WP57; and Russian Federation, *Activity of the International Air Program DROMLAN and its Interaction with Non-governmental Activity in the Antarctic*, ATCM 35 (2012), IP72 (air-supported land-based non-governmental activity).

131 Spain, *Scientific Activities On-board Tourist Vessels*, ATCM 46 (2024), WP33.

restrictions or prohibitions influencing access to some sites and some forms of activity and behaviour. Most measures that have been adopted could be characterised as conditions to engage in Antarctic tourism activities. Arguably, these rules do not restrict Antarctic tourism initiatives in a significant manner. Existing non-use measures are generally limited first to a low number of small areas, such as protected areas that are off limits to visitors or subzones or no-go areas within a site that is otherwise largely open for visitors; and second to a series of activity and behavioural requirements, some of which apply to all areas, and some of which are site-specific. Polarisation of views as to why and how to regulate tourism in Antarctica, the procedural requirement of consensus, and the double-edged sword of self-regulation by IAATO, among other factors, all contribute not only to the limited quantity – and scope of applicability – of non-use measures for the regulation of tourism in Antarctica, but also, more generally, to the unsatisfactory performance of ATCPs in governing this activity.

While there has been, over time, an accumulation of instruments establishing conditions to tourism use that could potentially result in a certain ‘bite’ on tourism operations, the regime in place is not yet the comprehensive and consistent framework for Antarctic tourism that was already called for in Resolution 7 (2009) *General Principles of Antarctic Tourism*. However, the tide may be turning. Resolution 4 (2023) *Urgent measures to be taken with respect to certain tourist and non-governmental activities* requires operators to discontinue activities that had previously been permitted, approved, or at least accepted/tolerated, ie any off-ship activities in Antarctica from vessels carrying more than 500 passengers to clarify the purpose of Measure 15 (2009); and the use of helicopters for recreational purposes in areas with concentrations of wildlife. Of note, however, is that the two other measures of the original proposal rolling back some further tourism activities, arguably the stricter ones – visits to ‘new’ tourist sites, and overnight camping at some locations – were unable to secure consensus. The Resolution then recommends Parties to engage in further discussions on these and other specific actions in the context of future discussions regarding tourism.

In Decision 6 (2023), the ATCM agreed to start a “Dedicated process for the development of a comprehensive and consistent framework for Antarctic tourism and other non-governmental activities”, and did so the following year. Considering the significant growth of tourism numbers in the recent years and the risks caused by the introduction or spreading of pathogens such as the avian flu, one can hope that the ATCM will, at long last, provide a much-needed intergovernmental framework to limit the negative impacts of tourism on Antarctica. At ATCM 46 in 2024, about a third of ATCPs (11 out of 29) submitted working

papers outlining their position on this issue (whether individually or jointly) and the way forward. Those papers can be neatly aligned along a continuum, having at one end those supporting a series of additional instruments, perhaps leading to a Convention on the regulation of Antarctic tourism or comparable high-level instrument, and at the other end those proposing instead alternative solutions of lower stringency, including an improvement of vsgs.

Discussions during ATCM 46 (2024) led to the adoption of a Decision in which Parties agree to initiate a dedicated process for the regulation of Antarctic tourism.¹³² Although non-binding, the Decision is a step further than the 2023 Resolution: rather than encouraging future consideration of this issue, it outlines a way forward. The Annex to the Decision covers six different thematic areas for consideration by Parties in the coming years: (1) managing growth, (2) managing diversification, (3) monitoring, (4) compliance and enforcement, (5) governance, and (6) general topics. Each of these themes includes several items for discussion, adding up to 46 ‘bullet points’ for the consideration of Parties. Non-use measures along the lines of the categories discussed in this chapter – namely area- or activity-focused – could be used to address some of these topics, particularly with respect to the growth or diversification of tourism. However, many of the same topics have been discussed in previous ATCMs, so it remains to be seen whether discussions will be circular and repetitive, as they have been in the past, or result in concrete regulatory action. The main difference is that, this time, there is a clearly stated intent by Parties to develop a dedicated framework for the regulation of tourism, and each of the points for discussion fits in that broader context rather than simply being an isolated agenda item.

As a final consideration, it is also useful to recall that Antarctica and climate change are closely interlinked. The discussions on a dedicated framework will take place at a time in which climate change permeates many other discussions in the ATS and elsewhere. While it is unlikely to be a deciding factor, the scrutiny of tourism under a climate change perspective, globally but also including in Antarctica, is likely to increase in the future – even though it is not at the time of writing listed as a topic of discussion in the 46 bullet points of the dedicated framework.

¹³² ATCM, “Development of a Framework for the Regulation of Tourism and Other Non-governmental Activities in Antarctica” (2024) Decision 5.

PART 5

The Atmosphere and the Outer Space



Solar Geoengineering as a Case-Study of Use, Non-use, and (Research) Governance

Jeroen Oomen

1 Introduction: a Polarising Climate

On the 23rd of February 2023, a group of climate scientists published an open letter calling for “research on reflecting sunlight to reduce the risks of climate change”.¹ “Climate change”, the letter opened, “is causing devastating impacts on communities and ecosystems around the world, posing grave threats to public health, economic security, and global stability”. Even more menacingly, “natural systems are approaching thresholds for catastrophic changes with the potential to accelerate climate change and impacts beyond humans’ ability to adapt”. The threat climate change poses to the future is now so severe that even if stringent carbon mitigation measures materialise in the coming years, catastrophic consequences cannot be ruled out, as even “1.5–2°C of warming brings with it significant risks to human, ecological, and global economic systems”. It might cause the crossing “of the threshold of Earth system ‘tipping points’”, leading to irreversible and highly dangerous changes in the planetary system. Given these severe threats, the letter’s authors argue, scientists need to research the potential of solar radiation modification (SRM), a controversial set of potential approaches aiming to increase the reflectivity of the Earth, also known as solar geoengineering. Today, over 110 climate scientists have signed the letter. Implicitly, the letter said: conventional mitigation may now be out of reach, geophysically and/or politically, so it is time to look for more options.

At first glance, such a call for more research is unsurprising and unproblematic. After all, scientific interest in any technology that may alleviate the worst effects of climate change is to be applauded. According to the authors of the letter, SRM holds precisely that promise. It might “slow warming and reduce climate impacts”. Yet, at the same time, this call for SRM research is more than a simple story of scientists responding to an urgent political and climatic need.

1 Climate Intervention Research Letter, “An open letter regarding research on reflecting sunlight to reduce the risks of climate change” (23 February 2023), available at <<https://climate-intervention-research-letter.org/>> accessed 21 June 2024.

It was also the result of scientific polarisation, political fear, and a complex struggle over whose visions of the future will prevail in climate politics. Above all, it raises questions about how to govern climate change and whose voices matter most.

The open letter was the latest round in an on-going debate over SRM. Its authors wrote it as an explicit response to a similar letter warning against the normalisation of SRM research published a year earlier. In a perspectives article published in the scientific journal *WIREs Climate Change* – “Solar Geoengineering: The Case for a Non-use Agreement” – 16 academics had argued that solar geoengineering presents unacceptable geophysical, ecological, and political risks.² In the piece, they proposed an international agreement not to use SRM, the restriction of government funding for SRM research, a limitation of SRM support and assessment in the Intergovernmental Panel on Climate Change (IPCC), and a prohibition of patents for SRM technologies. Furthermore, they also sought to limit experimental scientific research, going as far as to call for a ban on outdoor experimentation in countries that would sign the agreement. Instead of viewing solar geoengineering as a necessary complementary approach to climate change, these authors saw even ‘research’ into these technologies as a major risk.

This debate whether SRM ought to be researched more widely – or whether its research ought to be banned or defunded – has raged for nearly two decades, although it has older roots. In recent years, however, simmering tensions within the research field have resurfaced, as increasing fears about anthropogenic climate change are propelling SRM towards the scientific and political mainstream. SRM’s imminent public arrival on the geopolitical agenda raises complex governance questions. This is a technology that purports to have the ability to influence the climate on a global scale, the potential to cool the Earth as a whole. Clearly, such an undertaking would be fraught with political, bio-ecological, and geophysical risks.

This chapter is a case-study of the emerging debate on the proposed Non-use Agreement for Solar Geoengineering (non-use agreement or NUA). I write it not from the perspective of a neutral analyst, but as one who has been intimately involved with the controversy: I was one of the lead authors on the call for a non-use agreement. As such, this chapter is a personal-academic

2 F. Biermann et al, “Solar Geoengineering: The Case for an International Non-Use Agreement” (2022) 13(3) *Wiley Interdisciplinary Reviews: Climate Change* e754. On their website, they invited academics and non-governmental organisations (NGOs) to support these measures. By early 2024, their open letter was signed by over 470 academics, including key IPCC authors and climate scientists.

reflection on the proposed non-use agreement for SRM, on why it matters, and on how it connects to other non-use proposals. In this chapter, I will address the question of a non-use agreement for SRM by drawing on – and at points deviating from – Guggisberg’s definition and typology of use and non-use of resources.³ In her contribution, Guggisberg defines resource non-use as “as the absence of “use” of natural resources or spatial-extension resources”. SRM complicates this definition, as it complicates the debate on what to define as the resource. Clearly, there is some difference between the application of ‘use’ in legal debates on resources and the debate on the use of SRM as a proposed ‘technology’. Nonetheless, there is merit to this complication, as it brings into view the difficulty of legally governing complex and abstract phenomena such as the interaction between the atmosphere and the global climate. I will draw out some of these difficulties by reflecting on the controversies and disagreements around our proposed non-use agreement. To do so, I first address solar geoengineering as a proposed set of technologies, drawing out its historical relationship with climate change politics and climate science (section 2). I then paint the picture of the current disagreements about a potential non-use agreement historically, but also dive into the broad agreements that exist within the SRM community, underneath the ostensible polarisation (section 3). From this history, I draw some conclusions for a potential non-use agreement, in particular as to what it should include, and where major dividing lines may occur (section 4). In doing so, I blend insights from science and technology studies, political science, governance, and sociology with the non-use framework adopted in this volume.

2 Using Geoengineering to Address Climate Change

To understand the case for (and against) an SRM non-use agreement, it is important to address some technical and practical questions first. In this section, I explain what solar geoengineering is and why it is controversial. To properly appreciate why SRM is controversial, however, we must first turn, briefly, to its history as part of the debate on geoengineering, the idea to use large planetary systems to counteract global warming.

Geoengineering has always been a part of the debate on climate change. Scientific interest in manipulating the climate is at least as old as the scientific recognition of anthropogenic climate change. When climate change first

3 See the discussion by Guggisberg in chapter 2 of this volume.

appeared on the agenda of politicians and policymakers in the 1950s and 1960s – as a curiosity rather than an immediate concern (as a ‘vast geophysical experiment’) – the ‘only’ proposed countermeasures were what would later be called geoengineering: technologically cooling the climate. As scientific concerns about climate change grew and climate science outgrew its hubristic belief that control of the Earth’s climate would be possible, between the late 1960s and the 1980s, geoengineering technologies became more controversial. Despite physicist Cesare Marchetti’s proposal to inject carbon dioxide in ocean thermohaline currents in 1976, most scientists became convinced that the only feasible approach to the problem of global warming would be to reduce the emission of greenhouse gases as quickly as possible.⁴ The promise of geoengineering technologies – and even that of climate adaptation – came to be seen as a dangerous distraction to climate policy. This sentiment was so strong that David Keith, a leading SRM researcher, proclaimed in 2013 that “a de-facto taboo against serious work on geoengineering discouraged quantitative work and little was done” for decades.⁵ Keith has a point: from the 1980s until the mid-2000s, there is a remarkable lull in geoengineering research, especially on SRM.⁶ However, politically, geoengineering always remained of political and scientific interest.

In 2009, the Royal Society published the first major assessment report on geoengineering. The report defined geoengineering as the “deliberate large-scale intervention in the Earth’s climate system, in order to moderate global warming”.⁷ This definition included – in principle – “any methods for geoengineering climate” through large-scale interventions in “the working of the Earth’s natural climate system”.⁸ This meant that, to the authors of the report, geoengineering included two major sets of interventions, ‘carbon dioxide removal’ and ‘solar radiation management’.⁹ Although both types of technologies were controversial, they aimed to play at different geophysical mechanisms. From

4 C. Marchetti, “On Geoengineering and the CO₂ Problem” (1977) 1(1) *Climatic Change* 59.

5 D. Keith, *A Case for Climate Engineering* (MIT Press 2013) 92.

6 See eg J. R. Fleming, *Fixing the Sky: The Checkered History of Weather and Climate Control* (Columbia University Press 2010); J. Baskin, *Geoengineering, the Anthropocene and the End of Nature* (Palgrave Macmillan 2019); J. Oomen, *Imagining Climate Engineering: Dreaming of the Designer Climate*, Routledge Environmental Humanities (Routledge 2021).

7 Royal Society, “Geoengineering the Climate: Science, Governance and Uncertainty” (2009) 1X, available at <<https://royalsociety.org/-/media/policy/publications/2009/8693.pdf>> accessed 20 September 2024.

8 *ibid.*

9 Later, geoengineering mostly disappeared from policy discussions. Where the term still appears, it is mostly in relation to SRM, sometimes in a somewhat pejorative sense.

the start, CDR researchers were conflicted about this uneasy pairing.¹⁰ On the one hand, aligning with a broader research field provided opportunities for funding. On the other, the core premise of CDR – capturing carbon – was much less controversial than its twin SRM. Instead of directly altering the climate, CDR aims to ‘use’ land or oceans to reduce the environmental costs of a spatial-extension use of the atmosphere.¹¹ Although there were (and remain) serious concerns about political, economic, bio-ecological, and geophysical effects of CDR technologies, such as the disruption of nutrient cycles, changing precipitation patterns, land-grabbing, and the economic and technical feasibility of scaling up CDR measures, the basic premise of reducing atmospheric CO₂ levels corresponds directly with the core aim of climate politics as understood today. Still, because of the scale and impact of many proposed CDR measures, such as afforestation and ocean iron fertilisation, the Royal Society qualified CDR as a “deliberate large-scale intervention in the Earth’s climate system”.

CDR’s status changed after the 2015 Paris Agreement when political dynamics around the newly determined 1.5°C and 2°C goals rendered CDR at scale a political necessity rather than controversial speculation.¹² It was no coincidence that critics called the agreement a ‘Trojan horse’ for carbon geoengineering. Since the Paris Agreement, a complex process of ‘political calibration’ between scientific projections, the IPCC, and the United Nations Framework Convention on Climate Change (UNFCCC) has created an image of CDR as an inevitable, feasible, and desirable part of climate governance, despite severe doubts about whether CDR is feasible at the required scale (as even the IPCC itself admits).¹³ In recent years, net-zero promises that assume

10 Oomen (n 6).

11 Although, obviously, CDR too introduces a host of new forms of use of environmental components, such as the storage of CO₂ in sub-oceanic rock formations, the introduction of iron filings into the ocean to stimulate algae growth, or the dumping of limestone dust aimed to capture carbon from ambient air.

12 K. Anderson and G. Peters, “The Trouble with Negative Emissions” (2016) 354 *Science* 182–183; S. Beck and M. Mahony, “The Politics of Anticipation: The IPCC and the Negative Emissions Technologies Experience” (2018) 1 *Global Sustainability* e8; S. Beck and J. Oomen, “Imagining the Corridor of Climate Mitigation – What Is at Stake in IPCC’s Politics of Anticipation?” (2021) 123 *Environmental Science & Policy* 169–178; L. van Beek et al, “Navigating the Political: An Analysis of Political Calibration of Integrated Assessment Modelling in Light of the 1.5°C Goal” (2022) 133 *Environmental Science & Policy* 193–202.

13 M. Allen et al (eds), “Global Warming of 1.5°C: An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty” (2018) IPCC, available at <<https://www.ipcc.ch/sr15/>> accessed 20 September 2024; IPCC, *Climate*

CDR at massive scale – and that delay conventional mitigation – have become a central part of climate politics. Oil companies have even started to talk about carbon capture as their ‘social license’ to operate for a further eighty years (as Occidental Oil CEO Vicki Hollub is fond of doing).¹⁴ It is against this backdrop – the rapid political normalisation of CDR as an approach to climate change – that opposition to solar geoengineering takes shape.

SRM, on the other hand, is, in the words of a climate expert I interviewed for my PhD-thesis, the more ‘brutal form of geoengineering’. Its basic premise is simple: the global average temperature could potentially be lowered by increasing the reflection of sunlight from the atmosphere. By increasing the Earth’s albedo, its reflectiveness, SRM technologies would reduce the energy coming into the climate system, slow the climate warming, and (hopefully) reduce climate impacts. In the scientific literature, many SRM proposals circulate. Some are ‘science-fictionesque’ technofixes that are wholly unachievable in the near term, such as mirrors in space or using Moon dust as a solar shield. Other proposals are mundane and localised – such as brightening urban infrastructures – and would not affect the global climate significantly.¹⁵

At least three proposed SRM technologies, however, seem to hold some promise in terms of cooling the Earth: stratospheric aerosol injection (SAI), marine cloud brightening (MCB), and cirrus cloud thinning (CCT). The first, SAI, is the most well-researched. Consequently, it is the most visible and hence the most controversial of the three. SAI would entail injecting aerosol particles in the stratosphere, increasing the scattering of sunlight, sending a part of it back into space. As a technology mimicking the real-world effects of large volcanic eruptions, there is little doubt that SAI could cool the global climate, although serious questions remain about to what degree and at the cost of what side-effects. The second technology, MCB, also focuses on the reflection of incoming solar radiation. By adding sea salt aerosols to low-hanging marine clouds, these clouds could be made to thicken and brighten, enhancing the amount of sunlight they reflect out into space. Although there are a lot

Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (CUP 2022).

- 14 For an older, long profile, see: A. Rathi, “Vicki Hollub Is Showing Big Oil How to Survive Climate Change” (*Quartz*, 1 July 2019) available at <<https://qz.com/1641227/vicki-hollub-is-showing-big-oil-how-to-survive-climate-change>> accessed 28 July 2024.
- 15 For a good overview of the proposals and its scientific uncertainties, see National Academies of Sciences, Engineering, and Medicine, *Reflecting Sunlight: Recommendations for Solar Geoengineering Research and Research Governance* (National Academies Press 2021); National Research Council, *Climate Intervention: Reflecting Sunlight to Cool Earth* (National Academies Press 2015).

of technological questions around the feasibility of this technology, here too the scientific consensus seems to be that it holds promise in terms of cooling the Earth.¹⁶ CCT, the final technology currently receiving significant scientific attention, is the most speculative of the three. Unlike SAI and MCB, it does not aim to limit the solar energy coming into the climate system, but rather help energy-carrying infrared radiation ‘leave’ the system, by thinning cirrus clouds. Currently, it is unknown whether this could help cooling on a global scale, although there is some indication that the technology could be used to help maintain ice coverage at the poles.

All three of these technologies bring technology-specific risks and benefits. Potentially, if scientific understanding of the effects of these technologies advanced enough and the implementation of such technologies could take place in a carefully considered and coordinated fashion, SRM could significantly reduce the risks that climate change poses. At the same time, they all raise intractable political problems. Who would control such a technology? How could it be governed? How would the scientific expertise and technological capabilities be distributed? What would the effects of SRM be on the climate? Would it lessen or worsen the risks of climate change? All these questions remain open, without a clear answer in sight. For those worried about SRM research, even the ‘prospect’ of SRM might be dangerous, as it may distract from the fundamental and systemic emissions cuts needed in the present.

3 The Case for Caution

Against the backdrop of these uncertainties about the technical feasibility and climatic effects of SRM, there are political reasons for caution around these technologies, reasons which I lay out in this section. At the heart of this exposé is the lacklustre political performance on climate targets. The same forces of denial, delay, and derailment that have plagued climate politics for decades may try to point to SRM as an attractive alternative to deep mitigation. It is tempting to think of SRM research as a scientific interest driven by fears about climate change – and hence of the question of (non-)use as the use of a resource for climatic purposes – but these technologies have always been

16 Importantly, however, there exists serious concern about unequal cooling effects of MCB technologies. As Wan et al show, for example, cooling of the USA could lead to increased heatwaves in Europe. Such effects raise quite serious concerns about the feasibility of MCB technologies, see J. S. Wan et al, “Diminished Efficacy of Regional Marine Cloud Brightening in a Warmer World” (2024) *Nature Climate Change* 1–7.

political too. In 1992, for example, Robert Frosch, a Vice President of General Motors Research Labs and co-author of an important National Academy of the Science report on the ‘policy implications of greenhouse warming’, pushed for the inclusion of a chapter on geoengineering – despite the misgivings of many of his co-authors.¹⁷ To Frosch, geoengineering would be the logical approach:

I don’t know why anybody should feel obligated to reduce carbon dioxide if there are better ways to do it. When you start making deep cuts, you’re talking about spending some real money and changing the entire economy. I don’t understand why we’re so casual about tinkering with the whole way people live on the Earth, but not tinkering a little further with the way we influence the environment.¹⁸

Solar geoengineering, many fear, has a way of normalising by way of such a logic. In 2013, the philosopher Clive Hamilton published a piece in *Nature*, titled *No, we should not ‘at least do the research’*, in which he argued that the idea of using SRM to approach climate change was a dangerous distraction from mitigation commitments. In the piece, Hamilton castigated the idea that SRM research could be conducted without any obvious political risks. He also warned that research may not be conducted in good faith. Hamilton observed that “a slew of private patents has already been taken out over methods to engineer the world’s climate”.¹⁹ The call to do SRM research, according to Hamilton, “entrenches a situation in which geoengineering is often carried out by the wrong people, for the wrong reasons and with no oversight, and in the process is creating a lobby group that is likely to press for deployment when it is in its financial or professional interest to do so”. Although the climatic context worsened considerably in the meantime, such fears are still relevant. It is no coincidence that the United States, its geopolitical power importantly rooted in its control over the world’s flow of fossil energy, is one of the countries with the most pronounced history of political engagement with SRM.²⁰ Hamilton concluded his piece with a warning, stating that:

The ‘we should at least do the research’ lobby assumes that, if geoengineering research succeeds and the situation calls for deployment, it

17 For a first-hand account, see S. H. Schneider, *Science as a Contact Sport: Inside the Battle to Save the Earth’s Climate* (National Geographic Society 2009).

18 R. Frosch, as cited in J. R. Fleming, *Fixing the Sky. The Checkered History of Weather and Climate Control* (Columbia University Press 2010) 246.

19 C. Hamilton, “No, We Should Not Just ‘At Least Do the Research’” (2013) 496 *Nature* 139.

20 See A. Ghosh, *The Nutmeg’s Curse: Parables for a Planet in Crisis* (University of Chicago Press 2021) for reflections on the USA’s geopolitical power; J. Schubert, “Science-State Alliances and Climate Engineering: A ‘Longue Durée’ Picture” (2022) 13 *WIREs Climate Change* e760 for a history of US interest in solar geoengineering.

will be done in a way that respects the scientific evidence and protects the interests of the poor and vulnerable. Do we really believe that? The irony is that if we did believe in such a world, there would be no need for research into geoengineering.²¹

Very similar concerns animate the 2022 call for a non-use agreement on solar geoengineering. According to the authors of the *WIREs* article, SRM research may cause more problems than it solves. Not only might SRM bring risks to rainfall patterns, unequal cooling, and other geophysical and bioecological risks, its governance also presents almost unsurmountable problems.²² Because SRM, at a global scale, purports the manipulation of a global climate, it raises all kinds of concerns about who controls the technology, how major powers would negotiate such immense powers, and how disputes about SRM might be resolved. This might mean that solar geoengineering turns out to be ungovernable – or at least ungovernable in a fair and democratic manner. In that light, “proliferating calls for solar geoengineering research and development are cause for alarm, as they risk the normalisation of these technologies as a future policy option”.²³ Specifically, the authors worried about the potential of solar geoengineering research to deter decisive mitigation commitments. The long-standing history of climate change denial, the tendency of vested interests to obfuscate and attack climate scientists, and tense climate negotiations all point to a political system that struggles to incorporate systemic change.²⁴ It is, as critics of SRM point out, a political system that tends to look to speculative technological solutions rather than to address the underlying, extractive causes of climate change. In this view, SRM presents an uncertain technofix that will allow vested interests to continue to drag their heels. The prospect of

21 Hamilton (n 19).

22 For an overview of physical risks, see National Academies of Sciences, Engineering, and Medicine, “Reflecting Sunlight” (2021), available at <<https://nap.nationalacademies.org/catalog/25762/reflecting-sunlight-recommendations-for-solar-geoengineering-research-and-research-governance>> accessed 28 July 2024; P. L. Zarnetske et al, “Potential Ecological Impacts of Climate Intervention by Reflecting Sunlight to Cool Earth” (2021) 118 *Proceedings of the National Academy of Sciences* e1921854118; M.G. Lawrence et al, “Evaluating Climate Geoengineering Proposals in the Context of the Paris Agreement Temperature Goals” (2018) 9 *Nature Communications* 3734.

23 Biermann et al (n 2) 2.

24 N. Oreskes and E. M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (1st US ed, Bloomsbury Press 2010); G. Supran and N. Oreskes, “The Forgotten Oil Ads That Told Us Climate Change Was Nothing” (*The Guardian*, 18 November 2021), available at <<https://www.theguardian.com/environment/2021/nov/18/the-forgotten-oil-ads-that-told-us-climate-change-was-nothing>> accessed 28 July 2024; M. Mildemberger, *Carbon Captured: How Business and Labor Control Climate Politics* (MIT Press 2020).

SRM might allow politicians and climate sceptics to point to a potential last-resort technology that would make painful choices unnecessary. Moreover, opponents argue, even if solar geoengineering would not distract from climate mitigation, there are further risks to its research. Building a global research program into such technology could 'lock-in' further development, creating interest groups and infrastructures that may render its eventual implementation inevitable.

All these concerns – the physical and political risks of implementation as well as the risk of mitigation deterrence and a political and infrastructural lock-in through research – are hotly debated. The visibility of these disagreements, however, both in the scientific literature and in the media, and the resulting polarisation obscures the fact that most climate engineering researchers agree on at least four things. Firstly, SRM should not be used in the near future. Both the geophysical and the political uncertainties are much too great at this point. Secondly, SRM research presents urgent political risks, such as fears about mitigation deterrence, a lock-in of these technological systems, and a climatic arms race between nations, although some see those risks as more pressing than others. For the moment, SRM research does not present any urgent physical risks, though this might change if outdoor experimentation is scaled up. At the same time, not doing SRM research also presents significant risks, in the form of a paucity of knowledge as well as the potential for a dangerously rushed implementation. Thirdly, SRM should not be implemented without the prior existence of a strong and fair international governance, though in practice it might be. Fourthly, the question of whether and how to implement SRM technologies is not a scientific question; it is a political one. Scientific research may be able to provide an indication of what SRM could do and how it could be implemented, but it cannot weigh the normative political stakes of that decision. The authors of the letter calling for SRM research, for example, phrase their commitment as follows:

While we fully support research into SRM approaches, this does not mean we support the use of SRM. Uncertainties about how SRM implementation would play out in the climate system are presently too large to support implementation. Decisions about whether and how SRM might eventually be implemented must be preceded by both:

- a comprehensive, international assessment of how SRM interventions would affect climate risks regionally and globally.

- cooperative international decision-making on the use of SRM based in the latest science.

From these fundamental agreements, two important implications for SRM governance follow. The first is that, given the political and physical uncertainties, a moratorium on the use of SRM technologies may be necessary, indefinitely or only for a limited time. The second, and most urgent, is the need for real, strict, and robust ‘research’ governance. In the remainder of this chapter, I will address the question of the non-use of these technologies, based on Guggisberg’s typology, and draw out issues surrounding research governance. I review some previous proposals and attempt to formulate what I consider to be a minimum aim for a non-use agreement on SRM. To do so, I start by painting an (imperfect and brief) picture of its current governance landscape.

4 Non-use: *De-Jure* and *De-Facto* SRM Governance

In this section, I explore, in brief, existing governance frameworks that relate to SRM. From there, I survey, again briefly, several attempts to come to grips with the prospective governance of SRM, both in terms of research and implementation. However, as the debate around SRM is fast-moving and volatile, not unlike the climate debate, these surveys have an exploratory and introductory character.

4.1 *Current SRM Governance*

The governance of SRM (non-)use is complex. In the academic debate on SRM, it has become a truism to remark there exists very little *de jure* governance over SRM research and implementation. In legal terms, only a few treaties and agreements directly pertain to SRM, especially on a global scale. However, as Jesse Reynolds rightfully observes, SRM would not land in a legal and political vacuum.²⁵

Pre-existing legal frameworks affect the playing field of international SRM governance. Legal frameworks, such as the polluter-pays principle and the obligation of prevention of transboundary environmental harms, as well as implicit and explicit norms, such as the precautionary principle, would almost

25 J. L. Reynolds, *The Governance of Solar Geoengineering: Managing Climate Change in the Anthropocene* (1st ed, CUP 2019) 76.

certainly be applied to SRM implementation. Beyond these multilateral legal frameworks and norms, national law would also govern smaller scale activities that would not pose significant trans-border risks. In the words of Jesse Reynolds, there is indeed an absence “of a binding, in-force international legal instrument that is specific to solar geoengineering”, but this does not mean there is no legal framework through which to govern SRM.²⁶ Importantly, at least three significant treaties/conventions and one recent national ban play a more direct role in the debate over SRM (non-) use:

- The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD) bans the hostile use of environmental modification techniques. It was drafted in 1976, entering into force in 1978. Currently most States are party to the convention. Originally put on the international agenda in response to the USA’s illicit and secret use of weather modification techniques in the Vietnam War, ENMOD does not govern the manipulation of the climate ‘for environmental protection’ purposes. It could potentially, however, play a role in alleviating fears over the militarisation and securitisation of these technologies.
- Both the regimes created under the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention and Protocol) and the Convention on Biological Diversity (CBD) include clauses on ‘geoengineering’, in which they limit the use of spatial-extension resources (especially the oceans) for geoengineering purposes.²⁷ The London Protocol limits any dumping in oceans that is not agreed-upon. It remains an open question whether the London Protocol will hold any specific relevance to solar geoengineering. As to the CBD regime, it expressly prohibits any geoengineering interventions that may put biodiversity at risk.
- In 2023, Mexico became the first country to announce its intention to prohibit SRM, after the American start-up *Make Sunsets*, which sells cooling credits through releasing sulphur into the stratosphere, had started to conduct trials from Baja California. Mexico further explicitly stated its intent to investigate the possibility to use the CBD to ban SRM at large. At the

26 *ibid* 198.

27 About the London Convention/Protocol, see (LC/LP, “Resolution LC-LP.1 (2008) on the Regulation of Ocean Fertilization” (2008) LC/LP.1; LC/LP, “Resolution LC-LP.2(2010) on the Assessment Framework for Scientific Research Involving Ocean Fertilization” (2010) LC/LP.2; and LC/LP, “Resolution LP.4(8) on the Amendment to the London Protocol to Regulate the Placement of Matter for Ocean Fertilization and Other Marine Geoengineering Activities” (2013) Resolution LP.4(8). See also the discussion by Harrison in chapter 8 of this volume. About the CBD, see CBD, “Biodiversity and climate change” (2010) COP Decision X/33.

moment, however, this remains an intention, with the exact legal frameworks still to be developed.²⁸

However, it is yet unknown exactly how such existing legislation and international norms would affect SRM governance. The implications of this uncertainty are debated. Reynolds himself argues that it is too early for a rigid framework, as much is still unknown about SRM, a valid point for those seeking to govern the responsible use of SRM (instead of restricting it in the form of non-use). Beyond these examples, which – apart from Mexico's unilateral decision to ban SRM above its territory – only partially apply to SRM, little explicit forms of governance exist.

Most crucially, the governance of SRM 'research' remains an uncertain space. Because such research would present use of spatial extension resources only on a very limited level – its introduction of substances and climate effects being extremely small – the question of research governance on a non-use of resources basis is difficult. This does not mean, however, that SRM research is ungoverned. Here too non-legal norms and conventions play a crucial role. As David Keith's lament about a 'geoengineering taboo' – which resonated with many other researchers – makes clear, implicit norms can also govern research.²⁹ As Ina Möller and Aarti Gupta point out, the governance of SRM does not have to happen in a *de jure* manner.³⁰ In fact, they argue, the field of SRM research is already governed through *de facto* governance. Through implicit and explicit norm-setting, as well as the work of 'defining' the problem and potential solutions through expert assessments, the field of geoengineering has already established social norms about 'how to conduct geoengineering research'. Of course, these norms could be flaunted in principle, but, in practice, *de facto* work to prioritise research and development of SRM. Importantly, *de facto* governance encompasses more than early attempts to formulate norms and regulation; it also includes implicit rules about priorities and behaviour, mechanisms related to research funding, and the existence of expert communities who determine what is and is not acceptable and high-quality research. Many of the disagreements currently swirling around whether to do

28 See eg C. Garrison, "Insight: How Two Weather Balloons Led Mexico to Ban Solar Geoengineering" (*Reuters*, 27 March 2023), available at <<https://www.reuters.com/business/environment/how-two-weather-balloons-led-mexico-ban-solar-geoengineering-2023-03-27/>> accessed 28 July.

29 Oomen (n 6); M. G. Lawrence and P. J. Crutzen, "Was Breaking the Taboo on Research on Climate Engineering via Albedo Modification a Moral Hazard, or a Moral Imperative?" (2017) 5 *Earth's Future* 136–143.

30 A. Gupta and I. Möller, "De Facto Governance: How Authoritative Assessments Construct Climate Engineering as an Object of Governance" (2019) 28 *Environmental Politics* 480–501.

SRM research mirror the debates about geoengineering held between 2006 and 2013, which in turn reflected controversies of the early 1990s. In that sense, current debates about SRM are an exponent of an older debate on how to approach anthropogenic climate change. Nonetheless, a clear governance framework for SRM research remains absent, despite multiple attempts to set it up.

4.2 *The Road to Future SRM Governance*

There have been various attempts to govern SRM research, ranging from explicit legal framework to norm-setting and codes of conduct. Early in the current debate around geoengineering, in 2009, a group of scholars at Oxford University formulated the so-called 'Oxford Principles' for geoengineering. At the time, geoengineering still referred to both CDR and SRM. As a result, the principles lack some specificity. However, they are still widely regarded as one of the most fruitful starting points for thinking about SRM (research) governance. The Oxford Principles suggest five guiding rules for geoengineering governance:

1. Geoengineering should be 'regulated as a public good', meaning that the regulation of geoengineering should be 'undertaken in the public interest by the appropriate bodies at the State and/or International level'.
2. Public participation should play a role in public decision-making around geoengineering, meaning that those conducting research should be required to inform and seek prior consent from those affected by research activities.
3. Geoengineering research should be disclosed and its results should be openly published, meaning that researchers should provide a complete overview of their research plans and all results, also negative ones, should be made publicly available.
4. There should be an independent assessment of impacts, meaning that a body independent of research should conduct the assessment of what impacts the research may have.
5. Governance before deployment, meaning that before any decisions are made about the eventual implementation of geoengineering mechanisms, robust governance mechanisms should already be in place.³¹

The Oxford Principles remain an excellent starting point for responsible research around SRM. However, they are also somewhat insular, providing a

31 Notably, this already failed in respect to CDR, which has become an embedded assumption of climate politics despite the absence of any good governance mechanisms.

framework for responsible research of the technologies, without sufficient attention to broader political developments. Consequently, many more critical scholars of SRM fear that these principles cannot safeguard SRM from political appropriation. The potential for such political appropriation was one of our major motivations to call for a non-use agreement that also restricts research. Especially the fear of mitigation deterrence, of SRM entering the suite of climate options without proper democratic debate and instead of conventional mitigation, remains prominent among those critical of SRM. Many authors of the proposal for a non-use agreement fear SRM might present a logical next step for 'business-as-usual'. As such, they argue that SRM should be strictly regulated, its governance organised to restrict its use in international politics. To the authors of the open letter calling for more research, on the other hand, SRM might provide a last-resort addition to climate policy in case the consequences of climate change become catastrophic. They do not deny the political and geophysical risks that SRM may pose but insist on the potential benefits of these technologies too.

The question of SRM governance is a question of how we choose to govern the rapid and irreversible changes of societies, geopolitical power distributions, and the Earth's planetary environment. Yet as I wrote elsewhere, "the desirability of climate engineering is determined by the imaginative framework built around it".³² Importantly, such imaginative frameworks co-evolve with governance frameworks, as the ways in which we construct our governance objects influence the risks we see, the options we create, and the processes within which risks present themselves to us. In the eyes of proponents of research, governance systems should restrict its use, but build both the scientific and the political capacity to regulate and responsibly enable SRM as a potential option for climate governance. In the eyes of its opponents, solar geoengineering might facilitate the same kinds of denial, scientific obfuscation, and political obstruction that have characterised the climate debate for more than forty years. Because of such concerns, because of the risk of solar geoengineering becoming normalised without proper democratic debate, the NUA defined non-use as follows:

An International Non-use Agreement on Solar Geoengineering could commit signatory countries to five core prohibitions and measures:

1. The commitment to prohibit their national funding agencies from supporting the development of technologies for solar geoengineering, domestically and through international institutions.

32 Oomen (n 6) 202.

2. The commitment to ban outdoor experiments of solar geoengineering technologies in areas under their jurisdiction.
3. The commitment to not to grant patent rights for technologies for solar geoengineering, including supporting technologies such as the retrofitting of airplanes for aerosol injections.
4. The commitment to not deploy technologies for solar geoengineering if developed by third parties.
5. The commitment to object to future institutionalisation of planetary solar geoengineering as a policy in relevant international institutions, including assessments by the Intergovernmental Panel on Climate Change (IPCC).³³

The non-use agreement proved highly divisive and polarising. On Twitter, other academics and researchers accused its authors of going against academic freedom, being anti-democratic, and even anti-Enlightenment. While such accusations seemed to miss the point, our proposal certainly had shortcomings as a concrete governance proposal. The term ‘use’, which clearly connoted the use of SRM as a global technology, was not defined very clearly. Moreover, much of the proposal for a non-use agreement did not address *use per se*, rather the road to use. Furthermore, the proposal was rigid in its proposals, aiming to restrict a research space by rather heavy-handed measures. Importantly, however, the proposal was meant to incentivise further development of restrictive governance frameworks. This also influenced its definition of use and non-use. Rather than governing the use of a resource, these commitments were intended to restrict the development of (a) technological structures, and (b) interest groups who would push these technologies into central view. Before and since the NUA proposal, alternative research governance frameworks, for example relying on systematic public engagement protocols, have proliferated.³⁴ An already existing debate on SRM governance has intensified. Which of these proposals would be best in our current legal, political, and sociocultural practice is an open question. It is also a deeply

33 Biermann et al (n 2) 5.

34 For example, the National Academy of Sciences proposed a system with ‘offramps’, in case research turn up unexpected physical risks. In several other publications, Buck and Nicholson, and Parsons and others have also introduced new options: H. J. Buck and S. Nicholson, “Solar Geoengineering Research in the Global Public Interest: A Proposal for How to Do It” (2023) 6 *One Earth* 1652–64; National Academies of Sciences, Engineering, and Medicine (n 22); E. A. Parson et al, “Toward an Evidence-informed, Responsible, and Inclusive Debate on Solar Geoengineering: A Response to the Proposed Non-use Agreement” (2024) *WIREs Climate Change* e903.

political one that will be fought in many arenas – including the legal – for the foreseeable future.

5 Conclusion: Non-use of technology or of Technology?

The debate on the (non-)use of solar geoengineering is unfolding at a high pace. SRM is presently being researched. The National Academy of the Sciences in the United States has already called for more research, as have various other leading institutions. In February 2023, the United Nations Environment Programme (UNEP) also published a report signalling both a knowledge gap on the possible effects of SRM and the riskiness of SRM.³⁵ The call for SRM research fits the scientific and political climate of the early 2020s. So too does the call for a non-use agreement on these technologies. Almost all SRM researchers agree that the ‘use’ of solar geoengineering should be restricted through a moratorium, at least for the time being. On research, the picture is more muddled. Some would seek a ban of development altogether. Some, like me, would accept research, but only within a strict governance framework. Some, like the American National Academy of the Sciences and UNEP, argue for comprehensive research programs, with so-called ‘off-ramps’ in place in case the technologies prove too risky or uncertain.

The political and scientific history of SRM renders the question of the use and non-use of climate manipulation technologies complex. Where in other cases the argument for use or non-use of a resource can be clear – in that it may exhaust the resource or have detrimental effects on the environment – the arguments here are doubled-sided. The use of SRM is imagined to be a precaution or insurance against climatic devastation. At the same time, implementing SRM would also mean increasing the additive use of the lower atmosphere, the stratosphere, or outer space. As a result, debates about SRM non-use for the most part revolve around geopolitical and mitigation consequences of research and potential implementation. This fuels a difficult debate around how to configure a non-use agreement. It also creates difficulties classifying such a potential non-use agreement legally. As Guggisberg points out in chapter 2 of this volume, ‘use’ typically refers to “any activity that targets or otherwise impacts a resource”. She observes that any activity, even benign ones,

35 National Academies of Sciences, Engineering, and Medicine (n 22); UNEP, “One Atmosphere: An Independent Expert Review on Solar Radiation Modification Research and Deployment” (2023), available at <<https://www.unep.org/resources/report/Solar-Radiation-Modification-research-deployment>> accessed 20 September 2024.

are in fact ways in which people make use of the environment. Use, in this definition, has manifold applications. In her typology, Guggisberg makes the distinction between two major forms of use: using resources that the environment 'contains', typically in the form of extractive use, and the use of the resources the environment itself 'represents', which she terms spatial-extension resources. In this typology, the use of spatial-extension resources "usually relies on adding a person, object, substance or energy to a given space" that holds a certain value because of its location. This is a broad definition, as it allows us to view both tourism (which adds sight-seeing people), the dumping of waste at sea (which adds substances), and the unwitting emissions of greenhouse gases to the atmosphere (which adds geophysical and environmental effects) as spatial-extension use. SRM too could potentially be seen as the use of a spatial-extension resource, as it would introduce agents into the atmosphere (or even into outer space).

SRM complicates this typology, as the 'non-use' here is primarily directed at the use and development of a specific technology. Because of the diversity of proposed technologies – some of which in outer space, some in the stratosphere, and some in the lower atmosphere – the spatial-extension upon which these technologies would act are not clearly defined.³⁶ As a result, most proponents of a non-use agreement for SRM prefer to argue for a restriction on the use of a technology – or of forms of environmental management – rather than rooting the legal framework in the notion of spatial resources. In that sense, the debate over SRM non-use has important links with nuclear non-proliferation treaties and the use of genetic modification and nano technologies.³⁷ For the premise of precautionary non-use, as interpreted in this volume, this means that there exist varied ideas about the aims of non-use. In the table below, I give a brief impression of different perspectives on what a non-use agreement ought to achieve, based on the ways in which governance proposals see and frame the risks of solar geoengineering, (a) whether a non-use agreement

36 Furthermore, the debate about the non-use of SRM typically revolves around the question of *intent* rather than the use of a specific resource. In the case of SAI, for example, the use of the technology would entail adding sulphur or calcium carbonate to the stratosphere, using the stratosphere as a resource for climate protection. However, it is the intent of climate manipulation (and its possible consequences) rather than the introduction of particles itself that is deemed problematic. Humanity already emits a lot of sulphur into the atmosphere as a side-effect of industrial production, shipping, and aviation – which is not deemed problematic in the same way.

37 For an in-depth analysis, see A. Gupta et al, "Towards a Non-Use Regime on Solar Geo-engineering: Lessons from International Law and Governance" (2024) *Transnational Environmental Law* 1–32.

would focus solely on the implementation, or also on its research and development or (b) how such ideas relate to risk perceptions and the (non-)use of resources.

The question becomes even more complicated when we consider that the spatial resources would be used for the manipulation of an abstract phenomenon, namely the climate. Unlike most spatial-extension resources, the climate does not have a direct physical presence. Instead, it is a cultural-scientific

TABLE 16.1 Different perspectives on what a non-use agreement ought to achieve

	Aim of SRM non-use measures	Precaution against	Understanding of use
Proposed Non-use Agreement, Restrictive Research Governance	<i>Prevent</i> implementation of technology, permanent moratorium <i>Limit</i> normalisation of SRM in climate politics <i>Limit</i> building of constituencies arguing for use	<i>Precaution against:</i> political consequences, mitigation deterrence, inevitability of implementation of SRM	<i>Use defined as:</i> development of technological capacity, implementation of technology, implementation of spatial-extension use of atmosphere
Moratorium on Use, Permissive Research Governance	<i>Prevent</i> (premature) implementation of technology, temporary moratorium with periodic revisions. <i>Gather</i> further information about the feasibility and risks of technology <i>Limit</i> chance of panicked implementation	<i>Precaution against:</i> climatic disruption, panicked implementation of SRM	<i>Use defined as:</i> implementation of spatial-extension use of atmosphere, implementation of technology

construct that aims to make sense of complex, globally interweaving systems.³⁸ Nonetheless, both historically and currently, ‘geoengineering’ has deep connections to use, both in terms of extractive use and spatial use. Geoengineering has always been an ill-defined and flexible term connoting a range of different interventions in the Earth’s planetary systems. As Martin Meiske and I investigated elsewhere, a broad range of geoengineering technologies – including but not limited to lithosphere geoengineering and climate engineering – has been used over the years to deepen ‘other’ extractive practices.³⁹ The academic and political debate over a non-use agreement for SRM may focus its interest on the non-use of solar geoengineering ‘as a technology’, but questions about the potential use of resources are never far away. Nonetheless, rather than governing the ‘use’ of the atmosphere or outer space for climate purposes – in other words: as a spatial-extension resource – people have sought to govern the technology itself. Simultaneously, however, the use of SRM as a technology does have to relate to existing legal frameworks governing the spatial-extension use of both atmosphere and outer space. How to govern solar geoengineering in the context of escalating climate change – and what non-use would even entail – remains an open political discussion.

38 See eg O. Corry, *Constructing a Global Polity Theory, Discourse and Governance* (Palgrave Macmillan 2013); B. Allan, “Producing the Climate: States, Scientists, and the Constitution of Global Governance Objects” (2017) 71 *International Organization* 131–162; M. Hulme, *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity* (CUP 2009).

39 J. Oomen and M. Meiske, “Proactive and Reactive Geoengineering: Engineering the Climate and the Lithosphere” (2021) *WIREs Climate Change*.

Non-use of the Atmosphere and the Success Story of the Montreal Protocol

Solène Guggisberg and Mitchell Lennan

1 Introduction

The atmosphere is the layer or ‘envelope’ of gases that surrounds the Earth.¹ Primarily composed of nitrogen and oxygen,² it also contains ‘radiatively active’ or greenhouse gases (GHGs),³ which influence the Earth’s ‘radiation budget’⁴ and hence the global climate. The atmosphere supplies a plethora of goods and services that are directly or indirectly vital for the survival and well-being of life on Earth. These include the provision of the oxygen we breathe, the stability of the climate system, the protection against harmful radiation,⁵ and the role as a GHG reservoir.⁶ Many human activities, in turn, cause significant impacts to the atmosphere and limit its ability to provide these services.

- 1 International Law Commission (ILC), “Draft guidelines on the protection of the atmosphere, with commentaries thereto” (2021) *Yearbook of the International Law Commission* 11, Guideline 1(a).
- 2 Intergovernmental Panel on Climate Change (IPCC), “Annex VII: Glossary” in V. Masson-Delmotte et al (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (CUP 2021) 2215–2256.
- 3 In particular, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and other nitrogen oxides (NO_x), ozone (O₃), as well as water vapour, see IPCC (n 2).
- 4 This is understood as the “difference between the absorbed solar radiation and the net infrared radiation. The radiation budget takes into account the sum of all radiation, transferred in all directions, through the Earth’s atmosphere and to and from space. The radiation budget (or radiation balance) controls the Earth’s temperature and rainfall”, see NASA, “Atmospheric Radiation” (no date), available at <<https://www.earthdata.nasa.gov/topics/atmosphere/atmospheric-radiation>> accessed 4 February 2025.
- 5 R. E. Neale et al, “The effects of exposure to solar radiation on human health” (2023) 22(5) *Photochemical & Photobiological Sciences* 1011–1047.
- 6 United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107, art 1(7): “‘Reservoir’ means a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored”.

There is by-and-large no comprehensive international legal framework for the atmosphere; instead, the international treaties applicable to the atmosphere's uses and protection are fragmented and cover a broad range of activities. At the global level, two main regimes are usually identified as relevant, one for the protection of the ozone layer from harmful substances (primarily gases) or activities leading to the discharge of these substances, and the other to address climate change. Another regime, regional this time, focuses on substances or activities causing transboundary air pollution⁷ – due to its non-global approach, it will not be included in this chapter's analysis. The presence in the atmosphere of the substances targeted by these regimes, whether they are man-made (eg halons) or naturally occurring (eg carbon dioxide), has the potential to harm life on Earth.

The atmospheric protection regimes are complex and highly technical. This chapter focuses on the global regime created to address the pollution of the atmosphere with gases which deplete the ozone layer and on how the climate change regime compares to it. These ozone depleting gases were used in a variety of products and industrial processes, such as aerosols, refrigerators, air conditioners, fire extinguishers, foams, fumigation of soil or quarantined products.⁸ Once in the atmosphere, these substances release chlorine and bromine atoms, which cause the destruction of ozone molecules.⁹ Ozone depleting substances (ODSs) limit the ozone layer's ability to protect life on Earth from harmful solar radiation;¹⁰ decreased protection from ultraviolet radiation for example raises the risk of human health issues such as skin cancers and eye cataracts.¹¹ The Vienna Convention for the Protection of the Ozone Layer

7 Convention on Long-range Transboundary Air Pollution (adopted 13 November 1979, entered into force 16 March 1983) 1302 UNTS 217.

8 Australian Government, department of Climate Change, Energy, the Environment and Water, "Ozone depleting substances" (no date), available at <<https://www.noaa.gov/stories/4-facts-you-might-not-know-about-ozone-and-montreal-protocol>> accessed 4 February 2025.

9 NOAA, "4 facts you might not know about ozone and the Montreal Protocol" (2023), available at <<https://www.noaa.gov/stories/4-facts-you-might-not-know-about-ozone-and-montreal-protocol#:~:text=Chlorine%20and%20bromine%2C%20released%20by,impact%20on%20the%20ozone%20layer>> accessed 4 February 2025.

10 IPCC, "Safeguarding the ozone Layer and the Global Climate System" (2005), available at <<https://www.ipcc.ch/report/safeguarding-the-ozone-layer-and-the-global-climate-system/>> accessed 4 February 2025; L. M. Western et al, "Global increase of ozone-depleting chlorofluorocarbons from 2010 to 2020" (2023) 16 *Nature Geoscience* 309–313.

11 US Office of Environmental Quality, "The Montreal Protocol on Substances That Deplete the Ozone Layer" (no date), available at <<https://www.state.gov/the-montreal-protocol-on-substances-that-deplete-the-ozone-layer>> accessed 4 February 2025.

(Vienna Convention)¹² and the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol)¹³ aim at protecting the ozone layer. This regime is generally hailed as one of the main successes of international environmental law and is based on non-use measures.

Non-use measures here are those measures prohibiting the additive use of the planet's atmosphere as a spatial-extension resource.¹⁴ 'Use' of the atmosphere is understood as the discharging into the atmosphere (through eg emissions or leaks) of GHGs or substances that deplete ozone. Such discharges can result from the direct use of a substance, such as the ODS methyl bromide in agricultural fumigation. It can also involve the introduction into the atmosphere of a substance, which itself stems from activities involving other substances; for example, carbon dioxide can be generated during energy production through the burning of fossil fuel. Use of the atmosphere also includes the voluntary emission of substances which enhance atmospheric functions. These geoengineering techniques aim at mitigating climate change by increasing the reflection of incoming solar radiation or by helping thermal radiation leave the climate system.¹⁵ Given the uncertainty and concerns related to these practices' effectiveness and unforeseen impacts on planetary health,¹⁶ they may require their own non-use or limited-use measures.¹⁷ Presented in another chapter of this volume,¹⁸ they will not be examined here.

12 Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985, entered into force 22 September 1988) 1513 UNTS 293.

13 Montreal Protocol on Substances that Deplete the Ozone Layer (adopted 16 September 1987, entered into force 1 January 1989) 1522 UNTS 3. Unless specified otherwise, this chapter refers to the current version of the Montreal Protocol, which includes the different amendments and adjustments. This is discussed in more details in section 2.2 below.

14 It is worth noting that, in light of the atmosphere's critical role in sustaining life on Earth, it has also been recognised by the international community as a natural resource, see ILC (n 1), citing Committee on Natural Resources, Official Records of the Economic and Social Council, E/4969-E/C.7/13 (1971) 50th Sess Supp 6, section 4, para 94; Report of the United Nations Conference on the Human Environment, UN Doc A/CONF.48/14/REV.1 (1972), part 1, chap 1, principle 2; and World Charter for Nature, UNGA Res 37/7 (1982) GAOR 37th Sess Supp 49, annex para 4.

15 National Research Council, *Climate intervention: Reflecting sunlight to cool earth* (National Academies Press 2015).

16 A. Tang and L. Kemp, "A Fate Worse than Warming? Stratospheric Aerosol Injection and Global Catastrophic Risk" (2021) 3 *Frontiers in Climate*; S.M. Tracy et al, "Stratospheric aerosol injection may impact global systems and human health outcomes" (2022) 10 *Elementa Science of the Anthropocene*.

17 A. Gupta et al, "Towards a Non-Use Regime on Solar Geoengineering: Lessons from International Law and Governance" (2024) 13(2) *Transnational Environmental Law* 368–399.

18 On this, see the discussion by Oomen in chapter 16 of this volume.

Analysing the atmospheric protection regimes through the non-use angle, as presented in the conceptual chapter,¹⁹ proved arduous and required some adaptations. Under the Montreal Protocol, non-use measures are those measures prohibiting the production and the consumption by industries of ODSs; there are no measures specifically targeting emissions or leaks of these substances. Such slight deviation from the conceptual framework is embraced here. When it comes to the climate change regime, neither past nor existing measures fits into the concept of non-use measures. Indeed, the objective of the regime is not – and cannot be – the total absence of emissions of GHGs, which are natural gases that are part of processes vital for the survival of human and other life on Earth; there is a critical load of GHGs in the atmosphere that scientists have established to be safe. Moreover, emissions are part of a complex cycle: a portion of GHG emissions gets re-absorbed into sink and reservoirs (be they natural such as oceans and forests, or human-made such as through ocean fertilisation or carbon removal). Hence, since there is no absolute ‘non-use measure’ of the atmosphere in terms of GHGs, it is better to talk about a ‘non-use target’ which is the equivalent of net-zero, where subtracting removals from emissions equals zero.

In the context of this chapter, non-use measures, as applicable to the ozone protection regime, entail the banning or phaseout of the production or consumption of ozone depleting substances. Limited-use measures, in turn, are those measures that include a freeze or a phase-down without prescribing (yet) a 100% reduction. As to climate-change related measures,²⁰ the measures working towards a non-use target are the ones prescribing the reduction of GHG emissions into the atmosphere and/or increase in GHG removal from the atmosphere to the level of carbon neutrality. The quantified emissions reductions under the Kyoto Protocol, in turn, could be described as measures towards a ‘limited-use target’.

This chapter first presents the ozone protection regime, introducing the relevant multilateral instruments, their important features, and the non-use measures that have been adopted therein (section 2). Section 3 examines the factors that have made it possible to create this regime and that have

19 See the discussion by Guggisberg in chapter 2 of this volume.

20 It is recognized that the measures adopted in the Montreal Protocol have contributed to mitigating climate change, see eg C. Perry et al, “More to offer from the Montreal protocol: how the ozone treaty can secure further significant greenhouse gas emission reductions in the future” (2024) 21 *Journal of Integrative Environmental Sciences*; G. J. M. Velders et al, “The importance of the Montreal Protocol in protecting climate” (2007) 104(12) *Proceedings of the National Academy of Science* 4814–4819. For the purposes of the present chapter, climate change related measures are limited to those examined in section 4 below.

enabled it to be so effective, effectiveness being understood here as the ability to meet one's main objectives.²¹ Against the background of this success story, the chapter then turns to presenting the climate change regime (section 4) and discussing some of the reasons behind the very different track record of that regime (section 5). Finally, the conclusion highlights the characteristics of non-use targets that could support a better outcome in the climate change regime, while also acknowledging the limited likelihood of their adoption.

2 Ozone Protection Regime

2.1 *Vienna Convention*

The Vienna Convention was adopted in 1985 and entered into force in 1988. It has achieved quasi-universal status with 198 Parties. Its objective is "to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer",²² and Parties are obliged to take appropriate measures to that end in line with the Convention and protocols in force.

This framework convention does not contain limited-use or non-use measures, but it paved the way for such measures to be prescribed in later protocols. It indeed represented a commitment to action and established the substantive and institutional framework necessary for the Parties to do so.

The Convention demands that Parties cooperate in and through research and systemic observations, in information exchange on scientific, technical and legal matters, and in the development and transfer of technology.²³ It

21 As inspired by the works of D. Bodansky and H. van Asselt, *The Art and Craft of International Environmental Law* (2nd ed, OUP 2024) 353–362; P. H. Sand (ed), *The Effectiveness of International Environmental Agreements: A Survey of Existing Legal Instruments* (Grotius 1992) 4–7. The literature on regime effectiveness is very extensive, see eg E. L. Miles et al, *Environmental Regime Effectiveness: Confronting Theory with Evidence* (MIT 2002); A. Underdal, "Methodological Challenges in the Study of Regime Effectiveness" in A. Underdal and O. R. Young (eds), *Regime Consequences. Methodological Challenges and Research Strategies* (Kluwer Academic Publishers 2004) 27–48; J. Wettestad, *Designing Effective Environmental Regimes: The Key Conditions* (Edward Elgar Publishing 1999); O. R. Young, "Effectiveness of international environmental regimes: Existing knowledge, cutting-edge themes, and research strategies" (2011) 108 *Proceedings of the National Academy of Science* 19853–19860.

22 Vienna Convention, art 2(1).

23 *ibid* arts 2–4. On this point, see D. Bodansky, J. Brunnée and L. Rajamani, *International Climate Change Law* (OUP 2017) 57.

establishes a Conference of the Parties (COP) which has the explicit power to adopt protocols to aid achieving the Convention's objective.²⁴

The adoption of amendments to the Convention and to any protocol is ideally based on consensus, but, if consensus cannot be attained, a majority of, respectively, three-quarters and two-thirds suffices.²⁵ These amendments must, however, still be ratified by Parties before they enter into force.²⁶

2.2 *Montreal Protocol*

The Montreal Protocol was adopted in 1987 and entered into force two years later. It now boasts quasi-universal ratification with 198 Parties. The Protocol establishes a series of control measures that aim at controlling, and ultimately eliminating, the total global emissions of substances that deplete the ozone layer.²⁷

The first iteration of the Protocol contained only limited-use measures: States agreed to freeze production and consumption of five chlorofluorocarbons (CFCs) at 1986 levels and reduce production and consumption by 50% by 1999; and to freeze production and consumption of three halons at 1986 levels by 1993.²⁸ The adopted approach was – and remains – that of baskets of substances: within each of the groups of regulated substances, Parties are allowed to decide how to comply with the limited-use measures.²⁹ A certain level of flexibility also exists in the form of two exceptions to the applicability of the control measures, if the substance is needed for “essential use” or for “critical use”, two strictly defined terms.³⁰ The use of these exceptions is subject to authorisation by the Meeting of the Parties (MOPs), meaning that States Parties cannot abuse them.

Since 1987, the Protocol has been amended and adjusted several times, not only to cover additional substances and establish new stricter timelines, but also to proceed to phasing out substances instead of only reducing their production and consumption, thus introducing non-use measures to the regime (see Table 17.1).³¹ The amendment procedure, as provided in the Vienna

24 Vienna Convention, arts 6 and 8.

25 *ibid* art 9(3)-(4).

26 *ibid* art 9(5).

27 Montreal Protocol, preambular para 6.

28 Montreal Protocol (initial version, before the 1990 London Amendments), art 2.

29 J. S. Daniel et al, “Limitations of single-basket trading: Lessons from the Montreal Protocol for climate policy” (2012) 111 *Climatic Change* 241–248.

30 For most substances, see MOP, “Essential uses” (1992) Decision IV/25; for methyl bromide, see MOP, “Critical-use exemptions for methyl bromide” (1997) Decision IX/6.

31 There are numerous amendments and adjustments, however the London (1990), Copenhagen (1992), Vienna (1995), Montreal (1997), Beijing (1999), Montreal (2007) and Kigali

TABLE 17.1 Overview of the Montreal Protocol coverage and evolution

Substances	1987 Montreal protocol	1990 London Am and Adj	1992 Copenhagen Am and Adj	1995 Vienna Adj	1997 Montreal Adj	1999 Beijing Am	2007 Montreal Adj	2016 Kigali Am
CFCs	Decrease of 5 CFCs by 50% by July 1998	Addition of 10 CFCs to controlled substances (Am)	Phaseout of all 15 CFCs by 1996 (Adj)	Developing countries: 10 years delay based on 1990 control measures, ie by 2010 for CFCs, halons, and carbon tetrachloride and by 2015 for methyl chloroform				
Art 2A – Annex A group I								
Art 2C – Annex B group I								
Halons	Freeze of 3 halons by 1992	Phaseout of 3 halons by 2000 (Adj)	Phaseout of 3 halons by 1994 (Adj)					
Art 2B – Annex A group II								
Carbon tetrachloride	Not under control	Phaseout by 2000 (Am)	Phaseout by 1996 (Adj)					
Art 2D – Annex B group II								
Methyl chloroform	Not under control	Phaseout by 2005 (Am)	Phaseout by 1996 (Adj)					
Art 2E – Annex B group III								

TABLE 17.1 Overview of Montreal Protocol coverage and evolution (*cont.*)

Substances	1987 Montreal protocol	1990 London Am and Adj	1992 Copenhagen Am and Adj	1995 Vienna Adj	1997 Montreal Adj	1999 Beijing Am	2007 Montreal Adj	2016 Kigali Am
Hydrochlorofluoro- carbons Art 2F – Annex C group I	Not under control	Voluntary phaseout by 2040 and if possible 2020 (resolution)	Phaseout of consumption by 2030 (Am)	Phaseout of consumption for developing countries by 2040 (Adj)		Freeze of production by 2004 for developed countries and by 2016 for developing countries (Am)	Phaseout of production and consumption by 2020 for developed countries and by 2030 for developing countries	
Hydrobromofluoro- carbons Art 2G – Annex C group II	Not under control	Not under control	Phaseout by 1996 (Am)	Phaseout by 1996 for developing countries (Adj)				
Methyl bromide Art 2H – Annex E	Not under control	Not under control	Freeze by 1995 (Am)	Phaseout by 2010 for developed countries and freeze by 2002 for developing countries (Adj)	Phaseout by 2005 for developed countries and 2015 for developing countries (Adj)			

Bromochloromethane Art 2I – Annex C group III	Not under control	Not under control	Not under control	Not under control	Not under control	Phaseout by 2002 (Am)	Not under control	Decrease by 85% by 2036 for developed countries; by 80% and 85% by 2045 and 2047 for different groups of developing countries
Hydrofluorocarbons Art 2J – Annex F	Not under control	Not under control	Not under control	Not under control	Not under control	Not under control	Not under control	

NB All control measures applicable to production and consumption, except if otherwise stated. Am = Amendment and Adj = Adjustment

Convention, permits Parties to the Montreal Protocol to modify that instrument³² and hence to add new substances to the list of controlled substances. Amendments must be ratified or otherwise formally accepted by two-thirds of the Parties to enter into force and only bind the Parties that have accepted them.³³ The adjustment procedure allows Parties to adjust the control measures of already listed substances, hence tightening (or reversely relaxing) the applicable schedules and/or authorized production or consumption levels applicable to a given group of ODSs. Adjustments can be adopted by two-thirds of the Parties and enter into force without needing to be formally ratified or otherwise accepted.³⁴

In a similar manner as the Convention, the Protocol acknowledges the special requirements of developing countries.³⁵ The Protocol provides for different rules for a category of developing States, so-called Article 5(1) Parties, that had low levels of consumption of the controlled substances at the time of – or in the ten years following – the Protocol's entry into force.³⁶ The Protocol modifies the control measures for those States, in particular granting them a 10-year delay in implementing the limited-use or non-use measures.³⁷ Over-time, the phaseouts without increased flexibility became applicable to developing States.³⁸

The Montreal Protocol recognized, already in its initial form, the need for technical assistance for developing countries.³⁹ In 1990, the London Amendment created an interim financial mechanism, which became permanent two years later as the Multilateral Fund for the Implementation of the Montreal Protocol (MLF).⁴⁰ It is a financial mechanism which provides both financial and technical assistance to Article 5(1) Parties in complying with the non-use measures and other obligations prescribed by the Protocol.⁴¹

(2016) are of particular interest. Beyond CFCs, substances introduced via amendment include halons, other fully halogenated CFCs, methyl chloroform, hydrochlorofluorocarbons, hydrobromofluorocarbons, methyl bromide, bromochloromethane, and hydrofluorocarbons, see Montreal Protocol, art 2(b)-(j).

32 Vienna Convention, art 9(4)-(5); Montreal Protocol, art 2(10).

33 Vienna Convention, art 9(5).

34 Montreal Protocol MOP, "Rules of Procedure for Meetings of the Parties" (1989) Decision 1/1, rule 40(1).

35 Vienna Convention, preambular para 3; Montreal Protocol, preambular para 6.

36 Montreal Protocol, art 5(1). Low levels of consumption are those below 0.3 kg/capita.

37 *ibid.*

38 Montreal Protocol, art 2(a)-(j).

39 Montreal Protocol (initial version, before the 1990 London Amendments), art 10.

40 Montreal Protocol, art 10.

41 *ibid.*

A few other features of the regime created by the Protocol must be noted. First, a MOP was established to review the implementation of the Protocol and decide on the future evolution of the instrument.⁴² Second, as required under the Protocol, every four years at least, an assessment is undertaken to review the control measures.⁴³ Third, the Protocol provides for some trade controls, with imports and exports of controlled substances as well as imports of products containing or produced with controlled substances prohibited from/to non-Parties.⁴⁴

2.3 *Kigali Amendment*

The Kigali Amendment to the Montreal Protocol was adopted in 2016 and entered into force in 2019.⁴⁵ At present, 163 States have ratified this instrument. The Amendment to the Protocol targets specifically the emissions of hydrofluorocarbons (HFCs). HFCs were introduced as replacements for ODSS, and while they do not deplete the ozone layer, they are potent GHGs which have a considerably higher global warming potential than CO₂.⁴⁶ Therefore, their introduction into global production of goods such as air conditioners and foams has significantly contributed to global warming and climate change.

The Amendment prescribes progressive limited-use measures, in the form of a phase-down schedule.⁴⁷ The phase-down schedule is divided into three groups of States (developed and two categories of developing States), with different percentages of reduction in production and consumption, by a certain date, in relation to different baselines of average emissions.⁴⁸ The planned measures to phase down HFC use by 2047 are projected to prevent the release of up to 105 million tonnes of carbon dioxide equivalent in GHGs, potentially averting up to 0.5°C of global temperature rise by 2100.⁴⁹

42 *ibid* art 11.

43 *ibid* art 6.

44 *ibid* art 4.

45 On this, see eg M. W. Roberts, "Finishing the job: The Montreal Protocol moves to phase down hydrofluorocarbons" (2017) 26 *Review of European, Comparative & International Environmental Law* 220–230.

46 HFCs are also listed as GHGs in Annex A of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162.

47 Montreal Protocol, art 2(j).

48 *ibid* arts 2(j) and 5(8 qua)(a)–(b).

49 See UNEP, "Report of the forty-fifth meeting of the Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer" (2023) UNEP/OZL.PRO.WG.1/45/8, para 3.

2.4 *Limited-use and Non-use Measures*

The ozone protection regime is based on limited- and non-use measures. The Montreal Protocol started as a limited-use measures regime with 50% reduction of a few CFC gases and a freeze of halons, and quickly became characterized by its non-use measures for many ODSs. Since 1987, not only did the number of substances subject to controls increase drastically, but these controls became increasingly strict, with phaseout periods regularly shortened (see Table 17.1).

The limited-use and non-use measures provide the level up to which each Party is allowed to produce and consume a variety of ODSs, with the level being zero when a phaseout is complete. Timeframes are explicitly stated, with the date from which a production and consumption level (calculated against the baseline levels from an agreed year) is applicable. That level remains applicable thereafter without an end date, except if it is an intermediate step. Indeed, most control measures do not only include the ultimate phaseout date, but also limited-use measures as intermediate steps, creating a binding schedule of reductions.

3 Success Story of the Montreal Protocol

The Montreal Protocol has been described as the most successful multilateral environmental instrument ever.⁵⁰ With (quasi-)universal participation, strict standards, and near permanent compliance, it has been able to fulfil the objective of the ozone protection regime. According to the most recent assessment report, dated 2022, nearly 99% of banned ODSs have been phased out and the ozone layer is expected to recover to 1980 values by 2066 for Antarctica, 2045 for the Arctic, and 2040 for the rest of the world.⁵¹

50 K. Annan, "Report to UNGA's Millenium Summit" (2000) UN Doc A/54/2000, para 261. For a few words of caution, however, see eg D. Downie, "Still no time for complacency: evaluating the ongoing success and continued challenge of global ozone policy" (2015) 5 *Journal of Environmental Studies and Sciences* 187–194; S. Solomon, J. Alcamo and A. R. Ravishankara, "Unfinished business after five decades of ozone-layer science and policy" (2020) 11 *Nature communications* 4272.

51 World Meteorological Organization (WMO), "Executive Summary. Scientific Assessment of Ozone Depletion" (2022) GAW Report No 278. See also, S. Solomon et al, "Emergence of Healing in the Antarctic Ozone Layer" (2016) 353 *Science* 269–274.

Yet, this tale of success was not a foregone conclusion when the question of threats to the ozone layer first appeared on the agenda.⁵² When negotiations started, the dangers to the ozone layer were mostly theoretical and prospective,⁵³ the science of ODSS was uncertain, and the potential health and environmental damages that could result from ozone depletion were not yet visible.⁵⁴ Hence, many States were unconvinced about the need or feasibility of adopting measures limiting the use of such substances and the industry was pushing back, alleging lack of alternatives.⁵⁵ Even after the Vienna Convention was adopted, the existence or nature of actual control measures was highly debated. As mentioned above, the first iteration of the Montreal Protocol only applied limited-use measures to a few CFCs, a limited scope and levels of controls that are incomparable to the phaseout of almost all ODSS that has since been achieved under the Montreal Protocol.

Against this background, this section presents some of the factors that have led to the successful adoption of the Vienna Convention and the Montreal Protocol (3.1). It then turns to the factors that have enabled this regime to be so effective at addressing the ozone depletion issue (3.2). Focus is on the ability of the regime to adopt adequate measures to solve this issue and not on the factors that have contributed to States' compliance with such measures.

3.1 *Factors Leading to Successful Adoption*

Several simplistic arguments made to explain the adoption of the Vienna Convention and Montreal Protocol, including key discoveries in scientific knowledge, breakthroughs in developing alternatives to CFCs, and the leadership of the USA, have been scrutinised and partly deconstructed.⁵⁶ Explaining why and how the 10 year deadlock between the time the ozone issue came onto the international agenda and the adoption of two instruments in less than three years is not straightforward. Instead, multiple factors appear, together, to have contributed to these regulatory developments.

52 R. E. Benedick, "Science Inspiring Diplomacy: The Improbable Montreal Protocol", in C. Zerefos et al (eds), *Twenty Years of Ozone Decline* (Springer 2009) 13–19.

53 *ibid* 14.

54 E. R. DeSombre, "The Experience of the Montreal Protocol: Particularly Remarkable and Remarkably Particular" (2000–2001) 19 *Journal of Environmental Law* 49–81, 50.

55 M. Gonzalez, K. N. Taddonio and N. J. Sherman, "The Montreal Protocol: how today's successes offer a pathway to the future" (2015) 5 *Journal of Environmental Studies and Sciences* 122–129, 124.

56 Compare eg E. A. Parson, *Protecting the Ozone Layer: Science and Strategy* (OUP 2003) 255–256 and more generally chapters 4–5 and 9, to C. R. Sunstein, "Of Montreal and Kyoto: A Tale of Two Protocols" (2007) 31 *Harvard Environmental Law Review* 1–65, 23–37.

3.1.1 Vienna Convention

Following the hypothesis by chemists Rowland and Molina, published in 1974, that linked CFCs to ozone depletion, environmental and consumer groups in the USA reacted, in particular by asking for the use of CFCs in aerosols to be banned.⁵⁷ The chemical industry fought back, pointing out to potential large job losses, scientific uncertainty, and competitive disadvantage if the USA took unilateral actions.⁵⁸ The USA did adopt domestic regulatory measures, banning CFCs for non-essential aerosol uses, coming into effect in 1978.⁵⁹ Other States, such as Canada, Sweden or Germany, also adopted or started developing domestic measures regarding aerosols.⁶⁰

In 1976, the United Nations Environment Programme (UNEP) Governing Council mandated the Executive Director to convene a meeting in order to examine the issue of the ozone layer, and a first international expert meeting was consequently organized in 1977.⁶¹ Much research, many studies, and varying predictions as to ozone depletion ensued in the following years. In 1980, UNEP's Governing Council further mandated the institution to convene negotiations towards an international treaty to protect the ozone layer, and work on a framework convention started in 1981.⁶² States' views diverged on many issues; in particular, some States proposed to ban non-essential uses of CFCs in aerosol, others preferred measures limiting production of CFCs, and still others questioned whether any measures were needed since there was no scientific certainty related to the relevant processes.⁶³ To break the deadlock, it was decided to remove the actual control measures from the draft convention or from an annex thereto,⁶⁴ and the final text was adopted in March 1985 in Vienna.

3.1.2 Montreal Protocol

Even before the adoption and entry into force of the Vienna Convention, parallel discussions were already taking place on whether and, if so, how, to control CFCs and to what levels. In broad strokes, the USA, Canada and the Nordic countries (the so-called Toronto group) were in favour of controls focusing on

57 S. O. Andersen and K. M. Sarma, *Protecting the Ozone Layer: The United Nations History* (Routledge 2002) 44; Sunstein (n 56) 11.

58 Andersen and Sarma (n 57) 45; Sunstein (n 56) 10–12.

59 Andersen and Sarma (n 57) 50; Sunstein (n 56) 11.

60 Andersen and Sarma (n 57) 51.

61 *ibid* 45; R. E. Benedick, *Ozone Diplomacy* (2nd ed, Harvard University Press 1998) 40–41.

62 Andersen and Sarma (n 57) 51–55; Parson (n 56) 112.

63 Andersen and Sarma (n 57) 57–59; Benedick (n 61) 42–43; Parson (n 56) 115.

64 Parson (n 56) 117.

the consumption of CFCs, while the European Economic Community (EEC) and Japan were at first opposed to controls and then proposed measures limiting the production of CFCs generally.⁶⁵ Several factors led to the general acceptance of the need for and feasibility of controls and/or contributed to the tightening of key players' negotiating positions and hence to the relative strictness of the control measures adopted in 1987.

First, scientific knowledge played an important role. In 1986, shortly after the adoption of the Vienna Convention, a first comprehensive assessment of the ozone layer's status came out, highlighting that CFC emissions were growing and that continued release of CFCs at 1980 levels would lead to major ozone depletion. That report, led jointly by NASA and the World Meteorological Organization, authoritatively clarified prior scientific claims and made them acceptable to policy-makers. It also discredited the arguments of opponents to controls, leading to a change in the positions of the EEC and of several industry actors.⁶⁶ Moreover, the British Antarctic Survey reported what became known as the 'ozone hole' over Antarctica.⁶⁷ This surprise discovery of an area where ozone had significantly thinned attracted much attention.⁶⁸ Following confirmation, in early 1987, that CFCs were the cause of ozone depletion in the region, the USA indicated that it would toughen its negotiating position.⁶⁹ While this discovery's significance in making controls acceptable has been questioned, it seems that, at the very least, it gave the advocates of strong cuts a better negotiating stance than the proponents of a simple freeze.⁷⁰

Second, another major change between the lead-up to the Vienna Convention and that to the Montreal Protocol was the change in attitude of large sections of the industry. Indeed, the industry group "Alliance for Responsible CFC Policy" and DuPont, the largest CFC producer, respectively expressed support for some controls on CFCs and called for a multilaterally-negotiated limit on global emissions of CFCs.⁷¹ Various theories have been presented as to the reasons behind this change of attitude, ranging from industry fears that only domestic measures would be taken, thus creating a competitive disadvantage, to it being a response to the assessment report's conclusions and the discovery

65 Andersen and Sarma (n 57) 61–62; Parson (n 56) 118 and 120.

66 Parson (n 56) 251.

67 Andersen and Sarma (n 57) 66.

68 B. B. Green, "Lessons from the Montreal Protocol: Guidance for the Next International Climate Change Agreement" (2009) 39 *Environmental Law* 252–283, 258.

69 Andersen and Sarma (n 57) 77.

70 Parson (n 56) 250–251.

71 Andersen and Sarma (n 57) 74; Parson (n 56) 125–127.

of the Antarctic ozone hole.⁷² One reason often mistakenly presented for the industry's change of attitude was the alleged existence of a technological breakthrough that would have given certain companies a competitive advantage and a hope for profit. In fact, there had been no such breakthrough, as there had been no noticeable evolution in technology between 1980 and 1986.⁷³ However, knowledge 'leaked' from the industry to the policy-makers that research into alternatives had taken place *up until* 1980, when it was shelved as the then-anticipated regulatory pressure did not seem to materialize. This leak showed that the development of alternatives, based on the research undertaken prior to 1980, was in reality likely to be feasible within 5 to 10 years.⁷⁴

Third, while the actual weight to be given to the US leadership in ozone negotiations has been debated,⁷⁵ the USA was a generally positive force in ozone negotiations. In particular, from 1986, its negotiating position became very ambitious, calling for a near-term freeze and a long-term 95% cut in CFCs.⁷⁶ The demand for such level of controls made it more likely that other States would agree to some level of reductions instead of just a freeze – and this was ultimately achieved in the Montreal Protocol. The USA further announced in the same time period that, should a strong treaty not be adopted, it would unilaterally control CFCs and apply trade sanctions to States not taking similar measures.⁷⁷ In addition to the pressure this announcement put on States that relied on US imports for those substances, this threat probably also encouraged all States to negotiate a framework in order to avoid a trading system regulated by a single powerful State.⁷⁸

Fourth, it was possible to break the deadlock that threatened the negotiations' success because one block modified its proposal in such a way that paved a way to an agreement. As mentioned earlier, two groups of States had, from early on, opposed each other as to the type of measures to adopt, if any. The Toronto group supported measures to limit consumption of CFCs in aerosols. In contrast, the EEC favoured controls on production of CFCs not limited to one sector. While modified proposals tried to bridge the gap, each block was,

72 Andersen and Sarma (n 57) 74; Parson (n 56) 127.

73 Parson (n 56) 248.

74 *ibid* 122–123, 126–127, 248.

75 Compare *ibid* 252–253 to Benedick (n 61) 68–76.

76 Parson (n 56) 128–129.

77 *ibid* 143; P. Wexler, "Protecting the Global Atmosphere: Beyond the Montreal Protocol" (1990) 14 *Maryland Journal of International Law and Trade* 1–20, 9.

78 B. J. Gareau, "A critical review of the successful CFC phase-out versus the delayed methyl bromide phase-out in the Montreal Protocol" (2010) 10 *International Environmental Agreements* 209–231, 217–218.

in fact, mostly attempting to internationalize measures they had already taken domestically – at little cost to themselves but larger costs to the other group.⁷⁹ The USA, in its late 1986 negotiating position, moved away from its earlier aerosol-angle and now supported limits to all uses of CFCs and halons.⁸⁰ Cutting CFC use comprehensively would be onerous to the USA, thus demonstrating its good faith in making such a proposal.⁸¹ In addition, in the spring of 1987, Sweden proposed that control measures should be applied to both production and consumption, a solution that was adopted in the Protocol.⁸²

3.2 *Factors Leading to Effectiveness*

The Montreal Protocol as adopted in 1987 was an instrument with potential, but it did not immediately attract universal participation, especially when it came to developing countries which were wary of a regime imposing an unfair burden on them,⁸³ and it only included a few limited-use measures. Yet it has since been described as very effective in addressing the threat to the ozone layer. The reasons behind such success are many and varied.⁸⁴ Some are exogenous from the regime, such as the ability of the industry to develop reasonably cost-effective substitutes and the relatively specific and circumscribed nature of ODSS' uses.⁸⁵ Other reasons, however, are partly related to the design of the regime, contributing to a rapid evolution towards (quasi-)universality as well as comprehensive and prompt phaseouts of ODSS.

3.2.1 Ability to Attract Parties Universally

The Montreal Protocol managed to achieve (quasi-)universality in large part due to the regime's carrot and stick approach. Indeed, on the one hand, the Montreal Protocol recognizes the special situation of developing States. Implementing the common but differentiated responsibility (CBDR) principle, it modified the applicable control measures vis-à-vis developing States, providing them with delays. Moreover, participation to the Montreal Protocol regime could, if not benefit developing States, at least give them access to the MLF, a

79 Benedick (n 61) 44; Parson (n 56) 120.

80 Andersen and Sarma (n 57) 72–74; Parson (n 56) 129.

81 Parson (n 56) 255.

82 Andersen and Sarma (n 57) 78.

83 Benedick (n 61) 148–151.

84 See eg T. Birmipili, "Montreal Protocol at 30: The governance structure, the evolution, and the Kigali Amendment" (2018) 350 *Comptes Rendus Geoscience* 425–431, 427; Gareau (n 78) 217; Gonzalez, Taddonio and Sherman (n 55) 124.

85 DeSombre (n 54) 52. This is in relative terms of course and other commentators have, instead, noted the extensive use of these substances, see eg Birmipili (n 84) 426.

financial and technology transfer mechanism. While the negotiations leading to its creation and development were some of the most difficult ones in the history of the regime,⁸⁶ they were also of paramount importance in the decision of key developing States to join and to implement the regime's control measures.⁸⁷

On the other hand, non-participation to the Montreal Protocol involved direct costs. Indeed, trade in ODSs with non-Parties is prohibited, with bans applying not only to imports and exports of regulated substances, but also to imports of products produced or containing such substances. These trade measures were strong incentives for developing States to join, with many large developing States joining in 1993, just before the trade restrictions became applicable.⁸⁸ Another noteworthy design element is that a Party to the Montreal Protocol which does not ratify an amendment is to be considered as a non-Party with regard to the substances added by that amendment.⁸⁹ This must have been a strong incentive for Parties to ratify all amendments – as they have, (quasi-)universally, done so over the years.

3.2.2 Flexibility and Evolution

The Montreal Protocol regime also became effective at addressing the issue of ozone depletion because it was able to substantively evolve towards comprehensive non-use measures, which can be explained on three main grounds.

The regime was intended to adapt quickly to new scientific knowledge and/or technological information⁹⁰ and hence includes two flexibility-inducing features. First, the Protocol explicitly states that Parties might revise the applicable measures or adopt new ones, and provides the procedure therefore.⁹¹ In order to decide whether to adapt the control measures, at least every four years, "the Parties shall assess the control measures provided for in Article 2 [...] on the basis of available scientific, environmental, technical and economic information".⁹² Hence, not only was the adequacy of control measures to be verified, but a regular process was established to inform and encourage this review. Several cycles of assessment and revisions of the Protocol have allowed the scope of controlled measures to be expanded and the stringency of the

86 Benedick (n 61) 152, 183–190.

87 *ibid* 190; Parson (n 56) 164, 208.

88 Benedick (n 61) 242–243.

89 *ibid* 179.

90 DeSombre (n 54) 52; Gonzalez, Taddonio and Sherman (n 55) 125.

91 Montreal Protocol, art 2(9)–(10).

92 *ibid* art 6. On this see Parson (n 56) 144 and 162.

measures to be increased.⁹³ Second, the adjustment procedure permits Parties to change the timeframes and/or limits to production and consumption without requiring that domestic ratification processes be followed. The repeated tightening of the applicable schedules and/or authorized production and consumption levels was thus streamlined.⁹⁴

However, these design features do not explain *why* it was possible for Parties to agree to these modifications as well as to proceed with the necessary amendments to add new ODSs to the list of controlled substances. Indeed, notwithstanding difficult negotiations, Parties have generally been willing and able to negotiate these increasingly strict amendments and adjustments.⁹⁵ External factors must thus be examined.

In addition to the design features of the regime, its evolution can be explained by the increasingly dire content of scientific assessments and new scientific data. As the Montreal Protocol was adopted, several reports and new scientific findings indeed further showed not only the worldwide seriousness of the human-caused ozone depletion issue, but also that the issue had actually been underestimated.⁹⁶ These alarming conclusions led to a renewed debate about the adequacy of the Montreal Protocol's control measures. The 1989 Assessment Panel report then made it clear that the existing limited-use measures would be inadequate to address the ozone depletion problem and that only strict approaches with phaseouts of most ODSs could lead to a return of the Antarctic ozone layer to its natural state.⁹⁷ Hence, by the first MOP in 1989, the commitment to phaseout CFCs was already widespread, with the difficult 'details' of the extent and timing of restrictions negotiated in the lead-up to the following MOP, which took place in 1990.⁹⁸ This cycle of worrying scientific reports and assessments calling into question the adequacy of the applicable measures and leading to the adoption of stricter measures was repeated several times.⁹⁹

Finally, the role of the industry cannot be underestimated. Indeed, both producers and user industries of CFCs reacted to the increased regulatory pressure. Producers researched and developed chemical alternatives, on the basis of programmes that had existed in the 1970s.¹⁰⁰ User industries, faced with the

93 Parson (n 56) chapter 8 generally.

94 DeSombre (n 54) 54–55.

95 Benedick (n 61) chapters 11, 13–14.

96 Benedick (n 61) 108–111, 120; Parson (n 56) 147–155.

97 Benedick (n 61) 129–133; Parson (n 56) 167, 198–199.

98 Benedick (n 61) 124–125; Parson (n 56) 163–164, 198; Wexler (n 77) 15.

99 Parson (n 56) 209–211, 215–220.

100 *ibid* 175.

fact that there were uses for which no alternative had been found,¹⁰¹ primarily worked on reducing their consumption and emissions of CFCs, with different solutions for each sector.¹⁰² Both the innovation process by producers and the move away from reliance on CFCs by consumer industries went faster than anticipated.¹⁰³ This decreased need for CFCs contributed to the conclusion that control measures could realistically be made stricter.¹⁰⁴

4 Climate Change Regime

Although there is a range of multilateral agreements applicable to the causes and effects of climate change, what is broadly understood to constitute the climate change regime is limited to the UNFCCC, the Kyoto Protocol, and the Paris Agreement, which are consequently the instruments examined in this section. While the climate change regime also addresses questions of adaptation and, to some extent, loss and damages, the focus here is only on mitigation, since it is the component of climate change law which addresses use and non-use of the atmosphere.

4.1 UNFCCC

The UN Framework Convention on Climate Change (UNFCCC) was adopted in 1992 and entered into force in 1994. It has achieved quasi-universal status, with 198 Parties as of February 2025. This treaty, as indicated in its name, is a framework convention, and it provides for the possibility to be supplemented by Protocols.¹⁰⁵

The objective of the UNFCCC is the:

stabilization of [GHG] concentrations in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change.¹⁰⁶

101 *ibid* 182.

102 *ibid* 183–191.

103 *ibid* 173.

104 Andersen and Sarma (n 57) 133; Parson (n 56) 212–213.

105 UNFCCC, art 17.

106 *ibid* art 2.

It is acknowledged that the pace of mitigation must enable the continuation of food production and economic development.¹⁰⁷ Principles further state that Parties have a right to sustainable development and introduce the concept of CBDR.¹⁰⁸ While developed countries are expected to “take the lead in combating climate change and the adverse effects thereof”, all States must contribute to the global effort, according to their respective capabilities.¹⁰⁹ Without any criteria provided as to how to differentiate developed from developing countries, the division was made on the basis of existing groupings.¹¹⁰ Annex I of the UNFCCC lists developed countries,¹¹¹ meaning that States not in that Annex are considered developing States.

In addition to a range of general and heavily qualified commitments, such as the development of national inventories of anthropogenic emissions and the formulation and implementation of national and/or regional plans with measures to mitigate climate change,¹¹² a set of obligations only applies to Annex I Parties.¹¹³ In particular, each developed State Party has to take mitigation measures “by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs”¹¹⁴ and to take measures aimed at returning its GHG emissions to 1990 levels by the year 2000.¹¹⁵ This could be considered a limited-use target, even if it is formulated in vague and qualified terms.

In terms of institutional matters, the UNFCCC establishes a COP tasked, inter alia, to assess the “overall effects of the measures taken pursuant to the Convention”,¹¹⁶ and allowed to adopt protocols to the Convention.¹¹⁷ In implementation of the CBDR principle, the UNFCCC also creates a financial mechanism to provide financial resources to developing country Parties.¹¹⁸ Since 1994, the Global Environmental Facility is an operating entity of this financial

107 *ibid.*

108 *ibid* art 3(1), (5).

109 *ibid* art 3(1).

110 J. Gupta, *The History of Global Climate Governance* (CUP 2014) 149.

111 As well as States considered, at the time of the Convention's adoption, as undergoing the process of transition to a market economy.

112 UNFCCC, art 4(1)(a)(b).

113 *ibid* art 4(2).

114 *ibid* art 4(2)(a).

115 *ibid* art 4(2)(b).

116 *ibid* art 7(2)(e).

117 *ibid* art 17.

118 *ibid* art 11.

mechanism.¹¹⁹ In 2010, the Green Climate Fund was established to further serve the financial mechanism created under the UNFCCC.¹²⁰

4.2 *Kyoto Protocol*

The Kyoto Protocol was adopted in 1997 and entered into force in 2005. It has been ratified by 192 Parties, with the major exception of the USA. Under this instrument, Annex I Parties to the UNFCCC took binding quantified commitments to limit or reduce their emissions of GHGs “by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012”.¹²¹ From this aggregate goal of emission reduction, different commitments were negotiated between States, in the form of quantified emission limitation reductions (QELRs), as listed in Annex B. QELRs differed from country to country, especially in the case of economies in transition. The six GHGs targeted are listed in Annex A to the Protocol. No gas-specific limitation or reduction is set, and the basket approach lets Annex I Parties decide how to reach their targets.¹²²

Under the Kyoto Protocol, on the basis of CBDR and in light of historical emissions by developed countries, non-Annex I Parties are not bound by any QELRs. The Kyoto Protocol's first commitment period for emission limitations or reductions ran from 2008 to 2012.¹²³ There was an expectation that developing States would join in QELRs after 2012.¹²⁴ Yet, when the Doha Amendments to the Protocol created a second commitment period, ranging from 2013 to 2020, the new commitments only applied to Annex I Parties, and only to those who explicitly agreed to them.¹²⁵ In practice, the list of States bound by QELRs in the first and second commitment periods were not the same. Following the adoption of the Paris Agreement in 2015, there has been no third commitment period, and the limited-use targets created by the Kyoto Protocol have seemingly come to an end in 2020.

119 UNFCCC, “Introduction to Climate Finance”, available at <<https://unfccc.int/topics/introduction-to-climate-finance>> accessed 4 February 2025.

120 UNFCCC COP, “The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention” (2010) Decision 1/CP.16.

121 Kyoto Protocol, art 3(1).

122 A. Ceri Warnock, “The Climate Change Regime: Efficacy, Compliance and Enforcement” (2004) 8 *New Zealand Journal of Environmental Law* 99–135, 112.

123 Kyoto Protocol, art 3(1).

124 M. A. Maslin, J. Lang and F. Harvey, “A short history of the successes and failures of the international climate change negotiations” (2023) 5 *UCL Open Environment* 1–16, 3.

125 Kyoto Protocol CMP, “Amendment to the Kyoto Protocol pursuant to its Article 3, paragraph 9 (the Doha Amendment)” (2012) Decision 1/CMP.8.

A few other features of the regime created by the Protocol must be noted. First, the UNFCCC COP is to serve as the MOP to the Kyoto Protocol, and is, *inter alia*, to regularly review the implementation of the Protocol.¹²⁶ Second, amendments of the Protocol and to Annexes A and B are to be adopted by the COP serving as MOP, must be accepted by at least three-quarters of the Parties to enter into force, and do so only for those States that have accepted them.¹²⁷ Third, the Kyoto Protocol recognizes that the financial mechanism established under the UNFCCC is needed to support developing States.¹²⁸

4.3 *Paris Agreement*

The Paris Agreement was adopted in 2015 and entered into force in 2016.¹²⁹ States are Parties to this Agreement. The USA left in 2020, rejoined in 2021, and will leave again effective January 2026.¹²⁹ This instrument's objective is to keep "global average temperature to well below 2°C above pre-industrial levels and pursu[e] efforts to limit the temperature increase to 1.5°C".¹³⁰ The Paris Agreement also provides that "a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases", also called net-zero, must be reached "in the second half of [the 21st] century".¹³¹

To do so, the Agreement does not set quantified emission reductions or other binding values, but relies on nationally determined contributions (NDCs) by States Parties.¹³² The EU, for example, currently has undertaken to reduce, by 2030, its GHG emissions to 55% of 1990 levels.¹³³ All States Parties are bound by the same obligation to submit successive NDCs that are each time more ambitious than the previous iteration and to take measures domestically to achieve the objectives set therein.¹³⁴ NDCs are then publicly recorded.¹³⁵ However, the content of each State's commitment is up to its choosing and compliance

¹²⁶ Kyoto Protocol, art 13.

¹²⁷ *ibid* arts 20–21.

¹²⁸ *ibid* art 11.

¹²⁹ R. Markey-Towler, "Trump has withdrawn the US from the Paris Agreement. Here's why that's not such a bad thing" (*The Conversation*, 22 January 2025), available at <<https://theconversation.com/trump-has-withdrawn-the-us-from-the-paris-agreement-heres-why-thats-not-such-a-bad-thing-248109>> accessed 4 February 2025.

¹³⁰ Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) 3156 UNTS 79, art 2(1)(a).

¹³¹ *ibid* art 4(1).

¹³² *ibid* art 3.

¹³³ "Update of the NDC of the European Union and its Member States" (16 October 2023), available at <<https://unfccc.int/sites/default/files/NDC/2023-10/ES-2023-10-17%20EU%20submission%20NDC%20update.pdf>> accessed 4 February 2025.

¹³⁴ Paris Agreement, art 4(2–3).

¹³⁵ *ibid* art 4(12).

cannot be internationally verified. Hence, the individual limited-use targets found in NDCs are voluntary and non-binding.¹³⁶

While the Paris Agreement recognizes in several provisions that the position of developing States is different from that of developed States, hence acknowledging the continued relevance of CBDR,¹³⁷ the core obligations related to NDCs apply equally to developed and developing States. Nonetheless, in order to help developing States towards mitigation, developed States must provide financial resources and the UNFCCC financial mechanism is applicable to the Paris Agreement.¹³⁸

All Parties have to regularly submit “[i]nformation necessary to track progress made in implementing and achieving [their NDCs]”.¹³⁹ Using this information, the COP serving as MOP to the Paris Agreement (CMA) must, every five years, “assess the collective progress towards achieving the purpose of this Agreement and its long-term goals”.¹⁴⁰ This process, known as the Global Stocktake, was first undertaken in 2023.

4.4 *Limited-use and Non-use Targets*

The climate change regime is based on limited-use and non-use targets. Indeed, as presented in the introduction, quantified reductions are not simply reductions of GHG emissions, but the reductions of the sum of emissions to which removals by sinks and reservoirs is subtracted. While the limited-use/non-use target approach is shared between the Kyoto Protocol and the Paris Agreement, the similarities stop there. Indeed, while the Kyoto Protocol had a collective limited-use target and individual limited-use targets for Annex I Parties to it, the Paris Agreement only has a collective non-use target, in the form of net-zero (see Table 17.2).

Both instruments and their limited-use or non-use target are problematic, but for different reasons. The Kyoto Protocol’s very limited collective target for a 5% reduction only applied to Annex I Parties that had also ratified the

136 S. T. Zaman, “Exploring the Legal Nature of Nationally Determined Contributions (NDCs) under the International Law” (2015) 26 *Yearbook of International Environmental Law* 98–126.

137 P. Pauw, K. Mbeva and H. van Asselt, “Subtle differentiation of countries’ responsibilities under the Paris Agreement” (2019) 5 *Palgrave Communications* 1–7; C. Voigt and F. Ferreira, “Differentiation in the Paris Agreement” (2016) 6 *Climate Law* 58–74.

138 Paris Agreement, art 9. See also Paris Agreement CMA, “New collective quantified goal on climate finance” (2024) Decision 1/CMA.6.

139 Paris Agreement, art 13(7).

140 *ibid* art 14.

TABLE 17.2 Limited-use and non-use targets in the Kyoto Protocol and Paris Agreement

Kyoto Protocol	Paris Agreement
<i>Goal:</i> none stated	<i>Goal:</i> not more than 1.5/2 degrees global warming
<i>Collective limited-use target:</i> all Annex I Kyoto Protocol Parties together to reduce GHG emissions by 5% below 1990 levels in 2008–2012 commitment period	<i>Collective non-use target:</i> all Paris Agreement Parties together to reach global net-zero by/from 2050 [ie, sum of global emissions – global removals and sinks = 0]
<i>Individual limited-use targets:</i> each Annex I Kyoto Protocol Party to reduce [sum of emissions – removals and sinks] by the percentage in Annex B	<i>Individual limited- or non-use targets:</i> none

Kyoto Protocol. The absence of the USA and the lack of substantive obligations for developing countries, in particular the large emerging economies, meant that any reduction achieved by the Kyoto Protocol's Annex I Parties' would be dwarfed by the increase in emissions by other States. Even if the USA had joined, the emissions of other large economies would still have remained unregulated. Moreover, the reliance on commitment periods with end dates means that, except if an amendment process for a new commitment period is successful, the Kyoto Protocol QELRs are temporary. Such uncertainty as to the existence of future restrictions is not conducive to the clear and sustained regulatory pressure necessary to force the industry into investing in research and development for alternatives and/or to decrease carbon dependency.

The weaknesses of the Paris Agreement's target are quite different. In the absence of individual limited-use or non-use targets, there is no clear path forward and questions about accountability can arise. Moreover, there is no timeline with targets set for dates between the entry into force of the Agreement and the mid-century net-zero, which is both very near and quite distant in time. Finally, the vague language of the collective non-use target,¹⁴¹ which does not even provide a clear date by which net-zero must be reached, does

141 J. Rogelj et al, "Net-zero emissions targets are vague: three ways to fix it" (*Nature Comment*, 16 March 2021), available at <<https://www.nature.com/articles/d41586-021-00662-3>> accessed 4 February 2025.

not provide the legal certainty¹⁴² that the industry might require to proceed with necessary but costly changes.

5 Mitigated Track Record of the Climate Change Regime

Despite some achievements, in that current NDCs have the potential to avoid 4°C global warming,¹⁴³ the climate change regime in its present iteration is unlikely to achieve its objectives of stabilizing GHG concentrations in the atmosphere at a level preventing dangerous human-made interference with the climate system, and thus of keeping global warming to a maximum of 1.5/2°C. According to the 2023 Intergovernmental Panel on Climate Change report, indeed, the emissions that can be projected as per NDCs make it likely that the 1.5°C goal will be exceeded.¹⁴⁴ It will consequently become harder to keep global warming under 2°C.¹⁴⁵ According to the Global Stocktake of 2023, if all the latest NDCs are implemented, global warming will be in the 2.1–2.8°C range, hence above the 2°C threshold. There are moreover serious risks that even these NDCs will not be complied with.¹⁴⁶

This mitigated track record is in stark contrast with the success story of the ozone protection regime. Such a difference in effectiveness is striking, particularly when one recognizes the extent to which the original regimes for ozone protection and climate change share characteristics. Indeed, both regimes were initially developed at times when scientific uncertainty remained high as to the processes at stake and, in each case, major progress has been made

142 It is even argued that this is a non-obligation (see L. Rajamani, “The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations” (2016) 28 *Journal of Environmental Law* 337–358).

143 Paris Agreement CMA, “Outcome of the first global stocktake” (2023) Decision 1/CMA.5, para 18.

144 IPCC, “Summary for Policymakers” in V. Masson-Delmotte et al (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (CUP 2021) 3–32, A.3.4, A.4. It is likely that it was already temporarily exceeded in 2024, see Copernicus, “2023 is the hottest year on record, with global temperatures close to the 1.5°C limit” (9 January 2024) available at <<https://climate.copernicus.eu/copernicus-2023-hottest-year-record>> accessed 4 February 2025.

145 IPCC (n 144) A.4, A.4.3. See also D. Carrington, “Climate change target of 2C is ‘dead’, says renowned climate scientist” (*The Guardian*, 4 February 2025), available at <<https://www.theguardian.com/environment/2025/feb/04/climate-change-target-of-2c-is-dead-says-renowned-climate-scientist>> accessed 4 February 2025.

146 IPCC (n 144) A.4.4.

in terms of scientific understanding. Both regimes have also had to address truly global problems related to common goods, thus requiring (quasi-)universal participation. In neither the case of ozone depletion nor climate change were technological alternatives available or available at scale at the time of regime creation. In terms of design, both regimes are based on framework conventions with general environmental protection objectives, that are intended to be supplemented by additional instruments. Furthermore, they also both recognize CBDR, and they provide support to help developing States implement their obligations. Finally, they create institutional frameworks for States to regularly meet, hence enabling overview of the regimes' implementation.

Notwithstanding these numerous similarities, some major differences contributed to divergent paths and design evolution. Without going in-depth into the negotiating history of the climate change regime¹⁴⁷ or attempting the nigh impossible task of comprehensively comparing the two regimes, one can note that the two regimes have an important design difference (5.1) and the scopes of the issues to be addressed are not comparable (5.2), which in turn led to less constructive attitudes from developing States and the USA when it came to addressing climate change (5.3–5.4).

5.1 *Non-flexible Measures and Processes*

The Kyoto Protocol did not create a regular review process of its QELRS with the aim to potentially modify the measures. While the COP serving as MOP is entrusted with the review of the Protocol's implementation,¹⁴⁸ it is then only mandated, in vague terms, to "take appropriate action".¹⁴⁹ A modification of the QELRS could have been adopted through a formal amendment of Annex B, but the regime did not build flexibility or create a clear process to review – and change if necessary – the limited-use targets. In practice, the Kyoto Protocol QELR commitments adopted in 1997 remained untouched until the end of the first commitment period in 2012.

In comparison, the Montreal Protocol is designed for change, with a built-in flexibility process which has been used repeatedly. However, while this particular feature simplifies the strengthening of the regime, it would have served little purpose had States opposed the regime's evolution – and proper

¹⁴⁷ On this, see eg D. Bodansky, "The History of the Global Climate Change Regime", in U. Luterbacher and D. F. Sprinz (eds), *International Relations and Global Climate Change* (MIT Press 2001) 23–40; J. Gupta (n 110); H. Jespen et al (eds), *Negotiating the Paris Agreement* (CUP 2021); M. A. Maslin, "The road from Rio to Glasgow: a short history of the climate change negotiations" (2020) 136 *Scottish Geographical Journal* 5–12.

¹⁴⁸ Kyoto Protocol, arts 8(4)–(6) and 9.

¹⁴⁹ *ibid* art 9.

amendments are still the required procedure for adding new substances. Hence, other factors came into play.

5.2 *Scope of the Issues and Solutions*

An undeniable major difference which underpins the evolutions of the two regimes is the scope of the issues that the regimes attempt to address. Unlike ODSS which are mainly human-made chemicals limited to certain industries, GHGs are mostly natural gases emitted not only in many crucial economic sectors but also through fundamental natural processes. Whereas the ozone depletion issue had its complexities,¹⁵⁰ there is a general consensus that climate change is particularly multi-dimensional and that it is extremely challenging to know how to address this so-called ‘wicked’ problem.¹⁵¹

Moreover, the economic impacts of reducing emissions of ODSS and of GHGs have little in common.¹⁵² While addressing ozone depletion did create costs for the Parties’ economies and required whole industries to adapt, it is not comparable to the process of decarbonisation. Indeed, with the majority of the world economy since the industrial revolution based on carbon, limiting or stopping GHG emissions is perceived as a monumental task. The costs of such process in financial terms or developmental potential terms are (likely to be) enormous. Nonetheless, while cost-benefit analyses of mitigating climate change might well have indicated that reducing GHGs was prohibitively expensive,¹⁵³ they seem not always to include the actual costs of inaction, thus potentially distorting the picture.¹⁵⁴

150 Benedick (n 61) 13–19. However, ozone depletion has also been described as a ‘tame’ problem, see R. Grundmann, “Climate change as a wicked social problem” (2016) 9 *Nature Geoscience* 562–563.

151 On the origin of the terms, see H. W. J. Rittel and M. M. Webber, “Dilemmas in a general theory of planning” (1973) 4 *Policy Sciences* 155–169. On climate change as a wicked problem, see eg F. P. Incropera, *Climate Change: A Wicked Problem : Complexity and Uncertainty at the Intersection of Science, Economics, Politics, and Human Behavior* (CUP 2015); S. G. MacNall, *Rapid Climate Change: Causes, Consequences, and Solutions* (Taylor & Francis Group 2011).

152 R. Grundmann, “Ozone and climate governance: An implausible path dependence” (2018) 350 *Comptes Rendus Geoscience* 435–441.

153 See eg Sunstein (n 56) 23–37.

154 A. C. Köberle et al, “The cost of mitigation revisited” (2021) 11 *Nature Climate Change* 1035–1045; see also C. Alberti, “The Cost of Inaction” (4 January 2024), available at <<https://www.climatepolicyinitiative.org/the-cost-of-inaction/>> accessed 4 February 2025. The adequacy of using cost-benefit analyses to address climate change has also been discussed on other grounds (see eg T. Ekholm, “Climatic Cost-benefit Analysis Under Uncertainty and Learning on Climate Sensitivity and Damages” (2018) 154 *Ecological Economics*

5.3 *Implementation of CBDR*

The consequences of carbon ubiquitousness in our world economy on the climate change regime development are numerous and complex. Amongst others, developing States have, for a long time, been unwilling to agree to emission limitations or reductions that would hamper their economic development, pointing out that developed countries had already benefited from their ability to emit. The CBDR as originally interpreted in the climate change regime thus led to a clear differentiation between Annex I and non-Annex I Parties. Already the UNFCCC saw only Annex I agree to commitments to take measures aimed at returning their GHG emissions to 1990 levels by the year 2000.¹⁵⁵ Then, it was clear from the 1994 Berlin Mandate onwards that no obligations additional to those found in the UNFCCC would be imposed on developing States in the instrument that was to be negotiated by the COP in Kyoto.¹⁵⁶ This differs from the origins and implementation of the CBDR in the ozone protection regime. No division in groups of States is to be found in the Vienna Convention. When introduced in the Montreal Protocol, differentiation modified the schedule of obligations but did not altogether free developing States from substantive obligations.

In the climate change regime, the division between developed States having QELR obligations and developing States not being bound by such obligations became increasingly problematic. Indeed, the lists of Annex I and non-Annex I Parties, set in stone in the early 1990s, did not reflect the economic and polluting realities of the 21st century.¹⁵⁷ Importantly, emissions from some developing countries grew enormously and it was necessary to include the large emerging economies for the climate change regime to reach its objectives.¹⁵⁸

99–106; R. S. J. Tol, “Is the Uncertainty about Climate Change too Large for Expected Cost-Benefit Analysis?” (2003) 56 *Climatic Change* 265–289).

155 UNFCCC, art 4(2)(b).

156 UNFCCC COP, “The Berlin Mandate: Review of the adequacy of Article 4, paragraph 2(a) and (b), of the Convention, including proposals related to a protocol and decisions on follow-up” (1995) Decision 1/CP.1

157 T. Deleuil, “The Common but Differentiated Responsibilities Principle: Changes in Continuity after the Durban Conference of the Parties” (2012) 21 *Review of European Community and International Environmental Law* 271–281; J. Depledge and F. Yamin, “The Global Climate-change Regime: A Defence” in D. Helm and C. Hepburn (eds), *The Economics and Politics of Climate Change* (OUP 2009) 433–453.

158 S. Andresen, “Regime effectiveness” in K. Bäckstrand and E. Lövbrand (eds), *Research Handbook on Climate Governance* (Edward Elgar Publishing 2015) 425–434. On the evolution of carbon dioxide emissions, in particular the spectacular growth of emissions by China, which overtook the USA as the largest emitter in 2005, see L. Vigna, J. Friedrich and T. Damassa, “The History of Carbon Dioxide Emissions” (*World Resources Institute*, 3 June 2024) available at <<https://www.wri.org/insights/history-carbon-dioxide-emissions>> accessed 4 February 2025.

Hence, the climate change regime modified its differentiation approach after the Kyoto Protocol. Already in 2011, the Durban mandate made it clear that the next instrument would need to be applicable to all Parties.¹⁵⁹

There was some expectation that quantitative commitments would be agreed upon at COP15 in Copenhagen in 2009,¹⁶⁰ but China and India rejected QELRs, even differentiated ones – and Annex I Parties were generally opposed to again accepting such obligations in the absence of the USA and major emerging economies.¹⁶¹ This deadlock, together with a wide range of other issues, contributed to the failure of that conference. A new approach to emission reductions, based on national pledges, was subsequently followed¹⁶² and ultimately led to the Paris Agreement, an instrument based on NDCs which both developed and developing States are obliged to submit, but which include only self-determined targets.

5.4 *Role of the USA*

Another salient difference between the ozone protection and climate change regimes, which in large parts seems to ensue from the above two points, is the ambiguous and ultimately non-constructive attitude of the USA in the climate change regime.¹⁶³ Fully aware of the Berlin Mandate and the fact that additional obligations would not be applied to developing States, the USA took part in the negotiations leading to the Kyoto Protocol, influencing the text that would ultimately be adopted in 1997.¹⁶⁴ However, five months before the Kyoto meeting, the US Senate passed the Byrd–Hagel resolution, which stated that:

the United States should not be a signatory to any protocol [...] which would (A) mandate new commitments to limit or reduce greenhouse gas emissions for the Annex I Parties, unless the protocol [...] also mandates new specific scheduled commitments [...] for Developing Country

159 UNFCCC COP, “Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action” (2011) Decision 1/CP.17, para 2.

160 Maslin, Land and Harvey (n 124) 4.

161 P. Chasek, “The Paris Negotiations: Background and Context” in H. Jespen et al (eds), *Negotiating the Paris Agreement* (CUP 2021) 20–45, 28.

162 Maslin, Land and Harvey (n 124) 4–5; R. S. Dimitrov, “Inside UN Climate Change Negotiations: The Copenhagen Conference” (2010) 27 *Review of Policy Research* 795–821.

163 R. Cléménçon, “30 Years of International Climate Negotiations: Are They Still our Best Hope?” (2023) 32 *The Journal of Environment & Development* 114–146, 133–134.

164 J. Hovi, D. F. Sprinz and G. Bang, “Why the United States did not become a party to the Kyoto Protocol: German, Norwegian, and US perspectives” (2012) 18(1) *European Journal of International Relations* 129–150.

Parties within the same compliance period, or (B) result in serious harm to the economy of the United States.¹⁶⁵

The USA then proceeded not to ratify the Kyoto Protocol, and by doing so undoubtedly harmed the climate change regime. Such damage was not only linked to the absence of emission reductions by the USA, then the country responsible for 25% of global emissions. Rather, the absence of the hegemonic superpower of the time was a signal that the regime was weak, hence probably also failing to give the industry the necessary sustained regulatory pressure to make the required investments towards alternatives and/or decarbonisation.¹⁶⁶ Moreover, it most certainly represented a strong incentive (and potentially an excuse) for developing States not to agree to QELRs in a second commitment period.

This behaviour is in stark contrast to the approach that the USA generally took in the ozone regime. Indeed, it was a strong force in the ozone negotiations. In particular, to address the deadlock between its position and that of the EEC, the USA brought forward a new policy proposal which largely embraced the European proposal of CFC reductions not limited to a ban of non-essential aerosol uses. By doing so, the USA acted against its short-term economic interest, but was able to bring momentum by this show of good faith.

The Paris Agreement met the requirements of the USA,¹⁶⁷ which wanted developing States to be bound by similar obligations and mitigation commitments to be determined domestically.¹⁶⁸ This instrument has become the applicable international law, suggesting once more that this country's influence on negotiations' success is, if not hegemonic, at least unmistakable.¹⁶⁹

165 Government of the United States, "S. J. Res. 98, 105th Congress" (*Congress* 1997), available at <<https://www.congress.gov/bill/105th-congress/senate-resolution/98>> accessed 4 February 2025.

166 B. Buchner, C. Carraro, I. Cersosimo and C. Marchiori, "Back to Kyoto? US Participation and the Linkage between R&D and Climate Cooperation" in A. Haurie and L. Viguiér (eds), *The Coupling of Climate and Economic Dynamics* (Springer 2005) 173–204.

167 R. Cléménçon, "The Two Sides of the Paris Climate Agreement: Dismal Failure or Historic Breakthrough?" (2016) 25(1) *Journal of Environment & Development* 3–24, 6; R. S. Dimitrov, "The Paris Agreement on Climate Change: Behind Closed Doors" (2016) 16(3) *Global Environmental Politics* 1–11, 8.

168 S. Biniaz, "The United States: Interesting Processes and Techniques Lined the Road to Paris" in H. Jespen et al (eds), *Negotiating the Paris Agreement* (CUP 2021) 139–159, 139–143.

169 M. Milkoreit, "The Paris Agreement on Climate Change—Made in USA?" (2019) 17(4) *Perspectives on Politics* 1019–1037; C. Parker and C. Karlsson, "The UN climate change negotiations and the role of the United States: assessing American leadership from Copenhagen to Paris" (2018) 27(3) *Environmental Politics* 519–540.

The latest reversal of the US involvement in international climate governance, with President Trump's announcement that they will leave the Paris Agreement, is thus a worrying development.

6 Conclusions

The ozone protection regime is considered an undiluted success, having surpassed initial expectations in speed and coverage. Controlled ODSS have now been phased out by 99% and projections have the ozone layer recovering by 2040 generally and slightly later for the polar regions. In comparison, the climate change regime's track record can, at best, be described as mitigated, with projected temperature in excess of the 1.5°C and even 2°C goal under the current NDCs. This chapter examined factors that can explain such different trajectories and the role of limited-use and non-use targets therein.

Notwithstanding major similarities in their original designs, the climate change regime differs from the ozone protection one in that it addresses a much larger and more ubiquitous issue. In light of the projected costs of decarbonisation and of the industrialised world's responsibility for historical emissions, developing States successfully objected to being bound by QELRS – and in turn the USA refused to join a differentiated regime. In order to achieve the universality needed to address a global commons issue, the alternative path chosen was that of NDCs and a collective non-use target without individual targets to reach it. This is in stark contrast with the Montreal Protocol and its limited-use and non-use measures, which, although modified for developing countries, have bound all Parties from the start. Hence, the presence in the ozone depletion regime of non-use measures seems correlated with that regime's level of success. Yet, it also reflects the political willingness of key actors to put their short-term individual interests aside to address a global commons issue for the greater good.

Looking forward – and although current political developments are not encouraging – it is worth keeping in mind that both non-use measures and non-use targets can enable the atmospheric protection regimes to effectively reach their objectives. The problem in that respect resides in the current characteristics of the applicable non-use targets. Non-use targets would greatly benefit from (1) a binding collective non-use target with an exact timeframe for completion; (2) permanent individual limited-use or non-use targets, together with intermediate steps; (3) built-in flexibility to adjust intermediate steps, individual and/or collective targets in light of new scientific discoveries and technology developments.

While it is unlikely that the existing non-use targets will be fully reshaped to take into account the above mentioned elements, some progress might be achieved at CMAs. For example, the 2021 Glasgow Climate Pact called for a 45% reduction of carbon dioxide by 2030 (related to 2010 levels),¹⁷⁰ which is akin to an intermediate step – albeit a collective and non-binding one. That COP also saw an attempt to address climate change through limited-use or non-use *measures* focused on the production of energy by coal, a major source of GHGs. The call for a phasedown of unabated coal power,¹⁷¹ although non-binding and not the hoped-for phaseout, nonetheless represents a new approach, similar to the limitations of production and consumption under the Montreal Protocol. Related to the calls for ‘leaving-it-in-the-ground’,¹⁷² such limited-use measure might become a new, additional path to address the wicked problem that is climate change.

170 Paris Agreement CMA, “Glasgow Climate Pact” (2021) Decision 1/CMA.3, para 22. On the Glasgow Climate Pact, see also eg, J. Depledge, M. Saldivia and C. Peñasco, “Glass half full or glass half empty?: the 2021 Glasgow Climate Conference” (2022) 22(2) *Climate Policy* 147–157.

171 Glasgow Climate Pact, para 36.

172 See eg H. van Asselt, “Governing fossil fuel production in the age of climate disruption: Towards an international law of ‘leaving it in the ground’” (2021) 9 *Earth System Governance* 100118; J. Gupta et al (eds) *Leaving Fossil Fuels Underground* (Amsterdam University Press 2024); C. McGlade and P. Ekins, “The geographical distribution of fossil fuels unused when limiting global warming to 2°C” (2015) 517(7533) *Nature* 187–190; D. Welsby, J. Price, S. Pye and P. Ekins, “Unextractable fossil fuels in a 1.5°C world” (2021) 597 *Nature* 230–234.

Non-use of Space

Reconsidering Article 1 of the Outer Space Treaty and the Useability of Space Resources

Thomas Cheney

1 Introduction

The Outer Space Treaty (OST) is a pro-use treaty, as its full name, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies¹ implies. It exists to, or its ‘object and purpose’ is to, facilitate the exploration and use of outer space, the Moon and other celestial bodies. One of its core principles is the freedom to use outer space, including the Moon and other celestial bodies. That freedom, while broad, is not unrestricted: the OST places several limitations upon the use of outer space, for example, the freedom of use needs to be “carried out for the benefit and in the interests of all countries” (Article 1) and that it must be conducted with “due regard to the corresponding interests of all other States Parties” (Article IX). The freedom of use includes space resource extraction and utilisation² (commonly referred to as space mining). The details of what that entails are still being discussed and developed at both the international and domestic levels. Several States have introduced national legislation supporting the right to extract and possess space resources,³ the United States has promulgated the non-binding Artemis Accords, which aim to create a framework for cooperation in the civil exploration and peaceful use

1 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty/OST) (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205.

2 T. Cheney, *Sovereignty, Jurisdiction, and Property in Outer Space: Space Resources, the Outer Space Treaty, and National Legislation*, Doctoral thesis (Northumbria University 2020), 112.

3 United States of America: US Commercial Space Launch Competitiveness Act, Public Law 114–90, 114th Congress, 25 November 2015, 51 U.S.C., Title IV; Luxembourg: Law of 20 July 2017 on the Exploration and Use of Space Resources, Doc. parl. 7093; Sess. Ord. 2016–2017; United Arab Emirates: Federal Law No. (12) of 2019 on the Regulation of the Space Sector; Japan: Promotion of Business Activities Related to the Exploration and Development of Space Resources (Act No. 83 of 2021) (Space Resources Act).

of space, and the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) is discussing the matter at the working group on legal aspects of space resource activities.⁴

As the definition of non-use measure used in this volume focuses on those measures related to the conservation and management of resources – and hence does not include measures to control weapons, such as found in Article IV – the OST does not provide explicit non-use measures of relevance. However, some non-use measures have been proposed in the field of outer space governance. The two most notable are heritage protection measures and safety zones (both of which are included in the Artemis Accords⁵ and were proposed in the Hague Building Blocks⁶); both are discussed further by Martin in chapter 19 of this volume. A third, a space ‘wilderness’ zone, was proposed by astronomer Martin Elvis and space ethicist Tony Milligan.⁷

The goals of non-use measures as defined in this volume are broadly two-fold: to protect the targeted resource or to protect something else that is valued (most often the environment or elements thereof) and that resource extraction would impact. The proposed non-use measures with respect to space however do not all fall so easily into these groups. In the first category, there would seem to be wilderness zones, which are intended to protect ‘space resources’. However, this is not conservation for the sake of keeping the resources intact, but rather for use by future generations. Heritage zones can be placed into the second category since they are intended to protect objects and sites of historic importance in space from interference or harm. While these are not proposed to protect the environment per se, the ‘area’ around human-made objects are included for a variety of reasons. These non-use measures correspond to protecting an element of the environment, albeit the human environment rather than the natural one. As to safety zones, they are more complex to categorise,

4 UNCOPUOS, “Report of the Committee on the Peaceful Uses of Outer Space: Sixty-Fourth Session” (25 August–3 September 2021) UN Doc A/76/20, Annex III, available at <https://www.unoosa.org/res/oosadoc/data/documents/2021/a/a7620_o_html/A_76_20E.pdf> accessed 25 July 2024.

5 NASA, “The Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids For Peaceful Purposes” (13 October 2020), available at <<https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf>> accessed 25 July 2024.

6 O. Bittencourt et al (eds), *Building Blocks for the Development of an International Framework for the Governance of Space Resource Activities: A Commentary* (Eleven International Publishing 2020). Note that the author of the present chapter was a member of the Hague International Space Resources Working Group which produced these building blocks.

7 M. Elvis and T. Milligan, “How Much of the Solar System Should We Leave as Wilderness?” (2019) 162 *Acta Astronautica* 574.

since these measures are meant to enable safe and orderly use of resources, by restricting activities and/or access to a certain area. These proposed measures and their goals reflect the pro-use nature of the space governance regime, and show that most recent developments in the governance of space resource activities are intended to facilitate the extraction and use of space resources.

In turn, this chapter argues the need for an altogether new approach to non-use measures for space resources based on Article 1 OST: a general approach of non-use of space resources for activities other than scientific research is required in order to protect the Earth environment. This is not a non-use measure to protect space resources themselves or to protect the space environment but rather to protect the terrestrial environment for the ‘interests and benefits of all peoples’ from the consequences of a space-resource fuelled extension of the existing economic paradigm. Hence, this chapter starts by clarifying what space resources are and how they are currently governed (section 2). Thereafter, the pro-use aspects of the OST are outlined, together with limitations to such use, and alternate paths – both a past one and proposed ones – are introduced, which focus more on non-use in the governance of outer space (section 3). The reasons for a more general paradigm shift away from use of space resource are presented (section 4) before the manner through which such a shift could take place is discussed (section 5).

2 Space Resource Governance

2.1 *What Are Space Resources?*

The Hague International Space Resources Governance Working Group defines a space resource as “an extractable and/or recoverable abiotic resource *in situ* in outer space”⁸ (*italics in original*). This is the generally used definition and is deliberately vague so as to be broad. Space resources is thus a term that can cover everything from lunar regolith (essentially very fine, sand like, crushed rock) to platinum group metals and everything in between.⁹ It can also include renewable resources such as solar energy¹⁰ but, as this is a ‘non-extractable’ and ‘renewable’ resource, this is generally excluded from the discussion of

⁸ Bittencourt et al (n 6).

⁹ L. P. Keszthelyi et al, “Assessment of Lunar Resource Exploration in 2022” (2023) *United States Geological Survey Circular* 1507.

¹⁰ *ibid.*

space resource governance¹¹ and is not considered here. Further, the term 'space resources' does not refer to biological resources either terrestrial or extraterrestrial, the former as they are not generally subject to either Article I or II OST (but would fall under Article IX OST, being a potential source of contamination of celestial bodies), and the latter would be a significant discovery (as it would be the discovery of extraterrestrial life) necessitating their own governance regime (although they would also fall under Article IX OST, being a potential sources of contamination of Earth and potentially a threat to the Earth's environment).

Public discussions of space resources often focus on a broad array of precious metals and rare earth minerals which generate proclamations of trillion-dollar asteroids.¹² Notwithstanding such hype, the primary focus of any resource extraction activities in the near future is going to be water,¹³ in the form of ice or in 'clays'. Water is a valuable resource in space: humans drink it; it can be split into hydrogen and oxygen which can be used to produce

11 UNCOPUOS, "Australia's response to the invitation to provide information on the mandate and purpose of the Working Group on Legal Aspects of Space Resource Activities under the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space" (2022) UN Doc A/AC.105/C.2/2023/CRP.7; UNCOPUOS, "Canada's Submission to the Working Group on Legal Aspects of Space Resource Activities of the Legal Subcommittee on UNCOPUOS" (2023) UN Doc A/AC.105/C.2/2023/CRP.11; UNCOPUOS, "Proposed French Contribution to the Working Group on Legal Aspects of Space Resource Activities" (2023) UN Doc A/AC.105/C.2/2023/CRP.12; UNCOPUOS, "Contribution of the Grand Duchy of Luxembourg on the Mandate and Purpose of the Working Group on Legal Aspects of Space Resource Activities" (2022) UN Doc A/AC.105/C.2/2023/CRP.16; UNCOPUOS, "Submission by New Zealand to the UNCOPUOS Legal Subcommittee on the Mandate and Purpose of the Working Group on Legal Aspects of Space Resource Activities" (2023) UN Doc A/AC.105/C.2/2023/CRP.18; UNCOPUOS, "Submission on the Mandate and Purpose of the Working Group on Legal Aspects of Space Resource Activities" (2022) UN Doc A/AC.105/C.2/2023/CRP.20; UNCOPUOS, "Initial Submission by the Delegation of the United States of America to the United Nations Committee on the Peaceful Uses of Outer Space Legal Subcommittee Working Group on the Legal Aspects of Space Resource Activities" (2023) UN Doc A/AC.105/C.2/2023/CRP.37; UNCOPUOS, "Submission by the Delegation of China to the Working Group on Legal Aspects of Space Resource Activities of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space" (2024) UN Doc A/AC.105/C.2/2024/CRP.5.

12 See eg J. Carter, "A Bizarre Trillion-Dollar Asteroid Worth More Than Our Planet is Now Aligned with the Earth and Sun' *Forbes*" (*Forbes*, 5 December 2020) available at <<https://www.forbes.com/sites/jamiecartereurope/2020/12/05/a-bizarre-trillion-dollar-asteroid-worth-more-than-our-planet-is-now-aligned-with-the-earth-and-sun/>> accessed 25 July 2024.

13 P. D. Spudis, *The Value of the Moon: How to Explore, Live, and Prosper in Space Using the Moon's Resources* (Smithsonian Books 2016), 120–124.

air and fuel; and it can be used as radiation shielding. As to lunar regolith, it can be used as a building material and radiation shield.¹⁴ In light of US and Chinese plans to establish a long-term human presence on the Moon, lunar resources (water and regolith being the primary resource but there are other mineral resources that may be of interest) will have value in support of such endeavours,¹⁵ even without the development of wider economic activity (such as commercial lunar bases or industrial facilities).

However, much of the discussion about space resources remains theoretical. No one has yet conducted any substantive activities and it is consequently not clear what they will look like once initiated. It is also worth noting that the spatial body the activity is being conducted on will potentially have an impact on what 'resource activities' actually mean. On the Moon, it could rather resemble strip mining as huge quantities of lunar material (regolith) need to be 'processed' to extract water from lunar clays or minerals from lunar regolith, while, for an asteroid, extraction could be more akin to processing a pile of gravel as many asteroids are little more than loosely bundled balls of dirt and debris.

2.2 *How are Space Resources Governed?*

International law governing activities in outer space began to be discussed seriously in the late 1950s. This resulted in the creation of UNCOPUOS,¹⁶ the primary UN body for the discussion of activities relating to the peaceful uses of outer space. It is comprised of two subcommittees: the scientific and technical subcommittee, and the legal subcommittee. The UN Office for Outer Space Affairs (UNOOSA) serves as the committee's secretariat. UNCOPUOS laid the foundation for the Outer Space Treaty of 1967 with UN General Assembly Resolutions 1721¹⁷ and 1962.¹⁸ These two resolutions promulgated some of the core principles of space law, chief among them the principles of freedom of use of outer space and celestial bodies and the non-appropriation principle (the idea that no State can make 'territorial' claims in outer space). These principles would become Articles I and II of the Outer Space Treaty of 1967, the first of five UN space law treaties.

14 *ibid* 120; Keszthelyi et al (n 9).

15 Keszthelyi et al (n 9).

16 UNCOPUOS was first established as an *ad hoc* committee in 1958 (UNGA Res 13/1348 (1958) GAOR 13th Session) before becoming a permanent committee the following year (UNGA Res 14/1472 (1959) GAOR 14th Session).

17 UNGA Res 16/1721 (1961) GAOR 16th Session.

18 UNGA Res 18/1962 (1963) GAOR 18th Session.

The Outer Space Treaty provides the foundational legally binding framework for the space governance regime. This treaty was followed by four additional UN treaties: the Rescue Agreement,¹⁹ which deals with the rescue and return of astronauts and space objects and expands upon the provisions of Article v of the Outer Space Treaty; the Liability Convention,²⁰ which expands upon the Outer Space Treaty's provisions on liability for damage caused by space objects; the Registration Convention,²¹ which creates an obligation to register details of space objects with the UN; and the Moon Agreement,²² which calls for the creation of a space resource governance regime when space resource exploitation "is about to become feasible".²³ The Moon Agreement has the lowest number of ratifications of any of the five space treaties, and for that reason is regarded as the least successful, but it did receive sufficient ratifications²⁴ to enter into force. However, opposition to the 'common heritage of mankind' principle in Article 11 of the Moon Agreement has led to a widespread sidelining of the treaty – there are now more signatories to the US-led Artemis Accords than there are parties to the Moon Agreement, and over a third of the parties and signatories to the Moon Agreement have now signed up to the Artemis Accords.²⁵

Since the Moon Agreement in 1979, UNCOPUOS has not developed another treaty. The driver of space law developments over the past four decades has been UN General Assembly resolutions, 'soft law', non-binding instruments, and functional treaties developed outside of the UN framework such as the International Space Station Agreement.²⁶ Key examples of these

19 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement) (adopted 22 April 1968, entered into force 3 December 1968) 672 UNTS 119.

20 Convention on International Liability for Damage Caused by Space Objects (Liability Convention) (adopted 29 March 1972, entered into force 1 September 1972) 961 UNTS 187.

21 Convention on Registration of Objects Launched into Outer Space (Registration Convention) (adopted 14 January 1975, entered into force 15 September 1976) 1023 UNTS 15.

22 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement) (adopted 18 December 1979, entered into force 11 July 1984) 1363 UNTS 3.

23 Moon Agreement, art 11, para 5.

24 UNCOPUOS, "Status of International Agreements Relating to Activities in Outer Space as at 1 January 2023" (2023) UN Doc A/AC.105/C.2/2023/CRP.3.

25 *ibid*; US Department of State, "Artemis Accords", available at <<https://www.state.gov/artemis-accords/>> accessed 25 July 2024.

26 Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on

developments include: the 1992 Nuclear Power Sources Principles,²⁷ the 2007 Space Debris Mitigation Guidelines²⁸ and the 2020 resolution on Responsible Behaviours in Outer Space.²⁹ National legislation and State practice have also been an important source of developments. The 2015 US legislation on space resources³⁰ is perhaps the most prominent example. That legislation launched a global debate on space resources, including during sessions of UNCOPUOS, which now has a standing working group on space resources within the legal subcommittee.³¹

The debate on space resources that emerged in the wake of the 2015 US legislation spawned several non-governmental initiatives such as The Hague International Space Resources Governance Working Group which produced the Building Blocks for the Development of an International Framework on Space Resource Activities.³² The Hague Building Blocks have been submitted to UNCOPUOS³³ and its Legal Subcommittee's Space Resources Working Group.³⁴ They are intended to serve as groundwork for intergovernmental discussions on a potential international framework for space resource activities. Other initiatives followed, such as the Vancouver Recommendations on Space Mining, which were drafted by a group of experts and "intended to augment other recommendations and guidelines",³⁵ in particular the Building Blocks and the Breaking Ground Trust's Recommendations, which is guidance

the Civil International Space Station (ISS Agreement) (adopted 29 January 1998, entered into force 29 January 1998) TIAS 12927.

27 UNGA Res 47/68 (1992) GAOR 47th Session.

28 UNGA Res 62/217 (2008) GAOR 62th Session.

29 UNGA Res 75/36 (2020) GAOR 75th Session.

30 US Commercial Space Launch Competitiveness Act, Public Law 114-90, 114th Congress, 25 November 2015, 51 U.S.C., Title IV.

31 UNCOPUOS, "Report of the Committee on the Peaceful Uses of Outer Space: Sixty-Fourth Session" (2021) UN Doc A/76/20, Annex III.

32 Bittencourt et al (n 6).

33 UNCOPUOS, "Building Blocks for the Development of an International Framework on Space Resource Activities" (2020) UN Doc A/AC.105/C.2/L.315.

34 UNCOPUOS, "Building Blocks for the Development of an International Framework for the Governance of Space Resource Activities: A commentary" (2022) UN Doc A/AC.105/C.2/2022/CRP.23.

35 Outer Space Institute, "Vancouver Recommendations on Space Mining" (2020), available at <https://outerspaceinstitute.ca/osisite/wp-content/uploads/Vancouver_Recommendations_on_Space_Mining.pdf> accessed 25 July 2024. Note that the author of the present chapter has signed the Vancouver Recommendations open letter, though he was not involved in its drafting.

regarding lunar resources management put together through a stakeholder-driven process.³⁶

In 2020 the US-led Artemis Accords were announced. The Artemis Accords are an initiative, with the status of a Memorandum of Understanding, tied to the US lunar exploration programme of the same name. The Artemis Accords lay out several core principles for governance of activities on the Moon, with a specific focus on space resources, with the intention of establishing 'best practices' and shaping the development of future international law. While generating controversy particularly for being developed outside of UNCOPUOS,³⁷ the Artemis Accords have, as of July 2024, been signed by 43 States,³⁸ several of which are also party to the Moon Agreement.³⁹

Despite this variety of instruments of different legal nature, Articles I and II of the Outer Space Treaty are the focal point for the debate on the legalities of space resource utilisation. Article I declares outer space, including the Moon and celestial bodies, free for use by all States. Article II stipulates that outer space "is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means". An important debate centres on the seeming contradiction between the freedom to make use of the Moon and celestial bodies (including the resources of those bodies) articulated by Article I OST and the prohibition of national appropriation. Already during the drafting of the Outer Space Treaty, the French delegation argued that it should be clarified whether the freedom to use includes the freedom to exploit 'minerals' in outer space.⁴⁰ While the debate formally continues at UNCOPUOS, in particular within the space resources working group,⁴¹ there is an acceptance that space resources, once extracted, can be 'appropriated' as part of the freedom of use. Indeed, the past decade has seen an emerging consensus around the long-held US view that resources, once extracted, are capable of being appropriated.⁴² Article II OST is thus understood as focusing on

36 Breaking Ground Trust, "Deliberation on Our Resource Rights (DOORR) Recommendations" (2022), available at <<https://static1.squarespace.com/static/6047fb883de62945d915a26d/t/61f8badaf4d4b322db07b76a/1643690903716/DOORR-Recommendations>> accessed 25 July 2024. Note that the author of the present chapter was a participant in the DOORR process and is currently holder of Breaking Ground's International Diplomacy seat.

37 UNCOPUOS, "Report of the Legal Subcommittee on Its Sixtieth Session, Held in Vienna from 31 May to 11 June 2021" (2021) UN Doc A/AC.105/1243, para 31.

38 US Department of State (n 25).

39 UNCOPUOS, "Status of International Agreements Relating to Activities in Outer Space as at 1 January 2023" (2023) UN Doc A/AC.105/C.2/2023/CRP.3.

40 *ibid* 8.

41 See eg UN Doc A/AC.105/C.2/2023/CRP.7 (n 11).

42 Cheney (n 2) 112.

appropriation of ‘territory’ rather than a broader ban on any appropriation.⁴³ In that sense, Article II does not prohibit use; it simply stipulates that use does not give rise to rights of national appropriation of territory or space.⁴⁴ Space resources can therefore be used, and thus ‘appropriated’.

3 Use and Non-use in Outer Space Law

3.1 *The Pro-use Outer Space Treaty*

The Outer Space Treaty is a pro-use treaty. Article I OST states that outer space, including the Moon and other celestial bodies, “shall be free for exploration and use by all States”. When combined with the declaration in the preamble that humankind has a “common interest” in the progress of the “use of outer space”, it is clear that the freedom of ‘use’ is intended as a far-reaching and permissive freedom. An examination of the negotiating record further confirms that the intention was for the freedom of use to have a broad scope and include resources.⁴⁵

However, this is not an unlimited freedom. The OST indeed contains several restrictions, such as that activities aiming at the use of outer space must be carried out in accordance with international law and in support of peace, security, international cooperation and understanding (Article III). Such activities must also have exclusively peaceful purposes (Article IV). Articles I and IX contain further caveats to the freedom of use that are relevant to this Chapter’s argument. Article I provides that use shall be “carried out for the benefit and in the interest of all countries”. Article IX then stipulates that States are to conduct activities with “due regard to the corresponding interests of all other States Parties”, in such a manner as to avoid “harmful contamination” and adverse changes in the environment of Earth, the Moon and other celestial bodies, as well as “harmful interference” with the activities of other States.

Two additional provisions are worth noting, although they do not limit the freedom of use per se. Article VI stipulates that States are responsible for the activities of their nationals and are required to authorise and continually supervise those activities. Consequently, non-State actors do not escape the

43 P. J. Blount “Outer Space and International Geography: Article II and the Shape of Global Order” (2018) 52 *New England Law Review* 95, 102–103.

44 See the statement by the Soviet Delegation in UNCOPUOS “Committee on the Peaceful Uses of Outer Space Legal Sub-Committee: Fifth Session: Summary Record of the Sixty-Third Meeting” (1966) UN Doc A/AC.105/C.2/SR.63, 10.

45 Cheney (n 2) 112.

provisions of the OST, although the full extent of a State's obligation to "continually supervise" non-State activities needs clarification.⁴⁶ Moreover, Article II's non-appropriation principle clarifies that no activity or declaration can give rise to national appropriation. While, as examined above, not a prohibition on any activity itself, this principle nonetheless further confirms that use is not unlimited or without restriction.

3.2 *Alternative Path: the Moon Agreement*

The Moon Agreement provides a possible 'alternate' path that space law could have followed in terms of its framing of the freedom of 'use'. While the Moon Agreement was intended to develop the OST rather than deviate from it, it did not garner broad support. Its low number of State parties⁴⁷ makes it, in the eyes of many, a failed treaty. That said the Moon Agreement is an active and valid treaty, binding on those States that are party to it. Without delving into the reasons behind the fate of this treaty, it is worth pointing out a few novelties found in the Moon Agreement, which could have modified the freedom of use, had this treaty become the applicable legal framework for activities on the Moon.

The Moon Agreement privileges scientific activities more explicitly than the OST did.⁴⁸ While Article 6 of the Moon Agreement does not exclude commercial or non-scientific activities from the scope of the freedom of use, it does have an impact if States Parties to the Moon Agreement find themselves having to reconcile competing uses, such as whether to grant a mining or scientific exploration licence, giving priority to the latter. The Moon Agreement also raises the notion of protecting areas having special scientific interest and "international scientific preserves", through a designation process to be developed.⁴⁹ This idea has not been further developed under the auspices of the

46 A point China has made to the Space Resources Working Group, see UNCOPUOS, "Submission by the Delegation of China to the Working Group on Legal Aspects of Space Resource Activities of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space" (2024) UN Doc A/AC.105/C.2/2024/CRP.5, section III(d), 3.

47 17 as of 5 January 2024, following Saudi Arabia's withdrawal, see UNCOPUOS, "Status of International Agreements Relating to Activities in Outer Space as at 1 January 2023" (2023) UN Doc A/AC.105/C.2/2023/CRP.3; "Withdrawal by Saudi Arabia from the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" Ref: C.N.4.2023.TREATIES-XXIV.2 (Depositary Notification), available at <<https://treaties.un.org/doc/Publication/CN/2023/CN.4.2023-Eng.pdf>> accessed 25 July 2024.

48 Compare OST art I and Moon Agreement art 6(2).

49 Moon Agreement, art 7(3).

Moon Agreement, but the idea of a multilateral designation of protected areas is worth noting.

Article 7(1) provides one of the stronger aspects of environmental protection in space law:

In exploring and using the moon, States Parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing adverse changes in the environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise. States Parties shall also take measures to avoid harmfully affecting the environment of the earth through the introduction of extra-terrestrial matter or otherwise.

Hence, according to Article 7(1), States not only have to avoid negatively impacting the Earth environment, as was also provided in the OST, but also the environment of the Moon itself. The environment of this celestial body is thus considered worthy of protection beyond its utility to human activity or scientific investigation, notwithstanding the effects on the Earth.

Article 11 is the aspect of the Moon Agreement that generally gets the most attention as it provides, in its first paragraph, that “[t]he moon and its natural resources are the common heritage of mankind”. Article 11’s main stipulation is that, in the event that space resource activities become feasible, the parties to the Moon Agreement should develop an international regime to govern the exploitation of these resources.⁵⁰ This regime should exist to facilitate the orderly and safe development, rational management, and use of the natural resources of the Moon, as well as the ‘equitable sharing’ of the benefits derived from the resources.⁵¹ Hence, as with the OST (and other resource treaties of the era), there is a clear pro-use assumption, but the multilateral regime outlined under the Moon Agreement for the management of exploitation of resources would have further restricted the scope of the freedom of use.

Rather than a possible future, the Moon Agreement highlights a possible alternative past; it is a reminder that the space governance regime that currently exists was not the only possible pathway. This means that future space governance regimes also have room for alternative futures.⁵² It is increasingly

⁵⁰ *ibid* art 11(5).

⁵¹ *ibid* art 11(7).

⁵² A. Marino and T. Cheney, “Centring Environmentalism in Space Governance: Interrogating Dominance and Authority Through a Critical Legal Geography of Outer Space” (2023) 63 *Space Policy* 101521.

clear that the Moon Agreement will not be the governance framework for the upcoming activities on the Moon. This treaty's days may be numbered as an increasing number of States that are either parties or signatories to it are turning to another governance framework and joining the United States (US)-led Artemis Accords.⁵³ Moreover, it appears that the parties to the Moon Agreement, also those that have not signed up to the Artemis Accords, are failing to take the requisite action under Article 11 as space resource activities now appear 'feasible' and thus it would be time for the regime called for by Article 11 to be developed.

3.3 *Proposed Non-use Measures': 'Wilderness zones'*

While the OST lacks non-use measures specifically focused on space resources, there are proposals for non-use measures emerging due to the interest in conducting space resource activities. In addition to heritage zones, which are proposed to prevent damage to heritage sites, such as the Apollo 11 landing site, and safety zones, which are focused on the safety of those operating on a celestial body (whether conducting a resource activity or not), there have been proposals of wilderness zones.

The concept of wilderness zones for outer space was proposed by astronomer Martin Elvis and space ethicist Tony Milligan⁵⁴ as a measure to ensure the availability of accessible space resources in the long run. Elvis and Milligan argue that, with even modest levels of exponential population and economic growth, the growth that the resources of the solar system can support is considerably more limited⁵⁵ than the headline figures of space resource advocates indicate. Thus, they propose setting a portion of the solar system aside as a 'wilderness' zone to ensure the availability of space resources in the future to support human economic development in space and to reduce the risk of 'exhaustion' of the resources of the solar system.

Wilderness zones are more properly 'non-use' measures as defined by this volume, as they are aimed at ensuring the 'sustainability' of space resources. Wilderness zones are a resource-specific or resource-focused 'non-use measure'. These measures do not currently exist and remain, for the time being, an academic proposal. However, they could serve as inspiration in the

53 7 out of 21 as of 10 March 2024. For Moon Agreement State parties, see UNCOPUOS, "Status of International Agreements Relating to Activities in Outer Space as at 1 January 2023" (2023) UN Doc A/AC.105/C.2/2023/CRP.3. The list of countries that have signed up to the Artemis Accords is available on the US Department of State website, available at <<https://www.state.gov/subjects/artemis-accords/>> accessed 25 July 2024.

54 Elvis and Milligan (n 7).

55 *ibid.* Their 'worst case scenario' is about 400 years.

development of a future legal regime for outer space activities. As such, they represent an alternative future, where parts of the solar system resources are set aside, protecting them at least temporarily against exploitation.

4 The Case for a Paradigm Shift

Space resources have been a popular topic over the last decade. Media focus tends to be on the crudely calculated economic value of space resources, generating headlines about ‘trillion-dollar asteroids’.⁵⁶ Wealth (or greed)⁵⁷ is certainly a strong motivator for space resource endeavours and advocacy, but many advocates also argue that space resources are a climate solution⁵⁸ and “a way beyond the limits to growth, and toward a peaceful and prosperous future”.⁵⁹ This view is common, and rooted in a response to the 1970s ‘Limits to Growth’ thesis promulgated by the Club of Rome.⁶⁰ The central tenant of that thesis was that the threat to humanity is a shortage of resources in the face of limitless growth.

In fact, the unfolding climate crisis is not borne of a shortage of resources, but rather of the over-consumption of currently available resources and of the resulting emissions and pollution. While the climate and environmental movements have developed their arguments and concerns in response to this reality, the space expansionist movement, instead, still focuses on the threats of ‘limits to growth’. Space expansionists argue that space resources can be a part of the ‘green transition’ by moving polluting industries off-Earth, allowing a solution which would also not impact the prospect of growth. A rejection of any form of degrowth argumentation is indeed a key aspect of space expansionism, even when it is framed as an environmentalist movement.

56 See eg R. Waugh, “Single asteroid worth £60 trillion if it was mined – as much as world earns in a year” (*Daily Mail*, 31 July 2014), available at <<https://www.dailymail.co.uk/sciencetech/article-2147404/Found-The-single-asteroid-thats-worth-60-billion-years-financial-output-entire-WORLD.html>> accessed 30 August 2023.

57 One of the main motivations argues M. Elvis, *Asteroids: How Love, Fear, and Greed Will Determine Our Future in Space* (Yale University Press 2021).

58 *ibid*; W. E. Burrows, *The Survival Imperative: Using Space to Protect Earth* (1st trade paperback ed, Forge Books 2007); C. S. Cockell, *Space on Earth: Saving Our World by Seeking Others* (Macmillan 2007).

59 D. Wingo, *Moonrush: Improving Life on Earth with the Moon’s Resources* (Apogee Books 2004), 11.

60 D. H. Meadows and Club of Rome (eds), *The Limits to Growth: A Report for the Club of Rome’s Project on the Predicament of Mankind* (Universe Books 1972).

However, as seen below, these arguments focusing on the fundamental importance of space resources in addressing current environmental crises can, and must, be opposed. Space resources may be part of a transition to a more ecological, and prosperous, future. However, this will not occur on a timescale relevant to the unfolding climate crisis. Further, without an actual transition away from the existing economic and political paradigm, space resources risk fuelling the engine of extractivist capitalism that has generated the climate crisis rather than being a solution.

4.1 *The Long Exhaustion and the Final Frontier*

The ‘Long Exhaustion’ is a concept that helps to unpack the structures of the extractivist system that has given rise to the climate crisis. It also helps to elucidate how space expansionism risks extending and exacerbating that extractivist system.

The ‘Long Exhaustion’ was developed by Elizabeth Carolyn Miller⁶¹ and refers to the exhaustion of both specific sources of natural resources and natural resources in general (ie the exhaustion of a specific coal mine necessitating the opening of new coal mines in new areas and the prospect of the exhaustion of all extractable coal). This is a particular concern for non-renewable resources, although an unsustainable level of extraction of renewable resources would risk exhausting even renewable resources. According to Miller, “extraction-based life is a future-depleting system”.⁶² An extractive economic system, particularly in the case of mining which is the focus of her study, is literally ‘future depleting’ as with every tonne of ore extracted, the total quantity of ore available depletes. This is especially true for resources which are consumed by industrial processes such as coal burned for power or heat – or, in the case of outer space, water used to produce propellant. Exhaustion is the logical outcome of extraction of finite materials. Therefore, extractive capitalism needs frontiers – resource frontiers, waste frontiers, labour frontiers – as endless growth requires endless supply. The story of capitalism can be read as an ongoing expansion in search of those frontiers. Thus, there is an inherent link between exhaustion and imperialism (and neo-colonialism); as frontiers are exhausted, new frontiers must open.

Space as a frontier, indeed the ‘final frontier’, is a common trope in both science fiction and space advocacy. This frontier has rarely, explicitly, been described as a ‘resource’ frontier (at least by supporters of space expansionism)

61 E. C. Miller, *Extraction Ecologies and the Literature of the Long Exhaustion* (Princeton University Press 2021).

62 *ibid* 12.

but that is a large aspect of the argument. It is necessary to consider the broader implications of the concept of space as a frontier, which includes the idea of settlement or 'colonisation', and space resources are indeed generally seen as a part of a holistic programme for human 'expansionism'. Thus, the 'opening' of the space frontier is seen as an event of transformative potential. The resources of the solar system are viewed as a way to solve any issues of scarcity that may threaten the human future. Climate change and environmental issues can be solved by 'exiling' the industrial and mining sacrifice zones to outer space.⁶³ Further, there is a narrative of the benefits to be derived from 'taming' the frontier and the hazards of nature (ie necessity is the mother of invention and therefore the harshness of the space frontier will generate a need for inventiveness).⁶⁴ These framings are not NewSpace⁶⁵ developments – Kennedy described space as a 'new frontier' and explicitly linked it to the 'old frontier' of the American West, further arguing that the 'challenge' was in essence the point.⁶⁶ Many Presidents continue this rhetoric but the Paine Report, intended to provide a long-term 'direction' for post-Apollo NASA,⁶⁷ went further and claimed that expansion into the solar system will remove the "terrestrial limits to human aspirations" and "will prove of incalculable value to Planet Earth and to the future of our species".⁶⁸

While the conception of space as the 'next' even 'final frontier' has a relatively long history it particularly gained traction among space advocates in the 1980s and 1990s. Part of this was the initial flickering of what would grow into NewSpace but the interest in space resources specifically was ignited by the claims of John Lewis in his seminal book 'Mining the Sky' that asteroidal metal resources could supply the needs of Earth (and raise 'everyone's' standard of living to that of the average Westerner) for the next four hundred million

63 B. Kahn, "Jeff Bezos: 'We Need to Move All Polluting Industry Into Space'" (*Gizmodo*, 20 July 2021), available at <<https://gizmodo.com/jeff-bezos-we-need-to-move-all-polluting-industry-into-1847328711>> accessed 25 July 2024.

64 A common theme in Robert Zubrin's space advocacy, see R. Zubrin, *Entering Space: Creating a Spacefaring Civilization* (Tarcher/Putnam 1999); R. Zubrin and R. Wagner, *The Case for Mars: The Plan to Settle the Red Planet and Why We Must* (Touchstone 1997).

65 NewSpace is a term used to describe the 'entrepreneurial' / 'market driven' space industry.

66 J. F. Kennedy, "Text of President John Kennedy's Rice Stadium Moon Speech" (12 September 1962), available at <<https://er.jsc.nasa.gov/seh/ricetalk.htm>> accessed 25 July 2024.

67 J. M. Logsdon and Laddusaw, *Ronald Reagan and the Space Frontier* (Palgrave Macmillan, 2018) 236–237.

68 *Pioneering the Space Frontier: The Report of the National Commission on Space* (Bantam Books 1986) 21.

years.⁶⁹ This created an apparent economic rationale for space expansionism and would enable 'humanity' to overcome the ecological limits of the Earth, especially non-renewable mineral resource limits, thus enabling us to build a techno-utopian future, and ensure the survival of the endless growth required of liberal 'end of history' capitalism.⁷⁰ In various guises, space resources are presented as the way out of the 'planetary boundaries' of the Earth's resource capacity and are a necessity to ensure the continuation of liberal capitalism or as it is usually framed by space advocates: 'humanity'.

However, undermining this line of thinking is the reality that space resources are not infinite. Barring some miraculous discovery of faster than light travel the solar system is a closed system (extrasolar objects being too insignificant to meaningfully add to the total mass available) and once the resources of this solar system are exhausted then humanity faces a resource cliff edge. Further, calculations such as those of John Lewis' 400 million years of resources ignores several things, in particular the economic costs of extracting resources: just because a resource exists does not mean it is 'economically viable' to extract it (much of the iron mass of Earth is trapped in the molten core and is thus unavailable for human use). Similarly, these calculations ignore the realities of exponential growth, which, even at a relatively modest rate, could consume the available resources of the solar system within a few hundred years (albeit the very worst-case scenario).⁷¹ Therefore, rather than avoiding the 'long exhaustion', utilisation of space resources merely delays it.

Proposals to utilise the resources of outer space therefore need to be understood in this context. While expansion into outer space is presented by its proponents as opening new or transformative possibilities, relying on space resources only offers a time-limited continuation of the extractivist model of 'endless' growth: the resources of the solar system might be vast, but they too are not inexhaustible. Hence, instead of 'solving' the problem of the 'long exhaustion', the utilisation of space resources, under the existing economic and political paradigm, can only offer to delay that final exhaustion, while perpetuating the ecological damage of resource extraction on Earth by maintaining the extractivist paradigm.

Indeed, the motifs of space expansionists augur poorly for the terrestrial environment. They claim to alleviate any real need to modify our economic

69 J. S. Lewis, *Mining the Sky: Untold Riches from the Asteroids, Comets, and Planets* (Helix Books 1997) 194.

70 To borrow a phrase from F. Fukuyama, *The End of History and the Last Man* (Free Press 1992).

71 Elvis (n 57) 231–236.

behaviour, the same behaviour that has caused the current ecological catastrophe. The logic of ecological imperialism will thus continue to be applied terrestrially with the consequent ecological damage; from palm oil plantations replacing rainforest, to deep-seabed mining, and polar oil 'exploration', the West is likely to continue to relentlessly seek resource subsidies and ghost acres⁷² to fuel our unsustainable lifestyles.

4.2 *Climate Crisis, Not Resource Shortage*

Despite what space expansionists argue,⁷³ humanity's greatest challenge is not a shortage of resources. It is here instead argued that, as indicated in the most recent IPCC report, the biggest issue facing humanity is climate change and associated environmental crises.⁷⁴ To tackle this crisis, net-zero carbon emissions must be reached – and in reality, carbon negativity will be required. Even the former, less ambitious aim seems increasingly elusive. Since "emissions reliably track economic growth",⁷⁵ this failure is in large part due to the continued and increasing consumption of resources, which increased by a factor of eight and doubled per capita in the 20th century.⁷⁶ This is particularly problematic as oil remains the driver of the global economy and coal continues to be used at scale.⁷⁷ Hence, the primary problem facing humanity today is not a shortage of resources but the pollution generated by over-consumption. The environment lacks capacity to deal with the pollution, waste and consumption of the existing economic model. As Alexander Etkind has said, we will run out of air before we run out of resources.⁷⁸ Therefore, the focus of space expansionists on the necessity of acquiring more resources is misplaced, and their idea that mining and industry can be 'off-worlded', thus moving the emissions,

72 The phrases 'resource subsidies' and 'ghost acres' refer to the reliance upon the natural resources and agricultural products of colonised regions outside of Europe and the West more broadly in order to fuel our economic systems. The resource subsidies and ghost acres allow Europe, and the West, to exceed the ecological limits of our regions and even to reduce the ecological strain on our regions due to reliance upon the resources and acres of the non-European world. Palm oil is perhaps the best example of this phenomenon – on this, see eg M. Haiven, *Palm Oil: The Grease of Empire* (Pluto Press 2022).

73 Wingo (n 59) 9–11.

74 IPCC, "Climate Change 2022: Impacts, Adaptation and Vulnerability, Summary for Policy Makers" (2022), available at <<https://www.ipcc.ch/report/ar6/wg2/>> accessed 20 September 2024.

75 A. Etkind, *Nature's Evil: A Cultural History of Natural Resources* (Polity Press 2021) 5.

76 *ibid* 290–291.

77 *ibid*.

78 *ibid* 5.

is not a plan that can be implemented on a timescale that can meaningfully combat climate.

While the general focus to addressing climate change is on carbon emissions, if a real solution is going to be found, the broader systematic issues that gave rise to such ecological crisis must be considered. Climate change is ultimately rooted in the conceptualisation of the relationship between humanity and nature. A radical transformation of our thinking let alone our economic system is necessary. This shift, as Naomi Klein argues,

will require rethinking the very nature of humanity's power – our right to extract ever more without facing consequences, our capacity to bend complex natural systems to our will. This is a shift that challenges not only capitalism, but also the building blocks of materialism that preceded modern capitalism, a mentality some call 'extractivism'.⁷⁹

It is impossible to reconcile this need for a new paradigm in humans' interactions with nature and the Earth with space expansionism. Moving to space as the new frontier in order to source more resources falls squarely into the traditional economic model based on growth, enabling, the same behaviour that has caused the current ecological catastrophe. Even the 'climate friendly' visions of expanding into space in order to reduce pollution on the Earth environment and/or to enable the creation of renewable energies are not achievable in the timescales required for meaningful climate solutions.⁸⁰ In light of climate change and the Anthropocene, it is posited here that extracting and utilising resources from outer space is not actually beneficial to solve the crises facing Earth and humankind.

5 Rethinking 'Use' of Outer Space Resources

While the freedom of use in Article I OST is a fairly broad freedom, it is contingent upon that use being "carried out for the benefit and in the interests of *all* countries" (emphasis added). Traditionally, discussions of the 'benefits and interests' clause of Article I OST have focused on the benefits stemming from the actual use of outer space and its resources. However, taking a step back, this provision might also provide a mechanism to rethink whether, and if so,

79 N. Klein, *This Changes Everything: Capitalism vs. the Climate* (Penguin 2015) 25.

80 M. Berners-Lee, *There Is No Planet B: A Handbook for the Make or Break Years* (Revised edition, CUP 2020) 133–135.

how, the use of space resources actually enables a better future for *all* humanity. That may mean choosing not to make use of them, and it will certainly mean giving careful consideration of how to make use of them. It absolutely requires a reconsideration of how we think about resources and their use both in space and on Earth.

Article I is not a stand-alone provision. Article III stipulates that all of international law applies to space activities. That should extend to initiatives such as the Sustainable Development Goals (SDGs)⁸¹ and the Paris Climate Change Agreement.⁸² There is ample scope for considering limitations on the use of space resources in line with the SDGs and climate agendas. At the very least, the authorisation of space resource activities under Article VI OST and national legislation needs to take into account the climactic and terrestrial environmental consequences of those proposed activities. Article IX OST will also play a role, as it stipulates that activities shall be conducted “with due regard to the corresponding interests of all other States Parties to the Treaty”, further reinforcing that the freedom of use under Article I is not an unlimited or unrestricted freedom nor can any authorisation of non-State activities under Article VI OST be a *carte blanche*.

5.1 *The Ethics of Use*

Ethics can help in providing a framework in which choices are made. As one might re-examine the freedom of use in outer space, there are several ethical questions to consider in connection not only with such concept as traditionally understood, but also with the concept of non-use and its ramifications.

It is important to consider who gets to use the resource. One can indeed wonder whether the freedom to use those resource really extends to *all* States, given the financial and technological barriers to even getting into outer space let alone extracting, refining and using space resources. In the absence of a distributive regime such as suggested in the Moon Agreement, a further question also merits a critical analysis: are space resources activities, if extractive in nature, really able to be for the benefit and in the interest of all countries, and if so, under which conditions?

This leads to another crucial aspect related to the ultimate purpose of the use, for example, will extracted resources serve to continue business-as-usual on Earth, are they intended to enable a transition to renewables, or are they to be used to further scientific research? While the first purpose is clearly unsustainable, the second would require a shift to a more circular economic

81 UNGA Res 70/1 (2015) GAOR 70th Session.

82 UNFCCC COP, “Adoption of the Paris Agreement” (2015) UN Doc FCCC/CP/2015/L.9/REV/1.

model for these resources to actually create a sustainable future rather than simply delaying the 'long exhaustion'. It is for this reason that James Schwartz argues that "future regulation must legislate the *use* of space resources".⁸³ This use should include ensuring that resources, particularly scarce resources, are not 'wasted' and are "instead reserved for activities that realise greater ethical goods (eg fuel for science missions)".⁸⁴ He makes a case for centring scientific knowledge in the prioritisation of space activities and the use of space resources. Schwartz contends that scientific knowledge is intrinsically and instrumentally valuable because of "the ways they contribute to overall societal welfare and progress".⁸⁵ Therefore, space activities should be those "most likely to make meaningful contributions to science".⁸⁶ Schwartz argues, in particular, that limited resources like lunar water should be reserved (or stewarded) for realising greater ethical goods, such as the advancement of our scientific understanding of the Moon.⁸⁷

There should not be a conflation between use and purpose. The use to which something is put does not mean that it exists for that purpose.⁸⁸ Lunar water may be useful and may eventually be used in order to establish and maintain a human presence on the Moon but that does not mean that is the purpose for its existence. This is particularly important in light of attempts by space expansionists to argue that there is some sort of moral imperative for humanity to expand into outer space.⁸⁹ However, one must remember that use and non-use are choices. It is also worth noting that non-use is not an inherently neutral concept either. It can have a variety of aims and objectives. Stewardship, for example, recognises future potential users as stakeholders,⁹⁰ and that, without restriction on current use, future use may be impossible. This is particularly relevant for consumable resources such as space resources. Use of, say, lunar water will reduce the quantity of that resource for future generations which may render the Moon 'unusable' for future humans (by virtue of removing a key resource for human survival). But who that imagined future user is, where they come from, and what they want is also a choice; that future user is indeed imagined and whose imagination contributes to that imagining is also an ethical choice.

83 J. S. J. Schwartz, *The Value of Science in Space Exploration* (OUP 2020) 157.

84 *ibid.*

85 *ibid* 3.

86 *ibid* 3–4.

87 *ibid* 157.

88 S. Ahmed, *What's the Use? On the Uses of Use* (Duke University Press 2019) 23–25.

89 See, among others, Zubrin (n 64) 216.

90 Ahmed (n 88).

Furthermore, non-use of a given resource might well displace use towards another resource. Here, that might mean that imposing non-use measures on space resources will promote use of terrestrial resources, whether on land or at sea. Comparing costs and benefits of either resource extraction activity might be necessary, but ethical questions might mitigate the obvious response. Milligan argues that, while space resource activities may raise fewer ethical issues than terrestrial mining and are expected to be less environmentally harmful to the space environment than terrestrial mining is to the terrestrial environment, damage will still be done to the locations mined. He argues moreover that one of the ethical issues raised by space mining is whether it needs to happen at all. Terrestrial mining does need to happen to some degree, “but we do not *need* to go to Mars or to the asteroids”.⁹¹ Nonetheless, extracting resources in space needs to be considered in the context of climate change. Space expansionists do have a point that use of space resources would be less environmentally harmful to Earth than continued extraction of terrestrial resources. However, that transition is going to take time, longer than we have to achieve net-zero targets. There is, therefore, the danger that the prospect of a ‘solution’ provided by space resource mining could be used to obfuscate the necessary transition to a more sustainable use of resources. Moreover, making use of space resources does not guarantee a transition, and space resource utilisation could be an expansion of the sum total of resources used by humanity rather than a substitute for terrestrial resource use.

Therefore, the governance framework of future space resource activities needs to consider – and embrace – ethical considerations, such as those presented above. Of course, it is vital that these discussions encompass a global range of ethical frameworks and viewpoints – Western ethics cannot be the sole foundation for the governance of the future of humanity, nor would that be in the interest of all States. That said, the West does need to contribute to the solution, and we cannot simply rely on the rest of the world to solve a problem largely created by the West.

5.2 *Practical Way Forward*

In practical terms, one can wonder not only what measures could enable these aims of non-use for the greater good, but also through which channel such measures might be adopted. As the other chapters in this book discuss, there are existing mechanisms that can provide a basis for thinking about a more sustainable, less extractivist approach to space resources. A total moratorium

91 *ibid* 90.

is probably not a solution, even in the short term. First, non-use measures like total moratoriums have difficulties in regimes that are inherently pro-use such as that created by the OST. States have a right to use outer space and that includes its resources, and, by extension of Article VI OST, they have a right to authorise their nationals to make use of space resources.

However, in line with the ethical arguments discussed, one option may be to make a differentiation between In-situ Space Resource Utilization (ISRU) and 'mining'. A distinction should be drawn between ISRU as a supportive activity which is conducted to facilitate further use and exploration of outer space, primarily scientific use and exploration of outer space, and 'mining' (or 'commercial resource activities') which is a primarily commercial activity carried out for the pursuit of profit as the primary objective. That is not to say that ISRU cannot be carried out by private, profit seeking entities, but the authorisation for the ISRU activities would be relatively limited – ie fulfil the needs (for fuel, water, air, regolith etc) of a lunar outpost operated by NASA or the Chinese space agency. The role of the space mining companies in an ISRU framework would be as government contractors not 'market players'.⁹²

While perhaps not strictly a 'non-use' measure as it allows for some uses, this nevertheless would help ensure that the use of those space resources is for the broader benefit of humanity (by virtue of supporting scientific activities in line with the arguments of Schwartz). It would also limit the potential of such use to further exacerbate the climate crisis and allow for a more rational resource management regime to develop over time. This proposal is related to the concept of a space wilderness zone advanced by Elvis and Milligan, as discussed above in section 3.3. However, it is a more focused proposal targeted at the specific purposes the resources would be used for rather a blanket approach to resources located in certain areas. This approach could be combined with adaptive management and adaptive governance approaches to facilitate the development of an evolutionary regime that is able to incorporate the increased data and understanding of the space environment, the quantity and quality of resources available in the solar system, and the unfolding climate crisis (as well as developments in technology).

The challenge facing space governance is a problem facing broader international law: the challenge of stagnation of formal legal developments⁹³ and the deadlock generated by renewed 'great power' competition such as has been

92 Although those contracts should be competitively tendered, of course.

93 J. Pauwelyn, R. A. Wessel and J. Wouters, "When Structures Become Shackles: Stagnation and Dynamics in International Lawmaking" (2014) 25 *European Journal of International Law* 733.

seen over the competing approaches to space security.⁹⁴ However, there are developments in space law relating to space resources, as introduced above in section 2.2. The volume of submissions to UNCOPUOS' new space resources working group is also a notable development, although the risk of deadlock in that forum is considerable. The US-led Artemis Accords afford perhaps the most realistic way forward for developing a new approach to space resources. They enjoy broad and broadening support and avoid some of the challenges of UNCOPUOS. Pressure from non-governmental organisations through initiatives such as the Hague Building Blocks, the Vancouver Recommendations or the Breaking Ground Trust's Recommendations can help to further shape the future of the Artemis Accords – although that itself depends on the future political landscape. A second Trump presidency will be less receptive to proposals for a more justice-oriented space resources regime than a Democratic regime.

6 Conclusion

The use of space resources has significant potential both in the short and long term. Lunar resources can facilitate the development of lunar research outposts akin to the International Space Station (or Antarctica's extensive research infrastructure) and perhaps open a pathway to the exploration of the solar system on a grand scale. In the longer term, they may facilitate the development of space infrastructure that enables a transition to an ecologically sustainable economic model (space based solar power is one example of such a proposal⁹⁵). However, they may also simply serve as a new frontier for the resource intensive extractivist capitalism that has created the climate crisis. It is vitally important that space resource governance considers how and what those space resources will be used for, in addition to how they can be acquired and commodified. The concept of non-use measures is one avenue to start such reflection, both on how and what space resources should be used for, and on how to create a framework that implements these considerations.

94 United Nations, "Consensus Scuttled in First Committee over Two Competing Draft Resolutions on Space Security, Creating Parallel Processes, Polarization, Say Speakers" (*United Nations: Meeting Coverage and Press Releases*, 31 October 2023), available at <<https://press.un.org/en/2023/gadis3730.doc.htm>> accessed 12 March 2024.

95 J. Ramage, "Solution to the Climate Crisis? Earth Takes a Step Closer to Sustainable Space-Based Solar Power" (*euronews*, 26 June 2022), available at <<https://www.euronews.com/next/2022/06/26/solution-to-the-climate-crisis-earth-takes-a-step-closer-to-sustainable-space-based-solar->> accessed 12 March 2024.

On an initial reading, the Outer Space Treaty is a pro-use treaty. However, as this chapter has argued, this treaty does not provide an unrestricted endorsement of the use of outer space, the Moon, other celestial bodies or resources. Furthermore, it is necessary to think about what 'use' means in the context of the stipulation that such use should be "for the benefit and in the interests of all countries".⁹⁶ This is even more urgent in the context of the climate crisis. A substantial increase in resource consumption is not inherently for the benefit or in the interests of all countries. This is not to dismiss the potential for space resources to contribute to a long term 'climate solution', as part of a long-term fix, not a short-term remedy. In order for space resource utilisation to be any form of solution, it needs to be part of a wholesale reconsideration of humanity's relationship to resources and their consumption.

Thus, the question of use and non-use of outer space and its resources is a vital question for the broader topic of use and non-use of the environment and resources in international law. Outer space is a 'new' resource frontier and if an unrestricted, extractivist model is extended there, it will make it harder to combat the preservation of that model terrestrially. Further, the promise of a 'techno-utopian' climate solution of simply moving polluting industry and mining off Earth will undermine efforts to reduce the impact of mining and industry on Earth; the argument being that we do not need a climate solution because technology is going to save us. On a more optimistic note, space is an arena in which a positive case for a collective approach is potentially easier to make. There are fewer stakeholders, with fewer sunk costs. There also already is an international treaty, which all major States claim is of fundamental and vital importance, which supports a more nuanced reading of 'use', as argued by this chapter. A genuine engagement with 'non-use' of at least some space resources for certain purposes is necessary to adhere to the stipulation that the use of:

outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development.⁹⁷

This is not a call for a space mining moratorium or a ban on the use of space resources. This is a call for space governance as a field and the space industry as a sector to give serious consideration to the meaning of that short simple word in Article I of the Outer Space Treaty: use. What does it mean to use the Moon

96 Outer Space Treaty, art I.

97 *ibid.*

and other celestial bodies? This was a question that the French delegate asked at UNCOPUOS in 1966. As he said, while at that time it may have been hard to conceive of using the Moon for the extraction of minerals, it is “important for all States, and not only those engaged in space exploration, to know exactly what was meant by the term ‘use’”.⁹⁸ Fifty-nine years later, as the first private sector missions to the Moon begin, this is even more crucial. The time to define the scope of the freedom of use is now – and it is important that a broad array of voices contribute to that definition and that debate.

⁹⁸ Blount (n 43) 8.

The Concept of ‘Non-use’ under the Space Legal Framework

Illustration with the Establishment of Safety Zones on the Moon

Anne-Sophie Martin

1 Introduction

New space exploration missions aim to create a sustainable human presence on the Moon.¹ A growing number of countries are joining the space and lunar exploration market, notably in the context of the Artemis programme,² which is the NASA’s project to return astronauts to the Moon³ and to establish a long-term lunar base. Russia and China have also announced plans for a joint International Lunar Research Station.⁴ In addition, private entities⁵ are developing lunar missions as for instance iSpace and Astrobotic. The prospect of new space activities on the Moon, in particular those related to extraction, poses technical and logistical challenges in light of the likely geographical concentration of

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- 1 NASA, “NASA’s Moon to Mars Strategy and Objectives Development, A blueprint for sustained human presence and exploration throughout the Solar System” (2023), available at <https://www.nasa.gov/wp-content/uploads/2023/04/m2m_strategy_and_objectives_development.pdf> accessed 2 August 2023; Euroconsult, “Prospects for Space Exploration” (2022), available at <www.euroconsult-ec.com/press-release/global-governmental-space-exploration-investments-to-reach-31b-by-2031-as-public-and-private-players-reach-for-the-moon/> accessed 2 August 2023.
 - 2 NASA, “Artemis Program”, available at <www.nasa.gov/specials/artemis/> accessed 2 August 2023.
 - 3 US Department of State, “International Cooperation in NASA’s Artemis I Program” (16 November 2022), available at <www.state.gov/international-cooperation-in-nasas-artemis-i-program/> accessed 2 August 2023.
 - 4 S. Neuman, “China, Russia Announce Plan to Build Moon Research Stations” (*NRP*, 10 March 2021), available at <www.npr.org/2021/03/10/975579975/china-russia-announce-plan-to-build-moon-research-station> accessed 2 August 2023.
 - 5 R. Boyle, “A New Private Moon Race Kicks Off Soon” (*Scientific American*, 2022), available at <www.scientificamerican.com/article/a-new-private-moon-race-kicks-off-soon/> accessed 2 August 2023.

resources.⁶ Moreover, operational issues are likely to arise, due to the absence of atmosphere on the Moon, which means that dust and rock particles can have a wide range of negative impacts.⁷

One tool that has been advanced to help with these challenges is that of safety zones, a type of area-based management tool (ABMT) which is meant to restrict or even prohibit use in a zone around an ongoing operation. Safety zones have been included in some recent soft-law instruments, but they are not yet part of the space law legal system. There are in fact challenges in determining how they would fit therein. Indeed, the establishment of safety zones could be considered a breach of this legal system, which principally consists of the 1967 Outer Space Treaty (OST).⁸ In particular, these ABMTs might appear difficult to reconcile with certain principles, such as the free access to outer space, the freedom of exploration and use of outer space, as well as the fact that outer space shall not be subject to national appropriation. However, the OST also contains other overarching obligations and principles, in particular of due regard and cooperation, that could support some form of safety zone. This contribution does not delve into the 1979 Moon Agreement⁹ as it received a limited number of ratifications so far.¹⁰ While it remains a valid international law treaty binding its 17 State Parties (as of January 2025), it is not generally considered the ‘applicable’ legal framework.

This contribution explores the potential development of restrictions to use – and even of non-use measures – in a regime that emphasises the freedom

6 Harvard-Smithsonian Center for Astrophysics, “Growing interest in Moon resources could cause tension, scientists find” (*PhysOrg*, 23 November 2020), available at <<https://phys.org/news/2020-11-moon-resources-tension-scientists.html>> accessed 2 August 2023.

7 NASA, “Apollo 17 Technical Crew Debriefing” (4 January 1973), available at <<https://an.rsl.wustl.edu/apollo/data/A17/resources/a17-techdebrief.pdf>> accessed 2 August 2023; NASA Technical Reports Server, “Results of Examination of the Returned Surveyor 3 Samples for Particulate Impacts” (1972), available at <www.lpi.usra.edu/lunar/strategies/Cour-PalaisEtAl_NASA-SP-284E_Surveyor_3_Part particulate_Impacts.pdf> accessed 2 August 2023; M. Hanlon and B. Cunningham, “The Legal Imperative to Mitigate the Plume Effect: An ‘Aggravation and Frustration’ That Imperils Our History and Our Future” (2019) 43 *Journal of Space Law* 309.

8 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205, 115 States Parties as of January 2025.

9 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (adopted 18 December 1979, entered into force 11 July 1984) 1363 UNTS 3, 18 ILM 1434.

10 S.-M. Wedening and J. W. Nelson, “The Moon Agreement: Hanging by a Thread?” (Institute of Air & Space Law, McGill University, January 2023), available at <www.mcgill.ca/iasl/article/moon-agreement-hanging-thread> accessed 17 April 2025.

of use. As such, it presents the reasons behind the need to develop tools such as safety zones on the Moon, as well as discusses what those measures might consist of (section 2). Then, it analyses whether, and if so how, such new tools could fit in the existing legal regime set by the OST (section 3). Finally, it reflects on how safety zones could serve as stepping stones in the development of new, stricter, ABMTs in space (section 4).

2 The Concept of Safety Zones

In light of the planned increase in missions to the Moon, safety zones are needed because of the geographical concentration of resources and the issue of rock and dust causing damage to equipment (2.1). The concept of safety zones, while not formally codified in international law, has been delineated in soft law instruments, which provide clarifications as to what these ABMTs would consist of (2.2).

2.1 *Why Safety Zones Are Needed*

More than 250 missions to the Moon¹¹ are planned in the next few years.¹² Many of these programmes foresee permanent lunar bases and aim to explore, exploit and use the Moon's natural resources *in situ* or bring them back to Earth.¹³ In the short term, space resources would be used to sustain projects on the lunar surface, but in the long term, the Moon and its resources would represent an essential component in far-flung missions in the solar system. Indeed, lunar and cis-lunar activities constitute a first step towards future Mars missions.

Lunar missions of exploration, including mining activities, intend to identify what resources are really available on the Moon and on other celestial

11 NSR, "Developing Moon Market Propelled by 2050+ Missions and \$105 Billion in Revenue" (10 April 2023), available at <www.nsr.com/nsr-developing-moon-market-propelled-by-250-missions-and-105-billion-in-revenue-through-decade/> accessed 2 August 2023.

12 M. Hanlon, "Lunar mining and Moon land claims fall into a gray area of international law, but negotiations are underway to avoid conflict and damage to spacecraft" (*The Conversation*, 23 August 2022), available at <<https://theconversation.com/lunar-mining-and-moon-land-claims-fall-into-a-gray-area-of-international-law-but-negotiations-are-underway-to-avoid-conflict-and-damage-to-spacecraft-188426>> accessed 2 August 2023.

13 A. Abbid-Madrid, "Space Resource Utilization" (*Planetary Science*, 28 June 2021), available at <<https://doi.org/10.1093/acrefore/9780190647926.013.13>> accessed 15 July 2024.

bodies, where they are located, how they can be extracted,¹⁴ and in which quantity. At the moment, the most valuable of these resources is water. Water is found mainly as ice in shaded craters of the polar regions.¹⁵ It is one of the most important resources for living on the Moon (eg for drinking and growing food). Furthermore, once processed into hydrogen and oxygen, water can also be utilised as fuel to power rockets¹⁶ in order to get back to Earth or to travel beyond the Moon. Other precious resources on the Moon include Earth metals like neodymium and helium-3,¹⁷ both used to generate energy.¹⁸

Ongoing research indicates that there are only a few small areas of the Moon that are rich in both water and rare materials.¹⁹ This concentration of resources could raise potential tensions between actors conducting activities on its surface, as many of the missions are likely to explore and to prospect the same parts of the Moon depending on where resources will be found.

Moreover, when talking about lunar activities, it is necessary to consider the fine dust and small rock fragment (also known as 'regolith') present on its surface.²⁰ Since there is no atmosphere on the Moon, the dust is easily raised when spacecraft land or drive on the lunar surface.²¹ These dust particles can have a very negative impact on machinery and human activities,²² and might also alter historic lunar sites. In addition, lunar activities and infrastructures

14 C. Stuart, "A Race is afoot to make billions from the Moon's resources. Here's the story so far" (*BBC Science Focus*, 17 June 2022), available at <www.sciencefocus.com/space/new-space-race-moon/> accessed 2 August 2023.

15 L. Davic, "How Water on the Moon Could Fuel Space Exploration" (*Space Insider*, 29 March 2012), available at <www.space.com/15094-moon-water-ice-space-fuel.html> accessed 2 August 2023.

16 *ibid.*

17 European Space Agency, "Helium-3 mining on the lunar surface", available at <www.esa.int/Enabling_Support/Preparing_for_the_Future/Space_for_Earth/Energy/Helium-3_mining_on_the_lunar_surface> accessed 2 August 2023.

18 OpenMind BBVA, "Helium-3: Lunar Gold Fever" (14 March 2019), available at <www.bbvaopenmind.com/en/science/physics/helium-3-lunar-gold-fever/> accessed 2 August 2023.

19 Harvard-Smithsonian Center for Astrophysics (n 6).

20 A. Gilbert, "Safety Zones for Lunar Activities under the Artemis Accords" (*Open Lunar Foundation Report*, January 2022) 11, available at <https://uploads-ssl.webflow.com/5e4b7985a58df89b6c254001/61de2458e7af966b631a7f67_Copy%20of%20Pre-Print%20Safety%20Zones%20for%20Lunar%20Activities%20AQG%20Open%20Lunar%20Foundation.pdf> accessed 2 August 2023.

21 Center for Lunar and Asteroid Surface Science, "The Science of Plume Effects" (*University of Central Florida*), available at <<https://sciences.ucf.edu/class/landing-team/the-science-of-plume-effects/>> accessed 2 August 2023.

22 NASA (n 7); NASA Technical Reports Server (n 7); Hanlon and Cunningham (n 7).

(eg rovers, installations) could also contribute to the discharge of substances as gas or fuel that could have an impact on the lunar and space ecosystem.²³

Hence, in this context where more and more activities are being planned on the Moon and taking into account the risks of damage²⁴ and harmful interferences,²⁵ there is a need for some restricted-use or non-use 'space measures' on the Moon. These measures would overall aim at ensuring that activities conducted by States and private entities are pursued in a safe manner²⁶ with the aim to preclude risks and protect space systems during normal operation.²⁷

2.2 *What Safety Zones Could Consist Of*

Safety zones would be a type of ABMT for managing different forms of space use.²⁸ It is to be noted that the current understanding of safety zones would characterise them primarily as a form of restricted use. In order to enable the safety of specific operations, such as mining, rules would be put in place by the State 'active' (or the State responsible for a private entity) in an area or an international organisation, for a certain period of time and towards determined actors, to regulate who can be active in a given area, and how. Safety

23 T. Lewton, "Space Is an Ecosystem like any Other. And It's in Peril" (*Undark*, December 2022), available at <<https://undark.org/2022/05/12/space-is-an-ecosystem-like-any-other-and-its-in-peril/?>> accessed 2 August 2023.

24 See eg damage could be understood as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations" as per Convention on International Liability for Damage Caused by Space Objects (adopted 29 November 1971, entered into force 1 September 1972) 961 UNTS 187, art I(a).

25 See eg harmful interference could be understood as "interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with Radio Regulations", as per both International Telecommunication Union (ITU), Radio Regulations (2016 edition), No. 1.169; and Constitution and Convention of the International Telecommunication Union (adopted 22 December 1992, entered into force 1 July 1994) 1825 UNTS 1, No. 1003.

26 J. K. Schinger, "Imagining Safety Zones: Implications and Open Questions" (*The Space Review*, 8 June 2020), available at <www.thespacereview.com/article/3962/1> accessed 2 August 2023.

27 D. Porras, "Safety and Security in Outer Space: A New Hope for Cooperation?" (*Vienna Center for Disarmament and Non-Proliferation*, 2019), available at <<https://vcdnp.org/safety-and-security-in-outer-space-diverse-cases-for-common-approaches/#::~:~:text=Porras%20began%20his%20remarks%20by,speeds%2C%20collisions%20are%20incredibly%20damaging>>> accessed 23 January 2024.

28 E. Gissi et al, "Contributions of marine area-based management tools to the UN sustainable development goals" (2022) 330 *Journal of Cleaner Production* 129910.

zones have the potential to act as stepping stones to non-use measures in outer space, aiming for example at the preservation of cultural sites. As those are not safety zones per se, they will be discussed in section 4.

At the moment, there is a lack of practice with no safety zone in place on the Moon. The conditions for establishing safety zone have not yet been clarified, and there is no clear definition of the concept of safety zone in the space legal framework.²⁹ Nevertheless, the concept has been introduced in soft-law instruments, in particular the Building Blocks for the Development of an international Framework on Space Resource Activities (Building Blocks or BB) adopted in 2019 and in the Artemis Accords (Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets and Asteroids for Peaceful Purposes) adopted in 2020. Hence, even if the concept of safety zone is not present in a binding treaty, it has been introduced in soft-law instruments at the international level and progress is being made towards a common approach. The characteristics of safety zone developed in these recent soft law instruments are presented here below.

2.1.1 The Building Blocks for the Development of an International Framework on Space Resource Activities

The Hague International Space Resources Governance Working Group (the Working Group) was established in 2016 and consists of stakeholders of space resource activities, coming from academia, government agencies, international organisations, the industry, and non-governmental organisations.³⁰ It was created with the purpose to assess whether a governance framework for space resource activities was needed, and, if so, to start working on it. The outputs of this Working Group were intended to be provided to States and international organisations for their consideration if and when they came to developing an international governance framework.

In November 2019, the Working Group adopted a governance framework, entitled the Building Blocks for the Development of an International Framework on Space Resource Activities.³¹ The BB were presented at the United

²⁹ Gilbert (n 20) 2.

³⁰ International Institute of Air and Space Law, "The Hague International Space resources Governance Working Group" (*Leiden University*), available at <www.universiteitleiden.nl/en/law/institute-of-public-law/institute-of-air-space-law/the-hague-space-resources-governance-working-group> accessed 2 August 2023.

³¹ The Hague International Space resources Governance Working Group, "Building Blocks for the Development of an International Framework on Space Resource Activities" (*Leiden University*, November 2019), available at <www.universiteitleiden.nl/binaries/content/assets/rechtsgeleerdheid/instituut-voor-publiekrecht/lucht--en-ruimterecht>

Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) in 2020 with a working paper submitted by Luxembourg and the Netherlands.³² In April 2020, a Commentary on the Building Blocks was also published.³³

The Building Blocks, under 20 headings, provide principles, rights and obligations that aim to “create an enabling environment for space resource activities that takes into account all interests and benefits all countries and humankind”.³⁴ Building Block 11 on “technical standards for, prior review of, and safety zones around space resource activities” recognises the inherent risks of space resource activities and recalls the necessity to enhance transparency and international cooperation in conducting such operations. The BB 11 requests a State to consider a space-based activity before it is carried out to ensure that it “is conducted in a safe manner to avoid harmful impacts”. Thus, the international framework should provide for ‘due regard’ procedures to ensure that space resource activities are conducted in safe and secure manner.³⁵ Of particular interest here, Building Block 11.3 contains specific details related to safety zones:

11.3 Taking into account the principle of non-appropriation under Article 11 OST, the international framework should permit States and international organizations responsible for space resource activities to establish a safety zone, or other area-based safety measure, around an area identified for a space resource activity as necessary to assure safety and to avoid any harmful interference with that space resource activity. Such safety measure shall not impede the free access, in accordance with international law, to any area of outer space by personnel, vehicles and equipment of another operator. In accordance with the area-based safety measure, a State or international organization may restrict access for a limited period of time, provided that timely public notice has been given setting out the reasons for such restriction.

/space-resources/bb-thissrwwg--cover.pdf> accessed 2 August 2023; T. Masson-Zwaan and M. Hofmann, *Introduction to Space Law* (Wolters Kluwer 2019) 105–106.

32 UNCOPUOS, “Building blocks for the development of an international framework on space resource activities” (2020) A/AC.105/C.2/L.315.

33 International Institute of Air and Space Law (n 30).

34 The Hague International Space resources Governance Working Group (n 31).

35 O. Bittencourt et al (eds), *Building Blocks for the Development of an International Framework for the Governance of Space Resource Activities* (Eleven International Publishing 2020) 65.

Hence, under the BB, a safety zone is recognised as an important tool, through which States and international organisations might be able to apply measures in a specific area for safety reasons or to avoid harmful interference with the targeted resource. Such measures might include limiting access to a given area for other actors, provided it is for a limited period of time and a notification procedure which justifies the reasons for such restrictions has been followed. Notwithstanding the recognition of safety zones, the BB also states that such measures have to take into account the principle of non-appropriation and not impeded the free access to any area of outer space. Acknowledging the potential difficulties in reconciling safety zones and the principle of free access in particular, BB 11.4 continue by stating that:

11.4 The international framework should provide that appropriate international consultations are undertaken in case of possible overlap of safety zones or conflicts involving the freedom of access recognized by international law.

Safety zones have to be established in a manner that it is consistent with the United Nations Space Treaties, and in particular the OST. They should be established, operated and terminated in a way that safeguard personnels, equipment, vehicles and operations from harmful interferences³⁶ in order to ensure the safety and security of lunar activities. In addition, in case of international disagreement in relation to different aspects of safety zones, international consultations could be held between interested parties (eg space agencies, private companies),³⁷ through for instance the Permanent Court of Arbitration 'Optional Rules for Arbitration of Disputes Relating to Outer Space Activities'.³⁸ Nevertheless, this consultation procedure would need to be clarified in a future legal framework.

2.1.2 An Overview of the Artemis Accords

The Artemis Accords, also known as the Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes, were signed in 2020 by 8 founding States. This non-binding set of principles aimed at guiding cooperative activities in civil space exploration

³⁶ *ibid* 66–67.

³⁷ *ibid* 66.

³⁸ Permanent Court of Arbitration, "Optional Rules for Arbitration of Disputes Relating to Outer Space Activities" (Effective 6 December 2011) available at <<https://docs.pca-cpa.org/2016/01/Permanent-Court-of-Arbitration-Optional-Rules-for-Arbitration-of-Disputes-Relating-to-Outter-Space-Activities.pdf>> accessed 7 March 2024.

and use has been signed by 53 States as of January 2025.³⁹ The Artemis Accords reinforces and implements the existing space law, in particular the OST. And, even as a soft-law instrument, it represents a political commitment for signatories.

In its Section 11 on 'Deconfliction of Space Activities', the Artemis Accords contemplate the establishment and use of safety zones. The establishment of safety zones seems to rely on States' commitments to the principles of due regard and avoiding harmful interference, as found in Article IX of the OST.⁴⁰ Section 11 of the Artemis Accords details how safety zones could be used to limit harmful interference between various space activities and otherwise facilitate uses of the Moon by different nations. In practical terms, the Artemis Accords provide that:

11.7. In order to implement their obligations under the Outer Space Treaty, the Signatories intend to provide notification of their activities and commit to coordinating with any relevant actor to avoid harmful interference. The area wherein this notification and coordination will be implemented to avoid harmful interference is referred to as a 'safety zone'. A safety zone should be the area in which nominal operations of a relevant activity or an anomalous event could reasonably cause harmful interference. The Signatories intend to observe the following principles related to safety zones:

- a. The size and scope of the safety zone, as well as the notice and coordination, should reflect the nature of the operations being conducted and the environment that such operations are conducted in;
- b. The size and scope of the safety zone should be determined in a reasonable manner leveraging commonly accepted scientific and engineering principles;
- c. The nature and existence of safety zones is expected to change over time reflecting the status of the relevant operation. If the nature of an operation changes, the operating Signatory should alter the size and scope of the corresponding safety zone as appropriate. Safety zones will ultimately be temporary, ending when the relevant operation ceases; and

39 NASA, "The Artemis Accords" (8 April 2025) available at <www.nasa.gov/artemis-accords/> accessed 20 April 2025; UN Doc A/AC.105/C.1/2025/CRP.16/Rev.1 (10 February 2025).

40 Artemis Accords, 11.1.

- d. The Signatories should promptly notify each other as well as the Secretary-General of the United Nations of the establishment, alteration, or end of any safety zone, consistent with Article XI of the Outer Space Treaty.

Hence, in order to avoid harmful interference with each other's activities, the Signatories can establish safety zones in the area of operations of an activity, or where a special event occurs. Safety zones are intended to be temporary, until the end of the operation. At the heart of how safety zones will function in practice are notification and coordination between the Signatories: it is thus that they will communicate the size and scope of these ABMTs, as well as the changes in the conditions applicable to safety zones. Notification is also due to the United Nations Secretary General. As much as possible, information about safety zones is to be made available to the public.⁴¹

The Artemis Accords then recalls that the Signatories will respect the principle of free access as well as the other provisions of the OST.⁴² The complex relationship between this principle and safety zones is not fully clarified, as, on the one hand, States are required to respect safety zones in order to avoid harmful interference among operations but, on the other hand, the possibility of conducting operations in another State's safety zone remains open, as long as notification and coordination have taken place.⁴³

The Artemis Accords finally recognises that further efforts will be necessary to "develop international practices, criteria, and rules applicable to the definition and determination of safety zones and harmful interference".⁴⁴

2.1.3 Key Elements of Safety Zones as Restricted-use/Non-use Measures
The soft law instruments described here above provide guidance concerning the elements that could compose a safety zone but do not give a comprehensive definition of it, how it should be implemented, or the process to be followed by actors involved in space missions.

Under the BB, both States and international organisations are considered as entities able to establish safety zones, whereas the Artemis Accords only refers to its Signatories, which are States. In both sets of soft law instruments, it is clear that the aims of these ABMTs would be to ensure safety in operations

⁴¹ *ibid* 11.9.

⁴² *ibid* 11.11.

⁴³ *ibid* 11.10.

⁴⁴ *ibid* 11.6, see also 11.11.

and/or to avoid harmful interference. The importance of giving notice and of coordination is also highlighted in both instruments. More practically, neither instrument is able, at this early stage, of fully clarifying what types of measures might be adopted within a safety zone. The BB provides that access might be restricted for a limited period of time, while the Artemis Accords states that the geographical scope should correspond to the area of operations and that, by nature, a safety zone should be temporary. The complexity of safety zones seems to originate from the need, acknowledged in both instruments, to respect the principle of free access, while needing to restrict – to some extent – free access for safety reasons.

With that in mind and recalling that safety zones are still under development in international law, it seems possible to say that these ABMTs might constitute a restricted use or, in certain cases, a non-use measure for certain actors and for a limited period of time. Safety zones as non-use measures are, by nature, temporary since they are meant to evolve when the operation changes or ceases. Their aim is primarily to avoid safety concerns during extractive operations or harmful interference: they are consequently intended to enable use by the actor that establishes the safety zone, by placing restrictions on other actors. At a later stage, such ABMTs could be related to conservation or management of natural resources, as many other non-use measures are.

3 Can 'Safety Zones' Fit within the Outer Space Treaty Principles?

Notwithstanding the frequent references to the existing space law legal regime in the BB and the Artemis Accords, some questions of consistency between safety zones and key principles of the OST merit examination.⁴⁵ Indeed, the creation of safety zone raises concerns about their conformity with the space legal framework and in particular with the principles of freedom of use, free access (Article I of the OST), non-appropriation (Article II of the OST), and the obligation to open installations (Article XII of the OST) (3.1). Nonetheless, safety zones can be buttressed by the obligation of due regard and the concept of cooperation in the conduct of space activities (Article IX of the OST) (3.2).

45 M. Stubbs, "The Legality of Keep-Out, Operational, and Safety Zones in Outer Space" in C. Steer and M. Hersch (eds), *War and Peace in Outer Space – Law, Policy and Ethics* (OUP 2021) 201–206 and 224–226.

3.1 *The 'Freedom of Use', the 'Free Access', the 'Non-Appropriation' Principles and the Obligation to Open Installations*

The issue with the concept of safety zone is that it could be viewed as a breach of the freedom of use expressed in Article I of the OST. According to this article, "Outer space [...] shall be free for exploration and use by all States without discrimination of any kind".⁴⁶ This provision means that the use of outer space, for non-economic and economic reasons, is open to all States and non-governmental entities under their jurisdiction, which States have to authorise and continuously supervise in accordance with Article VI of the OST.⁴⁷ This freedom of use encompasses exploitation of outer space and celestial bodies, and is granted to States, private entities, international intergovernmental organisations as well as non-governmental organisations.⁴⁸ Consequently, a State deciding to put restrictions to activities by other actors in a certain area might appear to contradict the concept of freedom of use set in Article I.

Furthermore, according to Article I, "there shall be free access to all areas of celestial bodies". This concept represents a reinforcement of the principle of freedom of exploration.⁴⁹ The unilateral closing of an area for safety purposes or to avoid harmful interference would undoubtedly limit free access to such safety zone. In relation to freedom of access, it is also worth noting Article XII of the OST, according to which installations on the Moon must be open to visitation by other States.⁵⁰ Indeed, Article XII states that:

All stations, installations, equipment and space vehicles on the Moon and other celestial bodies shall be open to representatives of other States

46 S. Hobe, "Article I", in S. Hobe, B. Schmidt-Tedd, K.-U. Schrogl and G. Meishan Goh (eds), *Cologne Commentary on Space Law, Vol. 1, Outer Space Treaty* (Carl Heymanns Verlag 2009) 25–43.

47 M. Gerhard, "Article VI", in S. Hobe, B. Schmidt-Tedd, K.-U. Schrogl and G. Meishan Goh (eds), *Cologne Commentary on Space Law, Vol. 1* (Carl Heymanns Verlag 2009) 103–125; also see eg Outer Space Treaty, art VI, which provides that "States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the Treaty. The activities of non-governmental entities in outer space [...] shall require authorization and continuing supervision by the appropriate State Party to the Treaty. [...]"; 1979 Moon Agreement, art 14.

48 Hobe (n 46) 35.

49 *ibid* 36.

50 L. J. Smith, "Article XII" in S. Hobe, B. Schmidt-Tedd, K.-U. Schrogl and G. Meishan Goh (eds), *Cologne Commentary on Space Law, Vol. 1* (Carl Heymanns Verlag 2009) 207–214; 1979 Moon Agreement, art 9.

Parties to the Treaty on a basis of reciprocity. Such representatives shall give reasonable advance notice of a projected visit, in order that appropriate consultations may be held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited.

Finally, Article II of the OST stresses that no area of space is subject to "national appropriation" by "claim of sovereignty", by "means of use or occupation", or by "any other means".⁵¹ Creating a safety zone around a landing or mining site might be considered an occupation, and hence contrary to the principle of non-appropriation.⁵²

If at first sight, a safety zone might be seen as at risk of breaching Articles I, II and XII of the OST, the creation of such areas might however be in line with the principles and obligations of the OST. First of all, the freedom of use, while broad in scope, can be limited by conditions set under the provision of the space treaties or under customary international law.⁵³ Hence, should States create a legal framework for safety zones and acknowledge these measures as adequate in their activities in outer space, safety zones could be considered lawful restrictions to the freedom of use.

Moreover, safety zones could be established in such a manner that respects the freedom of access and the obligation to keep stations, installations, equipment and vehicle open to other States. Indeed, a condition could be that the installations located where the safety zone applies would have to remain, as much as possible, open to States others than the one which established it, in the limit that these States do not interfere with the operations underway.

Finally, safety zones do not necessarily come into conflict with the prohibition of national appropriation and their establishment does not automatically imply any claims of sovereignty or territorial rights by States. There is indeed a difference between appropriation and the creation of temporary and specific measures to restrict access to and use of an area in order to avoid interferences between various activities for instance.

As acknowledged in the BB and the Artemis Accords, a safety zone should, as much as possible, remain free of access to other parties without causing

51 S. Freeland and R. Jakhu, "Article II" in S. Hobe, B. Schmidt-Tedd, K.-U. Schrogl and G. Meishan Goh (eds), *Cologne Commentary on Space Law*, Vol. 1 (Carl Heymanns Verlag 2009) 44–63.

52 S. Hobe and K. Chen, "Legal Status of Outer Space and Celestial Bodies" in R. S. Jakhu and P. S. Dempsey, *Routledge Handbook of Space Law* (Routledge 2017) 30–34.

53 Freeland and Jakhu (n 51) 53.

interference with activities conducted in the zone. In so far as safety zones need to be established to ensure safety and to avoid harmful interference, any restrictions to use and access should be limited, temporary, and dependent on the activity at hand. They would also have to be articulated carefully among partners, and towards the international community.

In that sense, it is fundamental that States have agreed in the BB and the Artemis Accords – and hopefully soon formalise this agreement in a binding instrument – that safety zones are acceptable management measures for space activities. While the international community continues to examine this topic to identify a common approach, an example of an acceptable management measure for safety concerns in space is the International Space Station's (ISS) 'Keep-Out Sphere' which is an 'approach zone' to the Station. The ISS uses this area, delimited with an imaginary boundary of 200 metres from the centre of gravity of the ISS⁵⁴ as a type of safety zone to ensure the safety and protection of the ISS during docking operations.⁵⁵ Hence, during such operations, there are many requirements for cargo and module approach in order to reduce the overall risk to the ISS and its crew.

3.2 *Obligation of 'Due Regard' and Principle of Cooperation*

While the establishment of safety zones might appear, *prima facie*, a breach of certain core principles of the OST, it has been demonstrated above that these ABMTs can fit into the existing legal framework for outer space. Moreover, other fundamental principles found in the OST actually provide a solid legal ground for safety zones.⁵⁶ In particular, Article IX⁵⁷ requires that:

In the exploration and use of outer space, including the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their

54 D. S. Koons, C. Schreiber and F. Acevedo, "Risk Mitigation Approach to Commercial Resupply to the International Space Station" (2010) *ESA Special Publication* 1; A. Lemole, "SpaceX Crew-4 returns to Earth with Atlantic Splashdown" (*NSF* 14, October 2022), available at <www.nasaspaceflight.com/2022/10/crew-4-return/> accessed 2 August.

55 See eg ISS Safety Requirements Document (SSP 52721) (2019), available at <<https://ntrs.nasa.gov/api/citations/20210009936/downloads/SSP%2051721-Baseline.pdf>> accessed 2 August 2023.

56 C. Johnson, "The Space Law Context of the Artemis Accords" (*SpaceWatchGL*, May 2020) available at <<https://spacewatch.global/2020/05/spacewatchgl-feature-the-space-law-context-of-the-artemis-accords-part-2/>> accessed 2 August 2023.

57 S. Marchisio, "Article IX" in S. Hobe, B. Schmidt-Tedd, K.-U. Schrogl and G. Meishan Goh (eds), *CoCoSL*, Vol. 1 (Carl Heymanns Verlag 2009) 169–182.

activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty.

The obligation of due regard implies that States, as well as private entities authorised by their respective State, should carry on space activities with a certain standard of care and attention to others.⁵⁸ Similarly, the principle of cooperation, meant to enable peaceful co-existence, includes an expectation that States will work together through, for example notification, consultation, and negotiation. From a space law perspective, safety zones can therefore be seen as 'operationalising' the obligation of due regard and the principle of cooperation. Indeed, these ABMTs will allow space exploration and use to be conducted in a safe and secure manner, taking into account the interest of all other States, mainly by avoiding the risk of harmful interference between activities of actors involved.

In practice, the principle of cooperation⁵⁹ will play a significant role in establishing common definitions of key concepts relating to space exploration, such as safety zones, in order to ensure that space activities are conducted in a peaceful manner.⁶⁰ It will also be central in the actual establishment of these ABMTs, through consultation, information exchange, and notification.

Article IX requires State Parties to consult with each other when their respective activities might interfere, an obligation which is highly relevant to the question of safety zones. International consultations between parties must take place in two specific situations: first, when a State Party "has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space" and, second, when a State Party "has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space". Consultations must happen before the activities in question take place. The creation of a safety zone would necessitate coordination

58 *ibid* 175.

59 See eg UNGA Res 51/122 (1996) GAOR 51th Session.

60 A. A. Ortega, "Artemis Accords: A Step Toward International Cooperation or Further Competition?" (*Lawfare*, 15 December 2020), available at <<https://www.lawfaremedia.org/article/artemis-accords-step-toward-international-cooperation-or-further-competition>> accessed 24 January 2024.

between all stakeholders involved in lunar exploration. Through such consultations, the particulars of a safety zone could be agreed upon, hopefully on the basis of pre-determined criteria of what constitutes a safety zone.

Even after the international consultation phase, information exchange will continue to be at the heart of successful safety zones. Such information exchange might need to be centralised through an international body or, at least, a clearing house mechanism. Information such as the identity of the State establishing a safety zone, the reasons therefore, the types of restrictions in place and the period of applicability thereof would all constitute relevant data. The United Nations Office for Outer Space Affairs (UNOOSA) could provide such services, maintaining a registry of safety zones. It could also put together a centralised map of lunar activities and the safety zones established in relation to on-going operations. Ideally, it would also have a mandate to verify that the existing rules are respected, maybe through reports by States 'active' on the Moon.

In that respect, it is important to note that the OST creates an obligation for States to notify the United Nations Secretary General of their activities in outer space. Article XI provides that:

States Parties to the Treaty conducting activities in outer space, including the Moon and other celestial bodies agree to inform the Secretary-General of the United Nations as well as public and the international scientific community [...] of the nature, conduct, locations and results of such activities [...].

Hence, the Secretary General of the United Nations would receive and centralise crucial information related to operations in outer space. This might include data related to specific management measures, such as safety zones, which could then be shared with UNOOSA.

In summary, while safety zones have not been established yet, there are arguments and discussions in favour of creating them given the anticipated rise of space activities on the Moon in the next years. The international space community is aware of the challenges that numerous lunar activities represent for the safety of space activities. Safety zones are a practical application of the due regard and cooperation principles, two core elements of Article IX of the OST. Hence, the creation of safety zone could be seen as an application of the Outer Space Treaty. Moreover, several provisions of this treaty focusing on consultation and notification could contribute to the establishment and success of safety zones.

4 Further Non-use Measures in Lunar Exploration – From Safety Zone to 'Heritage Zone' for the Protection of Lunar Artifacts?

Safety zones, as restricted-use measures, could also be a stepping stone for stricter non-use measures in lunar exploration. In particular, one could envision heritage zones for the protection of historical artifacts on the Moon.

Considering the development of lunar exploration activities, the international community is becoming aware of the necessity to protect cultural sites on the Moon.⁶¹ In addition to the Apollo missions landing sites,⁶² it is estimated that there are more than 110 potential human heritage sites on the Moon.⁶³ The question hence arises about the need to create 'heritage zones' to safeguard, protect and preserve such cultural and heritage sites on the Moon and other celestial bodies as the traces of humanity in outer space. A heritage zone could deal with the non-use of an area where a cultural site is located in order to protect artifacts. Hence, to avoid that a lander, a robot, an astronaut, or an installation damage cultural heritage, a 'forbidden perimeter' would be established, creating a heritage zone.

Potential heritage zones on the Moon would not find a legal basis in existing space law and cannot be subject to the 1972 World Heritage Convention,⁶⁴ as it is only applicable to heritage sites located on national territory.⁶⁵ Nonetheless,

61 See eg the website of For All Moonkind, which is a US not-for-profit organisation aimed at developing norms to protect lunar heritage sites, including with a possible convention, or recognition by UNESCO, available at <www.forallmoonkind.org/> accessed 2 August 2023.

62 See eg For All Moonkind, "Crewed Landing Sites", available at <www.forallmoonkind.org/moonkind-mission/apollo-landing-sites/> accessed 2 August 2023; see also NASA History Program Office, "Catalogue of Manmade Material on the Moon" (July 2012), available at <<https://history.nasa.gov/FINAL%20Catalogue%20of%20Manmade%20Material%20on%20the%20Moon.pdf>> accessed 2 August 2023; For All Moonkind, "Moon Registry", available at <<https://moonregistry.forallmoonkind.org/>> accessed 2 August 2023.

63 For All Moonkind, "Other Landing Sites", available at <www.forallmoonkind.org/moonkind-mission/other-landing-sites/> accessed 2 August 2023.

64 Convention Concerning the Protection of the World Cultural and Natural Heritage (adopted 16 November 1972, entered into force 17 December 1975) 1037 UNTS 151.

65 A. S. Martin, "The 'Outstanding Universal Value' Concept of the UNESCO World Heritage Convention: Food for Thought to Preserve Lunar Artifacts" in A. Froehlich (ed), *Protection of Cultural Heritage Sites on the Moon* (Springer 2020) 53–64.

the subject has gained international traction, in particular in the Artemis Accords. Section 9 provides that:

The Signatories intend to preserve outer space heritage, which they consider to comprise historically significant human or robotic landing sites, artifacts, spacecraft and other evidence of activity on celestial bodies in accordance with mutually developed standards and practices. The Signatories intend to use their experience under the Accords to contribute to multilateral efforts to further develop international practices and rules applicable to preserving outer space heritage.

In March 2023, the Legal Subcommittee of the UNCOPUOS also acknowledged the need to recognise and to promote the adoption of measures to protect certain sites that embody historic firsts in the history of space exploration.⁶⁶

At the national level, the United States, a pioneer in the field, is engaged in developing standards and norms for the protection of historic sites on the Moon. For instance, NASA adopted in 2011 a set of recommendations to all space-faring entities, considering also the destructive potential of lunar dust. The goal was to protect Apollo and other US objects on the lunar surface that are of historical and scientific value. The recommendations implement ‘exclusion zones’, defined by NASA as “boundary areas into which visiting spacecraft should not enter”.⁶⁷ In addition, the United States recently passed the ‘One Small Step to Protect Human Heritage in Space Act’ which directs NASA to ensure that its contractors do not interfere with heritage sites on the Moon.⁶⁸ Such instruments are not enforceable against any entity or nation unless they are contracting directly with NASA.

In addition to these important domestic initiatives, it remains to be seen whether an international framework can be put in place to grant spatial protection to lunar heritage sites. Even more than for safety zones, international recognition seems necessary, as safeguarding space exploration tracks ought to be of interest to the international community as a whole.

66 UNCOPUOS, “Statement by the Delegation For All Moonkind” (*Legal Subcommittee*, 28 March 2023), available at <<https://www.unoosa.org/oosa/en/ourwork/copuos/lsc/2023/index.html>> accessed 2 August 2023.

67 NASA, “NASA’s Recommendations to Space-Faring Entities: How to Protect and Preserve the Historic and Scientific Value of U.S. Government Lunar Artifacts” (20 July 2011) available at <www.nasa.gov/pdf/617743main_NASA-USG_LUNAR_HISTORIC_SITES_RevA-508.pdf> accessed 2 August 2023.

68 Congress of the United States, *One Small Step to Protect Human Heritage in Space Act* (2020) Public Law No 116–275, S. 1694, available at <<https://www.congress.gov/116/plaws/publ275/PLAW-116publ275.pdf>> accessed 2 August 2023.

5 Conclusion and Way Forward

As examined here, due to the increase in interest and planned activities on the Moon, new ABMTs might be necessary to ensure safety during extractive operations and to avoid harmful interference. Safety zones are under discussion on the international scene, as evidenced by their inclusion in the Building Blocks and the Artemis Accords. According to these instruments, safety zones might be established by States, space agencies and/or private entities authorised by the appropriate State pursuant to Article VI of the OST, to limit, in a temporary manner, the activities and/or access of other entities into a given area that corresponds to the location of operations.

In addition to these soft-law initiatives, it is worth noting that, in June 2022, the UNCOPUOS formed the Working Group on Legal Aspects of Space Resource Activities. This group's mandate is to review the existing legal framework for the exploration, exploitation and utilisation of space resources, to develop and prepare a draft set of recommended principles for such activities under a five-year workplan.⁶⁹ It is likely that the topic of safety zone will be addressed. One could imagine that, based on the model of the Hague Working Group that drafted the BB, another working group could be set up, focusing this time on safety zones. It could contribute an expert opinion towards the definition of a legal framework for these ABMTs' establishment, with the participation of representatives of governments, space agencies, industry and civil society. Such framework could then be presented at UNCOPUOS to serve as a basis for inter-governmental negotiations for an instrument on safety zones.

Safety zones illustrate the emergence and early development of restricted-use or non-use measures, in response to a new need. Still under development, they have to fit within the existing legal framework, here the OST. Key principles of freedom of use, freedom of access, and non-appropriation provide limitations to the potential scope of safety zones, but these spatial tools also find roots in the OST, in particular in the obligation of due regard and the principle of cooperation. When fully operationalised, safety zones will represent a practical illustration of restricted-use or non-use measures intended to enable use. These measures indeed mainly aim at making sure that operations can be conducted safely and without damage to infrastructures; they limit the use and/or access by other actors, in order to enable one actor to extract resources. However, safety zones on the Moon could also serve as a stepping stone for

69 UNCOPUOS, "Report of the Chair and Vice-Chair of the Working Group on Legal Aspects of Space Resource Activities" (2023) UN Doc A/AC.105/C.2/2023/SRA/L.1; UN General Assembly, "Annex II" (2022) UN Doc A/AC.105/1260.

the development of other, stricter, non-use measures such as heritage zones or even potentially of conservation zones to protect the lunar environment.

Safety zones represent real challenges for international space law in terms of conditions and modalities for their adoption – and, at a later stage, their implementation, and compliance. Even if safety zones are quite special in that they are not conservation oriented, they are not unique in international law. For example, safety zones can indeed be established under the law of the sea around artificial islands, installations and structures,⁷⁰ to ensure the safety of both navigation and of the installations.⁷¹ While safety zones on the Moon will probably be determined unilaterally by the State planning the extractive activity, heritage zones would be likely be adopted internationally. There, inspiration could potentially be drawn from the Antarctic Specially Protected Areas (ASPAS) envisioned under the Environmental Protocol to the Antarctic Treaty.⁷² These areas have been set aside to preserve their unique natural systems or to reduce the risk of interference to areas with exceptional environmental, scientific, historic, aesthetic, or wilderness value. In both case of safety or heritage zones, information will need to be centralised and then publicised, to enable proper implementation and compliance. As the Antarctic Treaty Secretariat does in relation to ASPAS, UNOOSA might have a role to play in maintaining an updated catalogue of safety and heritage zones on the Moon and later on other celestial bodies.

70 United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3, arts 60(4), 60(5), 60(6), 60(7).

71 *ibid* art 147 (c).

72 Protocol on Environmental Protection to the Antarctic Treaty (adopted 4 October 1991, entered into force 14 January 1998) 30 ILM 1461, art 12(g).

PART 6

Concluding Remarks



Conclusions

Lessons Learnt and Pathways for Future Non-use Measures for Global Goods and Commons in International Law

*Solène Guggisberg and Catherine Blanchard**

1 Introduction

This edited volume examines a variety of existing non-use measures across regimes regulating global goods and commons, as well as a number of potential non-use measures that could be further developed and/or adopted. Notwithstanding our initial desire to clarify what exactly constitutes a non-use measure, the conditions under which such a measure is most likely to be adopted and then successfully implemented – and hence the future prospects of proposed non-use measures – it soon became clear that what unites non-use measures is their diversity. Once this humbling reality was acknowledged, we were nonetheless able to identify red threads that appeared across many chapters. The reflections that follow provide not only answers to many of the guiding cross-cutting questions originally circulated to the contributors to this edited volume (see Annex 1 to chapter 1), but also some considerations that might benefit from further research.

This chapter starts by highlighting some of the challenges encountered when applying the conceptual framework to specific non-use measures and other findings drawn from such exercise (section 2). Section 3 reflects on the unequal distribution of non-use measures across regimes that exist for global goods and commons, and on the potential influence of principles underpinning these regimes. Sections 4 and 5 build upon red threads identified across regimes, to analyse factors and conditions that contributed to the adoption and successful implementation of several non-use measures. Finally, section 6 turns to the future of non-use measures, by examining the proposed non-use measures that were discussed in this volume, presenting pathways for their

* The views expressed in this chapter derive exclusively from my former affiliation as Assistant Professor of Public International Law, Utrecht University (The Netherlands) and are not endorsed by nor represent the views of my current employer.

development and adoption, and, more generally, reflecting on the potential – and limitations – of this type of measures.

2 Complexity of Concepts Relating to Non-use

2.1 *Application of the Conceptual Framework's Definitions*

A fundamental question addressed in this volume is what is non-use and, inversely, what is use. While 'use' is here understood as "any activity that targets or otherwise impacts a resource", 'non-use' is the absence of any such activity.¹ In turn, resources are to be understood as both natural resources and spatial-extension resources, the uses of which are, respectively, extractive and additive.²

At first glance, these definitions and concepts are clear. Nonetheless, once applied to specific cases, complexities quickly appeared, in the first place about the identification of, and relationships between, non-use measures, relevant resources, and impacts to be prevented. It was already acknowledged in the conceptual framework presented in chapter 2 that not all non-use measures aim at conserving the resource which is the object of the prohibition of use; other non-use measures instead target one resource to protect another. This was confirmed in several examined non-use measures, and is based on the fact that ecosystems are all, to some extent, interconnected; the resources that cannot be used because of a non-use measure are not the only ones that would be impacted by use.

A finding from the non-use measures analysed here is that the positive effects of a non-use measure on resources that are not targeted by it can range from fully intended to incidental. An example of a non-use measure prohibiting use of a specific resource to protect not only its ecosystem, but also to reduce impacts on other resources and ecosystems is the discussed moratorium on deep-seabed mining. Indeed, this non-use measure would prevent mining and, consequently, the impacts on minerals and seabed biodiversity, but it would also limit the impacts of mining on the marine environment of the water column; this would be fully in line with the International Seabed Authority's (ISA) mandate both to protect and conserve "the natural resources of the Area" and to prevent "damage to flora and fauna of the marine environment".³ In other

¹ See the definitions by Guggisberg in chapter 2

² Guggisberg in chapter 2.

³ United Nations Convention on the Law of the Sea (UNCLOS) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397, art 145, see the discussion by Jaeckel et al in chapter 10.

cases, the positive impact of a non-use measure on another resource is more incidental: a closure of the high seas to fishing would be mainly adopted to reduce direct impacts on target and non-target species. However, it might also contribute to climate change mitigation by reducing greenhouse gases emissions and increasing carbon sequestration, which is first of all related to the atmosphere and hence not directly linked to the high seas.⁴

The non-use measures examined in this edited volume also demonstrate that the links between (non-)use, resources, and impacts can be even more intricate. Indeed, a non-use measure targeting one resource can have a negative impact on another resource: the whaling moratorium for example has enabled many species of whales to recover from overexploitation, but their increased numbers means that more krill and fish species are eaten, hence impacting those resources.⁵ In a similar vein, while non-use of the atmosphere or the marine environment for geoengineering would/does probably protect these – and some other – resources from harmful impacts,⁶ it would/does also preclude processes intended to reduce global warming. Consequently, prohibiting geoengineering would/does contribute to stronger and more damaging impacts of climate change on many resources and ecosystems.

Finally, most non-use measures are intended to avoid impacts on the resources whose use is prohibited. However, the case of the atmosphere is slightly different. Measures prohibiting the emission or dispersal of substances, including greenhouse gases, might avoid impacts *to* the atmosphere, but they are mainly focused on preventing impacts *through* the atmosphere.⁷ Indeed, while limits to atmospheric pollution and greenhouse gases emissions intend to protect the health of the atmosphere, the main objective relates to avoiding other impacts, such as global warming, ozone depletion, acid rain, ocean acidification, and the impacts of these processes on life on Earth.

In addition to these complex relationships between non-use, targeted resources, and impacts, the application of the conceptual framework to specific non-use measures for spatial-extension resources has led to some further critical considerations and, at times, adaptations. First, the focus chosen on use of *resources* might not be adequate when discussing a ban on solar geoengineering. While one could see this activity, if implemented at scale, as using the atmosphere or, eventually, outer space for the dispersion of materials into

4 Crespo in chapter 3.

5 This relationship between fish and whales is not presented here in support of culling whales in order to increase fish availability for fisheries. On debunking this argument, see L. R. Gerber et al, "Should Whales Be Culled to Increase Fishery Yield?" (2009) 323 *Science* 880–881.

6 Harrison in chapter 8; Oomen in chapter 16.

7 Guggisberg and Lennan in chapter 17.

these areas, a more suitable focus would be on the idea of (non-)use of *technology*. Indeed, as the proposed technologies are diverse and could target different spatial-extension resources, dividing the analysis per spatial-extension resource is artificial. Moreover, the call for a Non-use Agreement for Solar Geoengineering applies not only to the actual use of the spatial-extension resources, but also – and even primarily – to the *research* into developing the requisite technology.⁸

A second reflection on the conceptual framework was presented in the discussion about Antarctic tourism. There, the authors questioned the adequacy of the term ‘additive’ for all uses of spatial-extension resources. While tourism into Antarctica could be considered ‘additive’ to the environment and potential cause damage to it, this qualification oversimplifies the interactions between the use and the resource. Indeed, tourism could also be seen as ‘reductive’, since it might decrease the original attractiveness of the area in question, or even ‘intrusive’ or ‘incursive’ as tourists enter areas that were previously without them.⁹

A third set of reflections – and need for adaptation – arose with respect to non-use measures and the atmosphere. In the ozone protection regime, non-use measures should, *stricto sensu*, relate to the prohibition of emissions or leaks of ozone depleting substances (ODSs) into the atmosphere. However, as the relevant regime addresses the *production* and *consumption* of such substances, this deviation from the conceptual framework was embraced. In the case of the climate change regime, restricted-use or non-use *targets* better reflect the reality of measures aiming at reducing the total sum of emissions minus re-absorption. Yet, restricted-use or non-use measures similar to those for the ozone protection regime and focused on production or consumption have been envisaged in relation to fossil fuel extraction.¹⁰

These observations demonstrate that, although it is useful for comparative and analytical purposes, there are also limitations to attempting to fit such variety of non-use measures and resources into a fixed framework.

2.2 *Aims and Objectives of Non-use*

Another aspect that became clear in the course of this research is how complex it can be to determine the aims of a (potential) non-use measure. In addition to the general and quite widespread objective of protecting the environment, some of its components or ecosystem functioning from established or potential

8 Oomen in chapter 16.

9 Roura and Guggisberg in chapter 15.

10 Guggisberg and Lennan in chapter 17.

risks of harm,¹¹ a non-use measure can (also) have other objectives. In some cases, non-use might be intended to ensure resource availability for the future, more often when the resource is renewable and needs replenishing,¹² but also for non-renewable resources by setting some resources aside for future generations.¹³ Some non-use measures are meant to safeguard an environmental baseline in the absence of a given human activity for scientific purposes,¹⁴ or to enable an altogether different use of the space.¹⁵ Other aims include the protection of values such as cultural heritage,¹⁶ human health and safety,¹⁷ equity,¹⁸ or the benefit of humankind more broadly.¹⁹

Moreover, more often than not, several aims coexist; a group of States that decide to adopt a non-use measure can be driven by different rationales – and even one State could be following a variety of objectives in such a decision. The call for a moratorium on deep-seabed mining, for example, might be mainly based on environmental concerns, including scientific uncertainty,²⁰ but economic factors might also be of relevance for those States that want the financial mechanism for redistribution of benefits created first or are worried about the impacts of deep-seabed mining on their land-based mining industry.²¹

The stated objective might also hide considerations that were fundamental to the adoption of a non-use measure but that are not explicit in the relevant instrument. The prohibition of mining in Antarctica, for example, was adopted for seemingly pure environmental reasons. In reality, other geopolitical factors

11 Urrutia in chapter 5; Molenaar in chapter 6; Gollner et al in chapter 9; Jaeckel et al in chapter 10; Guggisberg and Lennan in chapter 17.

12 As expressed by some States regarding whales when debating the moratorium, see Jeffries and Latos in chapter 7.

13 Jaeckel et al in chapter 10; Cheney in chapter 18.

14 Menini et al in chapter 11; Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13; Roura and Guggisberg in chapter 15.

15 Jaeckel et al in chapter 10.

16 *ibid*; Cheney in chapter 18; Martin in chapter 19.

17 Roura and Guggisberg in chapter 15; Guggisberg and Lennan in chapter 17; Martin in chapter 19.

18 Crespo in chapter 3.

19 Cheney in chapter 18.

20 Jaeckel et al in chapter 10.

21 See eg A. Jaeckel, J. A. Ardron and K. Gjerde, "Sharing benefits of the common heritage of mankind – Is the deep seabed mining regime ready?" (2016) 70 *Marine Policy* 198–204; E. Lèbre et al, "Mining on land or in the deep sea? Overlooked considerations of a reshuffling in the supply source mix" (2023) 191 *Resources, Conservation and Recycling* 106898; K. A. Miller et al, "Challenging the Need for Deep Seabed Mining From the Perspective of Metal Demand, Biodiversity, Ecosystems Services, and Benefit Sharing" (2021) 8 *Frontiers in Marine Science*.

came into play, in particular the perceived competition from the United Nations General Assembly (UNGA) which wanted to bring the governance of Antarctica into the folds of the United Nations.²²

Finally, objectives might evolve through time. For example, the adoption of the whaling moratorium was made possible by a majority of International Whaling Commission (IWC) Members sharing an agreement to temporarily suspend this extractive activity. The original arguments were mostly centred around the needs to enable recovery of stocks, especially in light of scientific uncertainty, and to give time for States to adopt a proper inspection scheme, so that any resumed commercial whaling could be sustainable.²³ Some Members might already then have considered that whales should not be hunted at all, even if stocks were to recover, but this preservationist view is now the dominant one amongst IWC Members.²⁴

2.3 *Scientific Research and Ultimate Purpose of Use*

Across most examined regimes, and as already noted in the conceptual framework discussed in chapter 2, using a resource for scientific research is treated differently from other uses. In some cases, scientific research involves the extraction of limited quantities of a resource or the addition of limited quantities of a substance into a resource, with negligible impacts on the resource and its ecosystem. If one focuses on the definitions in this book, extraction or addition for research can be seen as use, notwithstanding the quantities involved.²⁵ However, it is also possible to see research as a totally separate concept (one warranting regulation nonetheless) in light of how limited the extraction of or addition into the resources would be.²⁶ In many cases, scientific research is considered as an exception to non-use measures, such as for example in

22 Kempf in chapter 14; see also eg P. J. Beck, "Twenty years on: the UN and the 'Question of Antarctica,' 1983–2003" (2004) 40 *Polar Record* 205–212; R. Tepper and M. Haward, "The Development of Malaysia's position on Antarctica: 1982–2004" (2005) 41 *Polar Record* 113–124.

23 Jeffries and Latos in chapter 7.

24 Jefferies and Latos in chapter 7; see also eg M. Fitzmaurice, "The International Convention for the Regulation of Whaling and International Whaling Commission – Conservation or Preservation – Can the Gordian Knot Be Cut (or Untangled)" (2013) 5 *Yearbook of Polar Law* 451–492; J. Morishita and D. Goodman, "The IWC moratorium on commercial whaling was not a value judgment and was not intended as a permanent prohibition" (2011) 1 *Aegean Review of the Law of the Sea and Maritime Law* 301–311; G. J. Nagtzaam, "The International Whaling Commission and the Elusive Great White Whale of Preservationism" (2009) 33 *William & Mary Environmental Law and Policy Review* 375–447.

25 Urrutia in chapter 5.

26 Oomen in chapter 16.

relation to iron fertilisation and the dumping regime²⁷ or fishing in the marine protected areas (MPAs) of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).²⁸ In the Antarctic Treaty System (ATS), scientific research is oftentimes the reason for some sectoral non-use measures restricting other activities, such as entry by non-governmental actors into Antarctic Specially Protected Areas (ASPAs).²⁹

One can debate whether, and under which conditions, the fact that a resource is used for scientific research should warrant a different regulatory treatment. On the one hand, scientific research is usually aimed at 'greater good objectives' and might be necessary to fill in the data and knowledge gaps that have triggered the need for non-use measures. On the other hand, abuses of scientific research exceptions have been known to happen, such as with the problematic Japanese scientific whaling program³⁰ or the questionable mining research by Russia in the Antarctic.³¹

An additional and related consideration contemplates, more generally, whether the ultimate objective of use should have an effect on the decision to allow, or not, the use of a resource: should an activity extracting a resource in order to create renewable energy or to enable space exploration be treated in the same manner as a similar activity leading to consumption?³² Are higher environmental purposes, such as addressing climate change, reason enough not to implement non-use measures related to marine or solar geoengineering activities?³³ No clear-cut answer is available, and these questions demand further reflection.

2.4 *Restricted-use and Non-use Measures*

As presented in chapter 2, use and non-use measures exist on a continuum – and sometimes coexist. For the purpose of this research, the definition of non-use measures has been agreed to be “measures adopted on the international scene that ban or suspend the use of a resource”.³⁴ In practice, making the distinction between non-use measures and restricted-use measures presents some challenges.

²⁷ Harrison in chapter 8.

²⁸ Guggisberg in chapter 13.

²⁹ Roura and Guggisberg in chapter 15.

³⁰ Jeffries and Latos in chapter 7.

³¹ Kempf in chapter 14.

³² Cheney in chapter 18.

³³ Harrison in chapter 8; Oomen in chapter 16.

³⁴ Guggisberg in chapter 2.

Indeed, many non-use measures have exceptions which constitute restricted-use measures. CCAMLR MPAs, for example, have been described as a combination of several non-use/restricted-use measures brought together in a larger management framework.³⁵ In the Ross Sea region MPA, scientific and exploratory fishing are indeed permitted in certain zones.³⁶ These types of fishing are then subject to other CCAMLR conservation measures. Scientific research exceptions that allow an extractive activity to proceed can also be found with respect to whaling and Antarctic mineral activities,³⁷ while the Central Arctic Ocean Fisheries Agreement (CAOFA) allows exploratory fishing.³⁸ Other instances of exceptions to non-use are in situations of emergency.³⁹ If the non-use measure so provides, restricted-use can also be allowed when permits are issued by national authorities, as in the case of ASPAs.⁴⁰ Finally, the London Protocol regime is based on a comprehensive non-use measure, except for those substances that are explicitly allowed to be dumped, and the ozone protection regime prohibits the production or consumption of banned ODSs except for tightly defined 'critical' or 'essential' uses.⁴¹ Depending on how wide-ranging the exceptions are, a non-use measure in place might only narrowly limit use.⁴²

Nonetheless, even if a non-use measure is limited by many exceptions, the default situation remains one of non-use as long as an activity is not explicitly allowed, in contrast with a situation of use where an activity is allowed, even under strict conditions. An example of the use/non-use default distinction can be found in the deep-seabed mining regime: within Areas of Particular Environmental Interest (APEIs), mining is not allowed (default of non-use) whereas, outside of them, mining might be allowed under certain circumstances (default of use).⁴³ Similarly, entry into ASPAs is not permitted in general, except if certain conditions are actively met (default of non-use), whereas entry in most other places in Antarctica is allowed, even if it is subject to strict behavioural conditions (default of use).⁴⁴

35 Teschke and Konijnenberg in chapter 12.

36 Guggisberg in chapter 13.

37 Jeffries and Latos in chapter 7; Kempf in chapter 14.

38 Molenaar in chapter 6.

39 Roura and Guggisberg in chapter 15.

40 *ibid.*

41 Harrison in chapter 8; Guggisberg and Lennan in chapter 17.

42 Guggisberg in chapter 13.

43 Menini et al in chapter 11.

44 Roura and Guggisberg in chapter 15.

A more complex situation is that of CAOFA as one can question which is the default situation and which is the exception. At first glance, it is a clear non-use default for parties to that Agreement, since fishing is suspended there, even if exceptions are provided for.⁴⁵ CAOFA parties have indeed voluntarily constrained their freedom of fishing. Nonetheless, this Agreement could also be perceived as an exception to the wider – and still relevant – regime applicable to the high seas under the United Nations Convention on the Law of the Sea (UNCLOS), which provides for the freedom to fish in the high seas, notwithstanding any conditions that must be met.

These reflections are conceptual, but they become relevant in the potential future evolution of a regime. Indeed, the default situation provides inertia in its favour, and any change to such default situation depends on the adoption of further measures, the ease of which depends, in turn, on the decision-making procedures in place. For example, the continued existence of the whaling moratorium has been the subject of debate and criticism by a number of States. While a simple majority has voted to end it for minke whales, the threshold to change the Schedule is a three-quarter majority of IWC Members, meaning that, for the time being, all quotas remain at zero.⁴⁶ Conversely, and with a high threshold since consensus applies in this regime, until and unless all Antarctic Treaty Consultative Parties agree to prohibit tourism except in certain specific areas of Antarctica – as was planned when Areas of Special Tourist Interest (ASTIS) were first developed – all locations, bar those that are explicitly closed-off, remain theoretically open to visitors.⁴⁷

3 Influence on Non-use Measures of Principles Underpinning Global Goods and Commons Regimes

3.1 *Varied and Unequally Distributed Non-use Measures*

As already presented in depth in the conceptual framework⁴⁸ and further confirmed in the overview of non-use measures' characteristics (Table 20.1), it is

45 Molenaar in chapter 6. The situation for non-parties is also – but differently – very complex. In light of their rights and obligations on high seas fishing under international fisheries law, as reflected in the UNCLOS and the United Nations Fish Stocks Agreement, one could question whether or not they are allowed to fish in contravention of CAOFA's rules. This falls beyond the scope of this chapter but raises similar questions as those related to the right of non-parties to regional fisheries management organisations (RFMOs) to fish.

46 Jeffries and Latos in chapter 7; see also eg no author, "2004 Annual Meeting, International Whaling Commission" (2004) 7 *Journal of International Wildlife Law and Policy* 217–222.

47 Roura and Guggisberg in chapter 15.

48 Guggisberg in chapter 2.

TABLE 20.1 Overview of the characteristics of the non-use measures analysed in the present volume^a

Common <i>Non-use measure(s)</i>	Resource(s) targeted by non-use measure	Aim(s) of non-use measure	Instrument(s) / Nature of instrument(s)	Geographic applicability	Timing of non-use measure
High seas					
<i>Whaling moratorium</i> (also Sanctuaries - with similar characteristics except local geographical applicability)	Whales	Initially ensure replenishment of whale populations and the orderly development of the whaling industry; over time, conserve/preserve whales	Schedule to the ICRW / Legally- binding	Global, including areas within national jurisdiction	Adopted after activity had started
<i>Abstinence from fishing under CAOFA</i>	Fish	Avoid unregulated fishing; ensure certain conditions are met before start of exploratory and commercial fishing	CAOFA / Legally- binding	High seas portion of the central Arctic Ocean	Adopted before activity starts
<i>Prohibition of fishing specific species or fishing in certain areas under regional fisheries management organisations (RFMOs)</i>	Fish	Ensure precaution in light of scientific uncertainty; support sustainability and productivity; protect habitat, ecosystem, and/or biodiversity	Conservation and management measures (CMMs) of RFMOs / Legally- binding	Local as specified in the relevant CMM	Adopted after activity had started

<i>Central Bering Sea (CBS)</i> <i>zero quota</i>	Fish	Ensure the replenishment of fish population	CBS / Legally-binding	High seas area of the Bering Sea	Adopted after activity had started
<i>Prohibition of dumping at sea, including marine geoengineering</i>	Ocean space	Prevent pollution of the marine environment; protect public health and amenities	London Convention and London Protocol / Legally-binding	Global, including areas within national jurisdiction	Adopted after activity had started (except for marine geoengineering)
<i>*Closure of the high seas to fishing</i>	Fish	Ensure precaution in light of scientific uncertainty; sustainability; productivity reasons; protect climate, habitat, ecosystem, biodiversity, and/or human rights; and contribute to equity	No instrument at present	Global high seas	Would be adopted after activity has started
Deep seabed					
<i>Non-mining measures under Regional Environmental Management Plans (REMPs)</i>	Minerals	Protect deep-sea environments from the effects of mining activities	REMPs of ISA / Unclear	Local as specified in the REMPs	Adopted before activity (exploitation stage) starts

TABLE 20.1 Overview of the characteristics of the non-use measures analysed in the present volume (cont.)

Common Non-use measure(s)	Resource(s) targeted by non-use measure	Aim(s) of non-use measure	Instrument(s) / Nature of instrument(s)	Geographic applicability	Timing of non-use measure
<i>*Deep-seabed mining moratorium</i>	Minerals	Ensure precaution in light of scientific uncertainty; conserve the environment; protect culture; contribute to inter- and intra-generational equity	No instrument at present	Global	Would ideally be adopted before activity starts
Antarctica					
<i>Prohibition of fishing and fishing-related activities in CCAMLR MPAs</i>	Fish and krill	Ensure long-term conservation and sustainable management of Antarctic marine ecosystems while supporting scientific research. Specific objectives depending on MPA	Conservation measures (CM s) / Legally-binding	Local as specified in each CM	Depends on the MPA planning region; usually adopted after activity had started

<i>Mining moratorium in Antarctica</i>	Minerals	Protect the Antarctic environment and dependent and associated ecosystems	Environmental Protocol / Legally-binding	Area south of 60° South Latitude	Adopted before activity starts
<i>Spatial and activity/behaviour non-use measures related to Antarctic tourism</i>	Antarctica space	Protect the environment, historic sites, science, wilderness, human life and safety	Environmental Protocol and Annexes, Measures / Legally-binding; Resolutions / Non legally-binding	Area south of 60° South Latitude	Some adopted before activity starts, some after it had started
<i>*Prohibition of tourism in Antarctica</i>	Antarctica space	Protect the environment, historic sites, science, wilderness, human life and safety	No instrument at present	Area south of 60° South Latitude	Would be adopted after activity has started

TABLE 20.1 Overview of the characteristics of the non-use measures analysed in the present volume (cont.)

Common Non-use measure(s)	Resource(s) targeted by non-use measure	Aim(s) of non-use measure	Instrument(s) / Nature of instrument(s)	Geographic applicability	Timing of non-use measure
Atmosphere					
<i>Prohibition of production and consumption of ODSs</i>	Atmosphere space	Protect the ozone layer; avoid adverse effects on human health and the environment	Montreal Protocol to Vienna Convention / Legally-binding	Global	Adopted after activity had started
<i>*Prohibition of discharges into the atmosphere for solar geoengineering purposes (and prohibition of research)</i>	Atmosphere space (technology)	Prevent implementation of technology without governance framework and at least until risks are better studied; avoid normalisation of technology and constituency- building	No instrument at present (beyond the Open Letter signed by academics)	Global	Would ideally be adopted before activity starts

Outer space				
<i>*No entry into heritage zones in outer space</i>	Outer space space	Safeguard cultural heritage	Mentioned in Artemis Accords and Building Blocks / Non legally-binding	Local Would ideally be adopted by States before activity starts
<i>*Non-use of outer space resources except for scientific research</i>	Water and minerals	Protect the Earth's environment	No instrument at present	Global Would ideally be adopted before activity starts

a This overview only includes non-use measures and hence does not present discussed measures that do not qualify as such. Consequently, OSPAR MPAS (Klerk in chapter 4) and safety zones on the Moon (Martin in chapter 19) do not appear in the table.

NB: Non-use measures preceded by * are discussed but not yet in existence within international legal frameworks.

clear that the non-use measures for global goods and commons studied in this volume are extremely varied. United in their diversity, they are also unequally distributed amongst regimes. Most existing (and even proposed) non-use measures are indeed related to the high seas and the deep seabed, a few notable ones pertain to Antarctica and the atmosphere, but no non-use measure exists, at present, in relation to outer space. Beyond obvious considerations of accessibility (distance- and technology-wise), one might wonder whether specific characteristics of the regimes for global goods and commons, in particular their underpinning principles, determine the direction of a regime towards use or non-use.⁴⁹

While this question would benefit from further theoretical and empirical research, the findings of this edited volume indicate that the existence or absence of non-use measures, while certainly influenced by the principles underpinning a regime, is not predetermined by them. Indeed, the reality is complex, due in part to the multi-faceted nature of principles such as the common heritage of mankind, which contains considerations of ecological protection as well as inter- and intra- generational equity.⁵⁰ Moreover, *prima facie* divergent rights and obligations interact within a single regime, such as the freedom of fishing on the high seas and the obligation to protect the marine environment. And, more generally, regimes evolve in ways that cannot always be predicted. All in all, a variety of factors determines a regime's relationship with non-use.

3.2 *Prima Facie Pro-use Regimes*

On the basis of the centrality of the freedom of fishing, the high seas might appear fundamentally open to marine living resources' use. However, this regime is also the one with most non-use measures, ranging from no-take zones within MPAs,⁵¹ to fisheries management seasons or area closures,⁵² to the abstention from fishing in the high seas portion of the central Arctic Ocean.⁵³ This existence not only of measures regulating use but also of several non-use measures reflects the tensions between the freedoms of the high

49 Guggisberg in chapter 2.

50 See eg K. Baslar, *The Concept of the Common Heritage of Mankind in International Law* (Martinus Nijhoff Publishers 1998); A. A. and Cançado Trindade, *International Law for Humankind* (Brill 2010), chapter XIII; P. Taylor, "The concept of the common heritage of mankind", in D. Fisher (ed), *Fundamental Concepts of Environmental Law* (Edward Elgar 2022).

51 Guggisberg in chapter 13.

52 Urrutia in chapter 5.

53 Molenaar in chapter 6.

seas and environmental obligations. Regime evolution has seen a progressive tightening of these freedoms, but this has not been without push back, such as witnessed in CCAMLR.⁵⁴ A full closure of the high seas to fishing remains extremely controversial – and unlikely to be adopted.⁵⁵

Outer space is regulated by a regime explicitly focused on use, prohibiting appropriation and requiring free access. At present, this regime does not contain non-use measures and the regime's features might hinder the development of wide-ranging non-use measures.⁵⁶ Had the Moon Agreement become the relevant legal framework for activities on that spatial body, with its references to the common heritage of humankind and environmental protection, the adoption of non-use measures might have been simpler.⁵⁷ However, even within the framework of the Outer Space Treaty, it might be possible to craft acceptable non-use measures, and it might even be necessary to do so in light of due regard obligations and the fact that the use of outer space should benefit all people.⁵⁸

3.3 *Common Heritage of Humankind and Common Concern*

The Area, in turn, is based on the common heritage of humankind principle. With all States having a recognised legitimate interest in this global common, the range of views as to whether to use or not to use is certain to be diverse. The regional non-use measures in place, which are quite ambitious but give priority to contract areas, might be reflective of this tension.⁵⁹ The larger discussion about a moratorium, while heavily informed by environmental considerations, might also stall because one central tenet of the common heritage of humankind principle, benefit sharing, generally relies on use.⁶⁰

The legal regimes relevant to the atmosphere are diverse and independent. The common concern of humankind, expressed in the climate change regime, could be just as relevant to the ozone protection regime. However, this latter, older regime makes no reference to an overarching concern; yet, it is the ozone protection regime which implements non-use measures and is most successful in addressing a global threat to the atmosphere with impacts on humankind as a whole.⁶¹

54 Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

55 Crespo in chapter 3; Urrutia in chapter 5.

56 Cheney in chapter 18; Martin in chapter 19.

57 Cheney in chapter 18.

58 *ibid.*

59 Menini et al in chapter 11.

60 Jaeckel et al in chapter 10; see also eg International Seabed Authority, *Equitable sharing of financial and other benefits from deep-seabed mining*, ISA Technical Study No. 31 (2021).

61 Guggisberg and Lennan in chapter 17.

3.4 *Sui Generis Regime*

Antarctica is a *sui generis* regime. Managed like a global common, it is nonetheless strongly shaped by the existence of sovereign claims. While they have been frozen and no State can make new claims, the legal status of Antarctica has not been resolved. This reality does not necessarily influence general views on use and non-use in Antarctica, but it has certainly contributed to non-use measures' existence or absence.

The Convention on the Regulation of Antarctic Mineral Resources Activities (CRAMRA) failed, in part, because mining in Antarctica was perceived by claimant States as potentially watering down their claims – and the end of CRAMRA quite directly led to the mining moratorium. Hence, in that case, the tensions due to how a mining regime would impact territorial claims were eased by a decision simply not to use the resource. The fear to see Antarctica managed by the UNGA instead of a smaller (select) club of States, and what that would imply for territorial claims, was also a game-changer.⁶²

In contrast, CCAMLR MPAs are opposed, again in part, because some States view these spatial measures as an attempt to strengthen one's territorial claims. Notwithstanding the questionable nature of this criticism, it is true that MPA proposals have so far always been put forward with the involvement of the relevant claimant State.⁶³ Hence, instead of acting in the interest of humankind, many States' decisions in the ATS appear driven by their interests into specific areas and geopolitical considerations.

4 Factors that Contribute to the Successful Adoption of Non-use Measures

The cases examined in this book demonstrate that non-use measures were successfully adopted when a variety of factors met, with no two scenarios the same. Hence, there is no fixed set of conditions that would automatically lead a regime to embrace and adopt non-use measures. Nonetheless, a certain number of factors can be identified as relevant to the likelihood of non-use measures' adoption. Many of these factors are not unique to non-use measures, in that they might also play important roles in the adoption of restricted-use measures.

62 Kempf in chapter 14.

63 Guggisberg in chapter 13.

4.1 *Characteristics of Non-use Measures*

Some non-use measures' own characteristics, be they for example temporal or location-related, appear to have contributed to non-use measures' acceptability to the States that had the right to vote in their favour or against them.

Measures developed and adopted before the activity they intend to prohibit has started are more likely to gather support, probably as interest groups are less clearly defined and industry actors have not yet invested as many resources in the activity. Such non-use measures were adopted for high seas fishing in CAOFA⁶⁴ and for mining in Antarctica,⁶⁵ and are under discussion in relation to deep-seabed mining.⁶⁶ Non-use measures that prohibit an activity already in place are rarer, though not unheard of, as the example of the 'no-regret' Antarctic tourism measures adopted in 2023 demonstrates.⁶⁷

More generally though, when a non-use measure is adopted in relation to existing activities, one of three situations can be witnessed. First, it might be that the activity in question no longer has socio-economic significance, as was the case with whaling⁶⁸ or with the CBS moratorium.⁶⁹ Second, non-use measures might be designed in such a way that they carve out existing activities – this can be seen in the development of CCAMLR MPAs which exclude existing or even future fishing grounds⁷⁰ and of the REMP for the Clarion-Clipperton Zone, which positions non-mining zones outside of contract areas.⁷¹ Third, other non-use measures targeting existing activities have started as restricted-use measures and have later been progressively tightened, until the default situation of use was reversed: for instance, the production and consumption of ODSS was progressively restricted under the Montreal Protocol, until full phase-outs were implemented.⁷² Moreover, oftentimes but not always, a grace-period is provided for the industry to adapt,⁷³ but there are also cases where the non-use measure is intended to start without delay.⁷⁴

The design and particulars of the non-use measures' material scopes are often developed and agreed through negotiations in order to take a variety of

64 Molenaar in chapter 6.

65 Kempf in chapter 14.

66 Jaeckel et al in chapter 10; Menini et al in chapter 11.

67 Roura and Guggisberg in chapter 15.

68 Jeffries and Latos in chapter 7.

69 Urrutia in chapter 5.

70 Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

71 Menini et al in chapter 11.

72 Guggisberg and Lennan in chapter 17.

73 Jeffries and Latos in chapter 7; Harrison in chapter 8.

74 Roura and Guggisberg in chapter 15.

interests into account. As a result of compromises, the non-use measure that is finally adopted often includes more exceptions and has a narrower scope than the original proposal. The Ross Sea region MPA proposal, for example, which already provided for a special research zone, saw the addition of a Krill Research Zone and was considerably reduced in size during negotiations.⁷⁵ When it comes to Antarctic tourism, proposals for non-use measures are also often watered down, for instance in the case of the proposals on permanent infrastructure and helicopters.⁷⁶ Whether reaching agreement is worth these concessions is a long-standing question in negotiations.

Finally, other characteristics that have contributed to States signing on to non-use measures are provisions enabling the automatic or simple termination of the measure. Limits on the duration of non-use measures, in particular, are quite important to some States; the commercial fishing abstention in CAOFA⁷⁷ and the Ross Sea region MPA⁷⁸ are both time-bound and last in principle for 16 and 30/35 years, respectively. At that point in time, the former will be automatically extended unless one CAOFA Party objects, and the latter will only be extended if CCAMLR Members agree to do so by consensus. The Antarctic mining moratorium does not have an end date, but an amendment procedure will become available as of 2048⁷⁹ – although the procedural requirements are so strict that it is unlikely they will ever be met. In certain cases, conditions are provided that would allow the activity to be (re)started, independently of any fixed timeframe. For example, CAOFA provides that commercial fishing can commence if the Conference of the Parties determines that certain conditions are met.⁸⁰ As to the CBS Convention, its zero annual harvest level will come to an end when the pollock biomass exceeds a specified minimum.⁸¹

4.2 *Procedural Factors*

Another noteworthy set of factors is related to procedural matters, which either make the adoption of non-use measures more likely or, conversely, impairs it. First, the relative openness of a regime to new members, including potential criteria to accede to the relevant treaty, may impact the nature of decision-makers and, consequently, the decisions made. For example, in a regime such as the IWC that does not require involvement in whaling or any

75 Guggisberg in chapter 13.

76 Roura and Guggisberg in chapter 15.

77 Molenaar in chapter 6.

78 Guggisberg in chapter 13.

79 Kempf in chapter 14.

80 Molenaar in chapter 6.

81 Urrutia in chapter 5.

other substantive condition for membership, pro-conservation States could easily join and reverse the earlier pro-whaling majority.⁸² The situation is different if a State has to prove a ‘relevant interest’ in fishing in order to join an RFMO; non-use oriented States might not be able to meet that requirement, and existing members might well do all they can to keep such States out of the regime.⁸³ It is also true that openness can be used both ways, as has been witnessed in CCAMLR, where the increasing number of fishing States has led to a polarisation of views as to the main objective of the regime.⁸⁴ Non-fishing or non-whaling States could be described as non-user States; this category of States can be expected to promote non-use, and their ability to join a regime is hence likely to impact its evolution. Further research ought to be pursued to determine whether this hypothesis is valid – or whether other characteristics correlate more closely with States favouring non-use.

Another crucial factor relates to the rules and procedures on decision-making. If decision-making is based on consensus, a single State can block the adoption of a proposal, which is what is happening with MPAs under CCAMLR, with both China and Russia opposing proposals.⁸⁵ In reverse, (qualified) majority decision-making can enable the swifter adoption – but also reversal – of a non-use measure since it is possible to ‘by-pass’ a few opponents. The Montreal Protocol, for example, has been amended and adjusted by two-third majority decisions to set progressively stricter limits to production and consumption of ODSs and to add new substances to be phased-out. The whaling moratorium was also adopted by a vote, requiring a three-fourth majority. However, one can wonder whether overriding States that are strongly opposed to a measure is entirely positive, because they might simply leave the regime, as Japan recently did with regard to the IWC.⁸⁶ Imposing a non-use measure on reluctant States might also trigger issues of compliance and create tensions in the regime.⁸⁷

For non-use measures found in instruments that require entry into force, an additional hurdle might be met at the domestic ratification process. As seen when it comes to the regulation of Antarctic tourism, these domestic

82 Jeffries and Latos in chapter 7.

83 Urrutia in chapter 5; Molenaar in chapter 6.

84 Guggisberg in chapter 13; Kempf in chapter 14.

85 Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

86 Jeffries and Latos in chapter 7; see also S. Guggisberg, “Legal considerations around Japan’s announcement that it will leave the International Whaling Commission” (2019) *Nereus blogpost*, available at <<https://nereusprogram.org/works/legal-considerations-around-japans-announcement-that-it-will-leave-the-international-whaling-commission-iwc/>> accessed 8 September 2024.

87 Urrutia in chapter 5.

procedures have contributed to delaying or maybe even blocking the entry into force of two Measures of the Antarctic Treaty Consultative Meeting (ATCM).⁸⁸ In that situation, States might prefer to rely on non-use measures that are not legally binding, as they can consequently avoid having to go through domestic ratification procedures. Another characteristic that avoids the pitfalls of domestic ratification procedures is tacit amendment. According to this type of procedure, found for example in the dumping regime,⁸⁹ the measure, usually an amendment, comes into force after a given time, except for those States that have explicitly objected.

Finally, it seems that an explicit provision that a regime can adopt non-use measures is not necessary. As seen in the case of RFMOs, CCAMLR, or the IWC, certain non-use measures were ultimately adopted without being explicitly envisaged by the founding instruments.⁹⁰ Nonetheless, having such a basis to refer to could avoid some tensions as to the actual mandate of a regime, an argument regularly used by opponents of non-use measures.⁹¹

4.3 *External Factors*

More often than not, the successful adoption of non-use measures has depended on the political motives of some key players. In particular, an aspect of note in several cases is the presence of at least one powerful State triggering the development of a non-use measure, or at the very least contributing to it. For example, the United States of America (USA) bolstered the proposed whaling moratorium with many pieces of domestic legislation that applied sanctions to States that continued whaling, and it also threw an aggressive campaign to recruit non-whaling States to join the International Convention for the Regulation of Whaling (ICRW).⁹² Its leadership was also central to the negotiations and adoption of the Montreal Protocol.⁹³ The USA was likewise probably the main instigator of CAOFA's development in that, after it had taken domestic action, it initiated international discussions to ensure that similar international action followed.⁹⁴ Another such example is the role of both the European Union and the USA as proponents of several CCAMLR MPAs.⁹⁵ The willingness of these major players to use diplomatic, political and/or economic

88 Roura and Guggisberg in chapter 15.

89 Harrison in chapter 8.

90 Urrutia in chapter 5; Jeffries and Latos in chapter 7; Guggisberg in chapter 13.

91 Jeffries and Latos in chapter 7; Menini et al in chapter 11; Guggisberg in chapter 13.

92 Jeffries and Latos in chapter 7.

93 Guggisberg and Lennan in chapter 17.

94 Molenaar in chapter 6.

95 Guggisberg in chapter 13.

power to see non-use measures adopted is indeed crucial. The reasons why these States act in favour of a non-use measure of course vary, including environmental concerns, desire to protect or promote one's economic interests (be they related to fisheries, land-based mining operations or other industries),⁹⁶ wish for a personal legacy,⁹⁷ and/or response to civil society pressure.⁹⁸

There are also interesting factors that may lead States other than the original promoters of non-use measures to accept them even when, at first glance, the non-use measures are not to their advantage. Non-Arctic States, for instance, in part signed on to the abstention from fishing in the high seas portion of the central Arctic Ocean because it allowed them to strengthen their position in Arctic governance.⁹⁹ Another example relates to Russia finally consenting to the Ross Sea region MPA in part because Vladimir Putin had announced a Year of Ecology and hence wanted a positive track-record in environmental matters.¹⁰⁰ Finally, some regimes rely on carrot and stick approaches to encourage reluctant States to join and/or agree to non-use measures. The ozone protection regime, for example, provides on the one hand trade restrictions in ODs for non-parties and financial support to help parties implement their obligations.¹⁰¹

Another key factor that can contribute to the development and adoption of non-use measures is pressure from other international fora. A prime example thereof is the moratorium on Antarctic mining, which was adopted in no small part as a response to the legitimacy crisis that was plaguing the ATS at the time. Indeed, non-aligned States, dissatisfied with the perception that only rich States would benefit from mining in Antarctica, brought the 'Question of Antarctica' to the UNGA. By asking to move the governance of Antarctica under the auspices of the United Nations, they fundamentally questioned the role of the ATS. The Environmental Protocol, with the mining moratorium as a key provision, was developed and adopted as a way to reassert the legitimacy of the ATS.¹⁰² The whaling moratorium is another instance where outside pressure was important: it was successfully adopted after the United Nations Conference on the Human Environment passed a resolution calling for a ten-year moratorium on whaling and the Convention on International Trade in

96 See respectively, Guggisberg in chapter 13; Kempf in chapter 14; Roura and Guggisberg in chapter 15.

97 Guggisberg in chapter 13.

98 See eg Harrison in chapter 8; Kempf in chapter 14; Guggisberg and Lennan in chapter 17.

99 Molenaar in chapter 6.

100 Guggisberg in chapter 13.

101 Guggisberg and Lennan in chapter 17.

102 Kempf in chapter 14.

Endangered Species of Wild Fauna and Flora listed whales on its Appendices, thus restricting international trade in the relevant species.¹⁰³ In an even more direct case of outside influence, the adoption of non-use measures by RFMOs to protect vulnerable marine ecosystems was largely triggered by the UNGA's continuous calls for adequate measures in that respect,¹⁰⁴ and maybe by the prospect that the UNGA could adopt measures itself, following the precedent on large-scale pelagic driftnets.¹⁰⁵

Finally, in certain cases, the movement towards the development of non-use measures, or the pressure to adopt them, is non-governmental and usually due to environmental concerns. The role of environmental non-governmental organisations (NGOs) has been crucial in raising awareness around the environmental risks linked to certain activities, such as whaling, mining in the deep seabed and in Antarctica, and fishing in the central Arctic Ocean.¹⁰⁶ Civil society has been known to apply pressure not only on the international scene but also domestically, sometimes in response to high intensity events (such as maritime disasters and the pollution they cause), leading for example Australia and France to reject CRAMRA and thus opening the way to the Environmental Protocol and the Antarctic mining moratorium.¹⁰⁷ In other cases, it is academics and scientists who are the driving force behind non-use measures, as best illustrated by the deep-seabed mining REMPS, which have been first developed through processes consisting almost entirely of environmental scientists.¹⁰⁸ The calls for a closure of the high seas to fishing and for a Non-use Agreement for Solar Geoengineering have both started as academic initiatives.¹⁰⁹ While the path forward for such non-governmental proposals is not always obvious in an international law system led by States, it is noteworthy that all proposals for OSPAR MPAs in the high seas have, so far, been made by NGOs.¹¹⁰

4.4 *Role of Science*

Scientific data and knowledge are crucial to the development and adoption of non-use measures. Indeed, they inform not only why a non-use measure might be needed, but also its particular design – as in the case of ISA REMPS

103 Jeffries and Latos in chapter 7.

104 Urrutia in chapter 5.

105 Crespo in chapter 3.

106 Molenaar in chapter 6; Jeffries and Latos in chapter 7; Jaeckel et al in chapter 10; Kempf in chapter 14.

107 Kempf in chapter 14.

108 Menini et al in chapter 11.

109 Crespo in chapter 3; Oomen in chapter 16.

110 Klerk in chapter 4.

or specific zones of CCAMLR MPAs.¹¹¹ A proposal backed-up by science demonstrating the impacts of an activity on biodiversity or other risks involved has probably more potential to convince States.

However, scientific information is not always followed by decision-makers. For example, risks to the marine environment of mining hydrothermal vents with polymetallic sulphides are well-known, and yet this has not been sufficient for States to adopt a moratorium or even spatially delimited non-mining areas within a REMP.¹¹² At the IWC, scientific information supports the argument that harvesting of minke whales could be resumed, but a significant number of States refuses to act on the basis of this evidence.¹¹³ Some non-use measures might even, from the start, not be based on science; the prohibition of dumping a former oil platform was, apparently, a response to an NGO campaign, rather than needed to address potential or actual risks to the marine environment.¹¹⁴

In certain cases, sufficient scientific information is simply not available. In those circumstances, a regime's relationship with precaution often informs what path is taken. Indeed, if it is the relevant standard, non-use measures might – or ought to – be adopted. When a risk of negative impacts is perceived (to degrees that differ in each regime), such activity should indeed not be allowed to proceed, even if there is no sufficient evidence to demonstrate the impacts – and non-use should thus reign. In an early application of the precautionary approach, States started developing the ozone protection regime while science was still uncertain over the processes at stake and the risks of harm.¹¹⁵ Scientific knowledge then improved and informed the adoption of progressively more restrictive measures. The dumping regime under the London Protocol clearly endorses the precautionary approach, in the sense that non-use applies “when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm *even when there is no conclusive evidence* to prove a causal relation between inputs and their effects”.¹¹⁶ In a more recent application of precaution, the significant lack of scientific knowledge of the marine ecosystems of the central Arctic Ocean

111 Menini et al in chapter 11; Teschke and Konijnenberg in chapter 12.

112 Gollner et al in chapter 9; Menini et al in chapter 11.

113 Jeffries and Latos in chapter 7.

114 Harrison in chapter 8.

115 Guggisberg and Lennan in chapter 17.

116 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (adopted 7 November 1996, entered into force 24 March 2006) 36 ILM 1, art 3(1) (emphasis added), see Harrison in chapter 8.

and how they would react to climate change and fishing pressure was a major driver behind the development of CAOFA.¹¹⁷

Nonetheless, States do not always adopt measures on the basis of the precautionary approach, even when the regime calls for it. For example, the absence of sufficient information about abyssal plains and polymetallic nodules to even undertake environmental impact assessments should trigger non-use measures, especially in light of the potentially very serious consequences for the environment, but such measures have not (yet) been adopted by the ISA.¹¹⁸ Also, while the enormous data and knowledge gaps about high seas living resources strongly argue in favour of closing the high seas to fishing, this proposal is generally considered a radical and unnecessary measure.¹¹⁹

In some cases, States even act in active defiance of the precautionary approach as do China and Russia within CCAMLR when it comes to MPAs. While the relevant ecosystems should be protected because several possible threats have been identified and the ecosystems are not fully understood, China and Russia nevertheless insist on the clear identification of threats to secure protection.¹²⁰ MPA proposals already include what has been certified by the Scientific Committee to be 'best available scientific data', but the opponents argue for a higher threshold, in contravention to the Convention on the Conservation of Antarctic Marine Living Resources itself.¹²¹ In some sense, this CCAMLR debate recalls the discussion at the IWC in the lead to the adoption of the moratorium – except that applying the precautionary approach was not required by the ICRW. Indeed, while several States had argued that the lack of scientific certainty meant that whales could not be protected under the existing management measures, and hence called for precautionary action, other States contended that the same lack of scientific knowledge should prompt the rejection of the moratorium.¹²²

5 Factors that Contribute to Successful Implementation/ Effectiveness of Non-use Measures

On the basis of this edited volume's chapters, we have identified some factors that are more likely to enable non-use measures to achieve their objectives.

117 Molenaar in chapter 6.

118 Gollner et al in chapter 9; Jaeckel et al in chapter 10.

119 Crespo in chapter 3; Urrutia in chapter 5.

120 Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

121 Guggisberg in chapter 13.

122 Jeffries and Latos in chapter 7.

Most of these factors are not particular to non-use measures, in that they also impact any regulatory measure's effectiveness. Interestingly, many of the factors that would lead to successful implementation, such as universal application or ambitious non-use measures with few exceptions, are the opposite of those that would lead to successful adoption.

A general consideration is the need to be careful with terminology and the relative value to give to terms. Non-use measures can be presented under a variety of names (moratorium, temporary pause or abstention, no-take zone, closed season, etc.), which can then also have different meanings across regimes.¹²³ While States are at times wary of terms such as bans and moratoria, probably because these are politically charged, and hence prefer to negotiate a zero-quota or a suspension, the chosen wording has, in practice, little impact on the measures themselves.¹²⁴ What will influence a non-use measures' effectiveness is its actual geographical, material, temporal, and personal scopes of applicability.

5.1 *Non-use Measures in Line with Objectives*

To be successful, non-use measures must be in line with the stated objectives. In that sense, the CCAMLR MPAs with the clear no-take zones and regulations¹²⁵ are in a much better position than the OSPAR MPAs, which have ambitious objectives but include few, if any, concrete restrictions on human activities.¹²⁶ In fact, OSPAR MPAs do not provide any non-use measure.

Non-use measures must also be of adequate material, temporal, and geographical scopes. The existence of measures that have the potential to fulfil their objectives is generally enabled by regimes with strong scientific input into designing the measures, especially when expert advice is taken on board by decision-makers, as in the REMP for the Clarion-Clipperton Zone.¹²⁷ Even those measures might need revising if, in light of new data, it appears that they are not as able to fulfil the stated objectives as originally expected.¹²⁸ The availability of data to that end, gathered for example through on-site monitoring programs,¹²⁹ and the ability to modify a non-use measure are consequently important. The success of the Montreal Protocol is in part due to all these factors being met: strong scientific input is available to guide Parties in deciding

¹²³ Guggisberg in chapter 2.

¹²⁴ Jeffries and Latos in chapter 7.

¹²⁵ Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

¹²⁶ Klerk in chapter 4.

¹²⁷ Menini et al in chapter 11.

¹²⁸ Gollner et al in chapter 9.

¹²⁹ Klerk in chapter 4; Menini et al in chapter 11.

whether to strengthen the regime, and the adjustment procedure makes it relatively simple to modify existing measures.¹³⁰

If exceptions are included in the non-use measures, some characteristics will make them less likely to undermine the actual objectives of the regulatory instrument. First, exceptions should be as limited in scope as possible. Then, they ought to be clearly defined; the scientific research exceptions to the moratoria on Antarctic mining and on whaling are examples of vagueness to avoid. In the former case, and although in practice it does not seem to have significantly undermined the moratorium (yet), the absence of definitions to both 'Antarctic mineral activities' and 'scientific research' and the potential overlaps between prospecting and scientific research makes it difficult to know with certainty whether a State is complying with the moratorium.¹³¹ The scientific whaling programme of Japan has also demonstrated the risks of abuse that can arise with lack of clarity – and unilateral implementation by States.¹³² In that respect, it is better if a multilateral body can decide on the validity of an exception, as is the case with scientific fishing exceptions in CCAMLR MPAs¹³³ or essential use under the Montreal Protocol.¹³⁴ If there is no body mandated to decide whether exceptions can be invoked or to implement exceptions directly, it is important that they be at least the subject of a reporting obligation by States, such as for permits to enter ASPAS or emergency exceptions to the various prohibitions of use found in the Environmental Protocol.¹³⁵

5.2 *Contribution to Broader Aims*

Non-use measures might meet their stated, specific objectives, but one can more generally wonder whether they are always sufficient to actually contribute in a meaningful manner to environmental protection or to other broader aims. As acknowledged, they are no magical tool, and non-use measures might often need to work in concert with restricted-use measures. Nonetheless, some sadly critical considerations are warranted.

Each non-use measure might appear in line with the stated objectives in a given instrument. Yet, they might still not effectively address the concerns that have triggered their development. Antarctic tourism is one such example,

¹³⁰ Guggisberg and Lennan in chapter 17.

¹³¹ Kempf in chapter 14.

¹³² Japan's decision to (ab)use the scientific whaling exception was also closely linked to the unwillingness by the majority in the IWC to lift the moratorium – at least in part – despite scientific evidence, as is mentioned in section 4.4 above.

¹³³ Guggisberg in chapter 13.

¹³⁴ Guggisberg and Lennan in chapter 17.

¹³⁵ Roura and Guggisberg in chapter 15.

where worries about growth and diversification have been voiced for over a decade, but very little progress has been made in addressing these issues. The non-use measures in place are discrete and limited in scope, while more ambitious measures were rejected. All in all, they do not restrict Antarctic tourism to any significant degree.¹³⁶

The whaling moratorium, in turn, has led to the recovery of many whale species – and in that sense is a landmark achievement – but the continued controversy over this non-use measure has hampered efforts to address other threats to marine mammals, such as bycatch, noise pollution, or habitat degradation.¹³⁷ Hence, while the non-use measure itself has achieved its objectives, other (new) concerns would warrant further action for the protection of whales, which the IWC is not currently able to take.

In some cases, it is the limits to the regime's mandate itself that are the issue. The dumping regime can generally be seen as successful in restricting that use of the ocean. However, the environmental impacts caused by dumping, in fact, pale vis-à-vis other sources of marine pollution, in particular land-based pollution.¹³⁸ Yet, those other sources of marine pollution are not regulated as strictly under their own regimes. Similarly, despite the success of individual MPAs in Antarctica, if one acknowledges that climate change represents the main threat to many ecosystems, and definitely so in Antarctica, the inability of the ATS to adopt non-use measures related to that issue is jarring. One could even advance that, in light of the impacts of climate changes, most non-use measure adopted under the ATS address comparatively minor issues.¹³⁹

In that respect, finally, one must point out that most, if not all, non-use measures examined are single-sectoral. Non-use measures focused on one activity include for example the moratorium on commercial whaling or the mining ban in Antarctica. Even within the CCAMLR regime, which has a wide mandate towards the conservation of Antarctic marine living resources, non-use measures are all limited to fishing and fishing-related activities.¹⁴⁰ It is difficult to imagine how such a piece-meal approach can respond to complex and interrelated challenges and address cumulative impacts.¹⁴¹

136 *ibid.*

137 Jeffries and Latos in chapter 7.

138 Harrison in chapter 8.

139 Guggisberg in chapter 13.

140 *ibid.*

141 *ibid.*

5.3 *Implementation and Compliance*

However perfectly designed non-use measures might be, they will only be efficient if they are actually implemented and complied with. Issues with implementation and compliance not only put at risk the achievement of a measure's objectives, but are also likely to undermine trust between States and in the system. In addition to implementation and financial support, which might sometimes be needed, for example to find alternatives,¹⁴² the existence of avenues and structures for monitoring and to promote compliance are important to the success of any multilateral regime.

When it comes to global goods and commons, there usually are a variety of States and bodies with potential jurisdiction, as noted in relation to the proposed deep-seabed mining moratorium.¹⁴³ This situation can, on the one hand, decrease legal certainty, but, on the other hand, it provides several enforcement avenues, should they be needed. Nonetheless, a regime where several States have the right to verify compliance and address its potential absence is not to be equated with automatic actions by those States. For example, the forward-looking inspection system established under the Antarctic Treaty demonstrates that, oftentimes and for a variety of reasons, States will not use inspection rights.¹⁴⁴ Generally, a centralised multilateral body to control compliance ensures that States do not have to spend political capital to monitor other States' behaviour. However, such bodies cannot solve deeper issues in a regime, if many parties reject their obligations.¹⁴⁵ In any case, a compliance mechanism can only function if States report on their activities, which they do not always have a good track record of doing.¹⁴⁶

The legal nature of the instrument in which a non-use measure is contained might also be a relevant factor to compliance, but probably not to a significant extent. While treaties and legally-binding instruments clearly create obligations for States, non-legally binding instruments can create efficient non-use measures – and are sometimes the only possible way forward. The 'no regret' measures adopted with regard to tourism are indeed included in a Resolution, which is non-binding – and yet they are considered as part of the corpus of regulation.¹⁴⁷ Non-mining areas under REMPs are also found in a non-binding policy document, but, according to the draft regulations, they are a prerequisite

¹⁴² Harrison in chapter 8; Guggisberg and Lennan in chapter 17.

¹⁴³ Jaeckel et al in chapter 10.

¹⁴⁴ Kempf in chapter 14.

¹⁴⁵ Guggisberg and Lennan in chapter 17.

¹⁴⁶ Klerk in chapter 4; Harrison in chapter 8.

¹⁴⁷ Roura and Guggisberg in chapter 15.

to exploitation.¹⁴⁸ The Artemis Accords are explicitly non-binding and, yet, they are quickly becoming the relevant legal framework to civil activities on the Moon.¹⁴⁹

5.4 *Pacta Tertiis and Third States*

To be effective, a non-use measure must be applied by all States and/or entities that could use the resource in question. In addition to the issue caused by opt-out provisions,¹⁵⁰ third States are, in light of the *pacta tertiis* rule, not bound by measures they have not consented to. This is a general challenge when it comes to global goods and commons, as the involvement of all States might be necessary to effectively implement a measure.

Hence, achieving (quasi-)universality is an obvious way for a regime to avoid free riding from third States. (Quasi-)universality is, however, not common beyond the ozone protection regime. Large memberships might be equally effective, but are influenced by the identity of the third State(s). Notwithstanding ratification by 170 Parties, the non-participation by the United States in UNCLOS brings up a number of issues, especially in relation to the deep-seabed mining regime.¹⁵¹ UNCLOS also offers other solutions to the problem of limited participation to some regimes. Indeed, through rules of reference, UNCLOS ensures that all States are bound by the dumping regime, notwithstanding limited participation in the London Convention and Protocol.¹⁵² When it comes to the whaling regime, there are no such rules of reference, but the obligation to cooperate in the conservation of marine mammals under UNCLOS (Articles 65 and 120) nonetheless places some requirements on States that are not parties to the ICRW.¹⁵³

In other cases, a regime does not need to be universal to be successful in reaching its objectives. For instance, CAOFA only has 10 Parties, currently the main States active in the Arctic. Article 8 of the treaty further calls Parties to “encourage non-parties to this Agreement to take measures that are consistent with the provisions of this Agreement [... and to] take measures consistent with international law to deter the activities of vessels entitled to fly the flags of non-parties that undermine the effective implementation of this

¹⁴⁸ Menini et al in chapter 11.

¹⁴⁹ Cheney in chapter 18; Martin in chapter 19.

¹⁵⁰ Jeffries and Latos in chapter 7. But see Harrison in chapter 8 for a more positive take on opt-out provisions.

¹⁵¹ Jaeckel et al in chapter 10.

¹⁵² Harrison in chapter 8. The applicability of the London Protocol to all States through UNCLOS is however more controversial than that of the London Convention.

¹⁵³ Jeffries and Latos in chapter 7.

Agreement”.¹⁵⁴ In practice, while third States are not bound by that treaty, it would be very difficult for them to engage in fishing in the high seas portion of the central Arctic Ocean without access to the ports of CAOFA Parties.

Generally, it has been noted that the issue of third States is less concerning in reality than could be imagined. Within the ATS, a policy of openness and inducement has ensured that interested States joined the relevant regimes instead of free riding.¹⁵⁵ In the case of RFMOs, a consistent practice has developed to treat fishing by vessels flying the flag of a non-party as illegal, unreported, or unregulated fishing, which can have negative consequences for the State in question.¹⁵⁶ Hence, several regimes have tools to counteract free riding – and there is no reason that such tools could not be extended to the implementation of non-use measures.

6 Future Prospects of Non-use Measures

This volume started as a project with dual objectives: understand existing non-use measures and discuss the possibility of new ones. Existing non-use measures remain relatively limited in number but have much to teach those that might wish to see the adoption of future bans, moratoria, no-take zones, or precautionary pauses. Some proposed alternative paths not chosen by States where other non-use measures would have been adopted – sometimes seen as missed opportunities¹⁵⁷ – can also inform future non-use measures. In an era of climate change, non-use measures might become more widespread, but practical challenges remain, as do valid questions as to whether non-use measures should always be promoted.

6.1 *Non-use Measures in an Era of Climate Change*

Climate change is a major threat to many ecosystems and biodiversity around the world and acts as a crosscutting issue in most examined regimes. Indeed, it appears not only as a reason to adopt a non-use measure but also, inversely, as the grounds to reject it.

¹⁵⁴ Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA) (opened for signature 3 October 2018, entered into force 25 June 2021) OJ 2019 L 73/3, see Molenaar in chapter 6.

¹⁵⁵ Kempf in chapter 14.

¹⁵⁶ Urrutia in chapter 5.

¹⁵⁷ Roura and Guggisberg in chapter 15 (ASTIS in Antarctica); Cheney in chapter 18 (Moon Agreement).

On the one hand, climate change and its direct or related effects are important reasons behind the need for some non-use measures. In the case of oil and gas extraction, the academic call for non-use measures, i.e. the 'leave-it-in-the-ground' movement, is clearly related to climate change: by implementing such non-use measure, one would indeed tackle an important source of greenhouse gases – and hence mitigate climate change and its impacts.¹⁵⁸ The proposed closure of the high seas to fishing would also, in a more marginal manner, contribute to conventional mitigation through reduction of emissions and increased carbon sequestration.¹⁵⁹ In some cases, the activity in question clearly contributes to climate change, as does Antarctic tourism, but the relevant regime remains surprisingly silent about that issue, even in a time of regulatory development.¹⁶⁰

In other cases, climate change is the reason why an activity becomes possible and hence might become regulated by non-use measures. For instance, CAOFA was developed in part because, due to ice melting, fisheries in the central Arctic Ocean might soon become accessible and stocks are migrating polewards.¹⁶¹ Climate change might also require the development of measures with novel characteristics, in order to take global warming into account: dynamic MPAs would, for example, be better equipped to protect migrating stocks than conventional MPAs.¹⁶² In still other circumstances, non-use measures might be needed because climate change creates an additional stressor on ecosystems, which stand a better chance to tolerate the pressure if other human activities are curtailed, as in CCAMLR MPAs.¹⁶³ Yet, not all States are willing to acknowledge that climate change's ubiquitous causes and consequences may require regimes besides the United Nations climate conventions to act and restrict their uses of various resources. This is particularly true for States that have a complicated relationship with the concept of anthropogenic climate change.

On the other hand, climate change appears in several cases to be the 'higher environmental purpose' that could serve as a reason to reject non-use measures or to create exceptions to them. For example, while the deep-seabed mining moratorium is presented as pro-environmental conservation, opponents have also pointed out that a transition to green renewable energies requires metals

158 Guggisberg in chapter 2; Guggisberg and Lennan in chapter 17.

159 Crespo in chapter 3.

160 Roura and Guggisberg in chapter 15.

161 Molenaar in chapter 6. The same applies to some Antarctic regions, see Teschke and Konijnenberg in chapter 12.

162 Klerk in chapter 4.

163 Teschke and Konijnenberg in chapter 12.

that are available in and on the deep seabed.¹⁶⁴ Similar arguments pro-use are made by space expansionists when it comes to outer space mining activities.¹⁶⁵ In the dumping regime, the addition of carbon dioxide streams in the oceans, which is a new technology intended to reduce the level of CO₂ in the atmosphere and hence mitigate climate change, has been explicitly added to the list of allowed dumping activities. This decision seems to have been made in light of the important environmental objective pursued.¹⁶⁶

Interestingly, other uses of the seas that are also intended to reduce climate change, ie marine geoengineering (except scientific research into iron fertilisation), have been prohibited by the same dumping regime.¹⁶⁷ The nature of risks and uncertainties inherent to certain technologies seems to have been the main reason for their prohibition. Similarly, the call for a Non-use Agreement for Solar Geoengineering places in strong focus the opposition between addressing climate change and taking major – and unjustifiable in the view of this Non-use Agreement's proponents – risks in order to do so.¹⁶⁸ The decision of which 'higher environmental purpose' is to be given priority is clearly a case-by-case decision, informed by scientists, but ultimately in the realms of policy and politics.

6.2 *Potential New or Additional Non-use Measures*

As examined in this volume, several non-use measures could arguably be developed and adopted (Table 20.2). The adoption of new non-use measures will depend on a variety of factors, many of which presented were presented in section 4 above, as applied to the specific circumstances of each case. Notwithstanding this variability, three categories of new or additional non-use measures can be distinguished.

First, there are the entirely new non-use measures, in regimes which had none, or with a totally different scope than existing non-use measures. These are also the most radical measures, which would create a new regime or fully change the default situation of an existing regime. A Non-use Agreement for Solar Geoengineering would be absolutely novel, addressing technologies and uses that are (nearly) unregulated internationally, even with restricted-use

164 On this, see eg L. A. Levin, D. J. Amon and H. Lily, "Challenges to the sustainability of deep-seabed mining" (2020) 3 *Nature Sustainability* 784–794; V. Vivoda, "Uncharted depths: Navigating the energy security potential of deep-sea mining" (2024) 369 *Journal of Environmental Management* 122343.

165 Cheney in chapter 18.

166 Harrison in chapter 8.

167 *ibid.*

168 Oomen in chapter 16.

TABLE 20.2 Potential new or additional non-use measures

	Entirely new non-use measures	New non-use measures deriving from (existing) restricted-use measures	New non-use measures similar to existing ones
High seas	Reversal of the default situation with the closure of the high seas to fishing		Additional no-take zones in MPAs Additional non-use fisheries management measures
Area	Moratorium prohibiting deep-sea seabed mining or a precautionary pause		Additional non-mining zones under REMPS
Antarctica	Reversal of the default situation with tourism prohibited except in designated locations and under prescribed conditions		Additional no-take zones in MPAs Additional no-entry zones in ASPAs Additional prohibitions of specific activities or behaviours
Atmosphere and outer space	Ban on solar geoengineering technology and/or research Reversal of the default situation with resources of the outer space not to be used except for scientific research or other stated objective for the benefit of humankind	No-entry zones in outer space (heritage protection zones)	

measures.¹⁶⁹ Prohibiting the use of outer space resources except for scientific research or other stated objective for the benefit of humankind would not only be revolutionary but would probably also require a careful design to avoid outrightly violating the Outer Space Treaty.¹⁷⁰ Some proposals for major non-use measures might be slightly less revolutionary, but they remain novel in scope of application. For example, closing the high seas to fishing would be

¹⁶⁹ *ibid.*

¹⁷⁰ Cheney in chapter 18.

at a scale not in line with existing high seas MPAs or fisheries closures.¹⁷¹ Also, the proposed deep-seabed mining moratorium, which is under discussion among States and non-State actors, might apply to the whole Area, towards all minerals, and all types of activities;¹⁷² this contrasts with non-mining zones in REMPs, which are focused on designated minerals and areas.¹⁷³ Similarly, closing Antarctica to tourists except in designated areas, which was already envisioned by both ASTIS and a 'no regret' measure, would be of a totally different nature than existing ASPAs.¹⁷⁴

A second category are those new non-use measures that would derive from (existing) restricted-use measures through a process of progressive tightening of the rules. This happened in the whaling and ozone protection regimes, which started as restricted-use regimes before turning to non-use ones.¹⁷⁵ It has also proved central in the dumping regime, with the addition of prohibited substances on the Annexes of the London Convention and/or the removal of exceptions on the Annexes to the London Protocol.¹⁷⁶ New non-use measures can hence derive from restricted-use measures acting as a stepping stone to prepare the regulatory environment for non-use measures. For example, once safety zones are fully accepted in the regulatory regime of the Moon, they could pave the way to non-use measures, such as heritage protection zones.¹⁷⁷

Finally, a third category relates to all those new non-use measures that are similar to existing ones. For example, this covers further CCAMLR MPAs with no-take zones,¹⁷⁸ additional REMPs with non-mining areas,¹⁷⁹ new ASPAs with non-entry areas,¹⁸⁰ and new non-use fisheries management measures.¹⁸¹ While one could think that measures in this category would be the easiest to adopt, this is actually not the case. The likelihood of the adoption of these four non-use measures is in fact very different: REMPs seem to be an ISA priority and will probably move forward, non-use fisheries management measures and ASPAs are developed and generally adopted when the need arises and relevant States agree, and new CCAMLR MPAs are very much in a deadlock. For both CCAMLR

171 Ortuño in chapter 3; Urrutia in chapter 5; Molenaar in chapter 6; Guggisberg in chapter 13.

172 Jaeckel et al in chapter 10.

173 Menini et al in chapter 11.

174 Roura and Guggisberg in chapter 15.

175 Jeffries and Latos in chapter 7; Guggisberg and Lennan in chapter 17.

176 Harrison in chapter 8.

177 Martin in chapter 19.

178 Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

179 Menini et al in chapter 11.

180 Roura and Guggisberg in chapter 15.

181 Urrutia in chapter 5.

MPAS and REMPS, some States call for harmonisation or revision of the procedures for the development and adoption of the measure. While standardised and robust procedures are to be applauded, especially when several similar measures are planned, these calls can also be a strategy to slow or stall a non-use measure's development and/or adoption.

While it might seem that the adoption of a large-scale measure reversing the default situation would make other non-use measures with more limited scopes of applicability unnecessary or even redundant, one could argue otherwise. Overlapping measures already exist, in particular with the whaling moratorium and the Whale Sanctuary in the Southern Ocean. They can serve as back-up and ensure that, should the broader non-use measure lapse, some protection remains. In that sense, even if a deep-seabed mining moratorium is adopted with a broad geographical scope, REMPS should not necessarily be terminated.

6.3 *Pathways for the Development and Adoption of Future Non-use Measures*

New non-use measures are under discussion in many intergovernmental fora, such as the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), CCAMLR, and the ATCM.¹⁸² Some are on the agenda, such as MPAS at CCAMLR. Others are in the Building Blocks sent to UNCOPUOS for its consideration. As to further non-use measures for Antarctic tourism beyond additional ASPAS or behaviour- or activity-related prohibitions, they are not (yet) explicitly mentioned as an option at the ATCM. However, it is still early days in the negotiations towards a Framework for the Regulation of Tourism and Other Non-governmental Activities in Antarctica. Moreover, non-use measures were included in other recent policy proposals, and could consequently be expected to make a return.¹⁸³ Only the future will tell whether, in each forum, the conditions are met to convince all or the necessary majority of States to adopt the relevant proposal.

When it comes to non-use measures that would not clearly fall within the mandate of a particular existing intergovernmental regime or have not been taken on-board by governments, such as the call for a closure of the high seas to fishing and non-use of solar geoengineering technologies, the prospects are certainly bleaker. Notwithstanding an uphill battle, such proposals can still influence regulatory processes. Indeed, the Building Blocks, for example, were

¹⁸² Guggisberg in chapter 13; Roura and Guggisberg in chapter 15; Martin in chapter 19.

¹⁸³ Roura and Guggisberg in chapter 15.

drafted by a group of stakeholders and were then submitted to UNCOPUOS for consideration.¹⁸⁴

Even for the proposals that fall within existing intergovernmental regimes and are supported by States, major challenges remain. In particular, in procedural terms, certain regimes are deadlocked or unwilling to consider non-use measures. Alternative approaches to the traditional purely inter-State negotiation process within a given regime might need to be envisaged, such as through diplomatic and high-level political pressure¹⁸⁵ or the initially unilateral initiative of a major State.¹⁸⁶

Beyond these already tried-and-tested methods, the adoption of the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement) has been hailed as very positive for an integrated protection of the marine environment. This framework treaty for all marine biodiversity in areas beyond national jurisdiction (ABNJ) puts a large quantity of commons in one comprehensive and potentially coherent regime. This regime is open to all States, focused on a balance of conservation and sustainable use, and the product of our current times, hence including modern principles of international environmental law. Since one of its parts concentrates on area-based management tools (ABMTs), including MPAs, this regime is viewed as a potential alternative and/or additional avenue for the adoption of MPAs in ABNJ, such as in Antarctica. Key interpretation issues will however need to be resolved before it can be implemented. These, in particular the concepts of 'not undermine' and 'competences' in relation to existing bodies, will determine the potential of this new regime to adopt ABMTs in geographical areas where other institutions also have a relevant mandate.¹⁸⁷ The BBNJ Agreement could also have an impact on non-use measures in the Area¹⁸⁸ and in area-based management of human activities such as dumping.¹⁸⁹ Moreover, whether directly, institutionally, or normatively, this regime is likely to contribute to the consideration of cumulative impacts of various ocean uses. Hopefully, it will then lead to the adoption of more ambitious, integrated, and multi-sectoral measures.¹⁹⁰

184 Martin in chapter 19.

185 Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

186 Guggisberg and Lennan in chapter 17; Cheney in chapter 18; Martin in chapter 19.

187 Klerk in chapter 4; Urrutia in chapter 5; Guggisberg in chapter 13.

188 Menini et al in chapter 11.

189 Harrison in chapter 8.

190 Klerk in chapter 4; Guggisberg in chapter 13.

Unfortunately, a similar framework is not available in relation to the land-mass of Antarctica, the atmosphere or outer space. Hence, one cannot rely on the option that the relevant regimes be side-lined, or forced to act because of institutional competition. The regulation of Antarctic tourism, for example, will most likely remain within the scope of the ATS. While the International Maritime Organization and the International Labour Organization provide shipping and working standards and hence are relevant to some aspects of tourism in Antarctica, there is no regime apart from the ATS that could regulate other facets of this activity. However, history of that particular regime shows that pressure from the UNGA, for example, can lead to major regulatory changes. Also, while multi-sectoral measures might be beneficial and easier to adopt within the framework of the BBNJ Agreement, or through the institutional cooperation it might instigate, the ATCM is fully able to enter into agreements with other sectoral bodies and to collaborate with them.

The absence of a BBNJ Agreement-like treaty in the outer space regime means that there are no normative security nets or cross-fertilisation that would enable an old regime to embrace new environmental concepts. The Outer Space Treaty is explicitly pro-use and reconciling no-entry zones with its key provisions, while possible, remains a delicate exercise relying on the duty of due regard and the obligation of cooperation.¹⁹¹ Nonetheless, this treaty does not exist in a vacuum and it acknowledges that international law applies to space activities, opening the door to climate change considerations for example.¹⁹² Moreover, if past examples are anything to go by, careful design of measures and progressive steps can lead to a new interpretation of a regime; high seas MPAs were indeed adopted before the BBNJ Agreement and, they too, walked a fine line between respecting the freedoms of the high seas and ensuring environmental protection. While, arguably, high seas MPAs still only bind States that have directly consented to them,¹⁹³ the legality of this type of conservation measure is not up to debate anymore.

6.4 *Promotion of Non-use Measures for Environmental Protection*

This final section addresses the critical question of whether non-use measures should actually be promoted and what risks/benefits they entail.

Adopting and implementing non-use measures is not a silver bullet. At present, non-use measures for global goods and commons are largely single-sectoral and rather piece-meal, which is quite inefficient for integrated

191 Martin in chapter 19.

192 Cheney in chapter 18.

193 Klerk in chapter 4.

environmental protection. Their adoption does not always have much to do with environmental concerns, with States pursuing varied and not always fully acknowledged objectives. They also sometimes target activities that are easier to regulate instead of those with the largest impact on the environment.¹⁹⁴ Moreover, non-use measures can have unintended, and at times counter-productive, side-effects, such as displacing an activity to another area which is not always better equipped to deal with the impacts. For example, a moratorium on outer space mining could lead to increased efforts to mine the deep seabed or continental Antarctica.¹⁹⁵ Non-use measures might also cause other unintended negative impacts. The phase-out of ODSS, for instance, led to the use of hydrofluorocarbons, which act as non-ozone-depleting substitutes. Yet, these substances have a high global warming potential and their use contributes to global warming.¹⁹⁶

It has also been argued that non-use measures would hamper the gathering of scientific data.¹⁹⁷ In these cases where much data is recovered by the industry, this is indeed a factor to be taken into account. Nonetheless, often-times, there is a scientific research exception that enables a certain level of extractive activity to proceed, as long as it also fulfils advanced data gathering requirements.¹⁹⁸ A more fundamental issue, maybe, is the risk that a non-use measure disrupts a regime. Forcing such measure onto unwilling States by way of majority voting or pressure might trigger them to leave a regime, as Japan did vis-à-vis the ICRW in 2019.¹⁹⁹ The existence of non-use measures within a regime might also be a more fundamental threat to the regime itself; the inability for CCAMLR Members to move forward on the question of MPAs is a source of concern that the regime simply cannot function anymore.²⁰⁰

Notwithstanding these challenges, non-use measures have the potential to contribute to environmental protection in that they give some breathing space to nature/certain species and/or restrict certain activities. CCAMLR MPAs, for example, are meant to provide refugia to species under climate change stress.²⁰¹ They can also give States and relevant stakeholders the time to gather and analyse relevant scientific data, in order to base any restricted-use measures

194 Harrison in chapter 8; Guggisberg in chapter 13.

195 Cheney in chapter 18. On other risks of displacement, see Crespo in chapter 3.

196 Guggisberg and Lennan in chapter 17.

197 Jeffries and Latos in chapter 7.

198 Teschke and Konijnenberg in chapter 12; Guggisberg in chapter 13.

199 Jeffries and Latos in chapter 7.

200 Kempf in chapter 14.

201 Teschke and Konijnenberg in chapter 12.

on solid advice, such as intended under CAOFA.²⁰² Finally, while not equal to the rights of nature movement, in which a discussion on rights of non-use can be embedded,²⁰³ or other ecocentric initiatives, non-use measures pursue some similar objectives and are more likely to be adopted in the near future than a paradigm shift.²⁰⁴ The decision, if taken, not to use certain resources or technologies might also contribute to deep reconsideration of humans' relationship with nature and the acknowledgment that major changes to our systems are needed.²⁰⁵

Acknowledgments

The authors would like to thank Erik Molenaar for comments on earlier versions of this chapter.

202 Molenaar in chapter 6.

203 Guggisberg in chapter 2.

204 S. Guggisberg, "Rights of Nature and Non-use of Nature for Environmental Protection in Antarctica" (2024) 14 *The Polar Journal* 446–474.

205 Oomen in chapter 16; Cheney in chapter 18.

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NON-USE MEASURES FOR GLOBAL GOODS AND COMMONS IN INTERNATIONAL LAW

Edited by Solène Guggisberg and Catherine Blanchard

In a world facing major environmental crises, radical measures are increasingly called for. As a change in paradigm from our anthropocentric approach to the environment and its resources remains mostly aspirational, non-use measures present themselves as practical regulatory tools to respond to environmental degradation.

This edited volume examines moratoria, bans, no-take or entry zones across regimes regulating global goods and commons. It analyses factors that have contributed to the successful adoption and implementation of non-use measures for resources in the high seas, deep seabed, atmosphere, and Antarctica. It then presents pathways for the development and adoption of further non-use measures in these areas and in outer space, before reflecting on such measures' limitations and potential.

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ISBN 978-90-04-73056-4



POOD 105
ISSN 0924-1922
brill.com/pood