

1. Introduction

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While global oceans are facing extreme pressure from anthropogenic activities, such as marine pollution and ocean acidification, the Polar Regions (Arctic and Antarctica) are still relatively pristine. Nevertheless, marine ecosystems in the Polar Regions are experiencing rapid changes. Climate change is already having dramatic impacts on global marine ecosystems and fisheries.¹ Global warming has caused rapid loss in ice cover in many Polar Regions. For example, the multi-year ice cover in the Arctic has declined from 61 per cent in 1984 to 34 per cent in 2018.² Ice-melting has facilitated human access to formerly remote areas. The potential for increased activities such as fishing, shipping, tourism and bioprospecting in the Polar Regions pose significant ecological risks.

The Polar Regions are potentially resource-rich 'Final Frontiers'. For example, due to historic presence of multi-year ice, no commercial fisheries have operated in the central Arctic Ocean. In the Southern Ocean, Antarctic krill (*Euphausia superba*) makes up an estimated biomass of around 379,000,000 tonnes,³ and as such are likely the most abundant species on the planet. While some agencies (e.g., the United Nations Food and Agricultural Organization) consider krill to be potentially underexploited relative to its biomass, multiple countries fish competitively for krill around the Antarctic Peninsula and in recent years have pushed for higher catches.⁴ Polar species and ecosystems

¹ See for example, Ove Hoegh-Guldberg and Elvira S. Poloczanska (eds), *Effects of Climate Change Across Ocean Regions* (Frontiers Media 2018).

² National Snow and Ice Data Centre, 'Arctic Winter Warms up to a Low Summer Ice Season' <<https://nsidc.org/arcticseaicenews/2018/05/arctic-winter-warms-up-to-a-low-summer-ice-season/>> accessed 27 February 2019.

³ CCAMLR, 'Krill fisheries and sustainability' <<https://www.ccamlr.org/en/fisheries/krill-fisheries-and-sustainability>> accessed 9 January 2019.

⁴ Cassandra Brooks, Larry Crowder, Lisa Curran, Robert Dunbar, David Ainley, Klaus Dodds, Kristina Gjerde, Rashid Sumaila, 'Science-based Management in Decline in the Southern Ocean' (2016) 354 *Science* 185–7.

have proven particularly vulnerable to overexploitation. For example, historical overfishing in the lower latitudes of the Antarctic and sub-Antarctic led to the collapse of multiple populations of whales, seals, and finfish, some of which have yet to recover and with continued ecosystem impacts.⁵ In the Arctic, the ‘Donut Hole’ stock of Pollock in the Aleutian Basin of the central Bering Sea during the 1980s is perhaps the most spectacular fishery collapse in North American history.⁶ The Poles urgently need effective governance regimes to deal with increased human activities.

In recent years, the international community, especially western countries, has pushed for the governance regimes of marine living resources in the Polar Regions to be more precautionary. In Antarctica, which has been governed by the Antarctic Treaty System (ATS) over past decades and arguably with high efficacy,⁷ States have been carrying on discussions for years towards implementing more precautionary management. One example within the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), the management body that gives effect to the 1980 Convention for the Conservation of Antarctic Marine Living Resources (CAMLR Convention), is the establishment of marine protected areas (MPAs) in the Southern Ocean.⁸ CCAMLR committed to designate a network of Southern Ocean MPAs in accordance with global targets set by a number of international institutions since 2002. Since then, they have adopted two MPAs, including the world’s second largest in the Ross Sea. Further, multiple proposals are on the table. Nevertheless, questions remain as to whether CCAMLR is doing enough to be truly precautionary. Further, is CCAMLR operating as a Regional Fisheries Management Organization (RFMO) or a conservation body? What are

⁵ David Ainley and Daniel Pauly, ‘Fishing Down the Food Web of the Antarctic Continental Shelf and Slope’ (2013) 50 *Polar Record* 92–107; Robert J. Hofman, ‘Sealing, Whaling and Krill Fishing in the Southern Ocean: Past and Possible Future Effects on Catch Regulations’ (2017) 53(268) *Polar Record* 88–99.

⁶ Leilei Zou and Henry 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* 132–8.

⁷ See for example, Julia Jabour, ‘The Antarctic Treaty System: What’s on the Horizon?’ (2012) 4 *Yearbook of Polar Law* 709–22; Marcus Haward, ‘Contemporary Challenges to the Antarctic Treaty and Antarctic Treaty System: Australian Interests, Interplay and the Evolution of a Regime Complex’ (2017) 9(1) *Australian Journal of Maritime & Ocean Affairs* 21–4.

⁸ Convention on the Conservation of Antarctic Marine Living Resources, adopted 20 May 1980, entered into force 7 April 1982, 1329 *UNTS* 175.

successes and failures of CCAMLR's work? What are key debating points in the negotiations over CCAMLR MPAs? Is CCAMLR's compliance regime effective?

In the Arctic, so far, large-scale commercial fisheries are only taking place in the sub-Arctic.⁹ As mentioned above, no commercial fishing has occurred in the central Arctic Ocean, one of the key impacts of climate change in the Arctic marine ecosystem is the potential northward expansion of various sub-Arctic and temperate marine species.¹⁰ Five Arctic coastal States (Canada, Denmark, Norway, Russia and the United States – the Arctic Five), four important high seas fishing States (China, Iceland, Japan and South Korea) and the European Union (EU), concluded the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAO Agreement) in November 2017.¹¹ This Agreement ended a decade negotiation, initiated by the United States, and filled a lacuna in the legal regime for Arctic high seas fisheries by imposing a temporary moratorium on commercial fisheries in the central Arctic Ocean (CAO) for 16 years. However, a number of questions need to be addressed. Would the duration of 16 years be sufficient for understanding the effects of climate change on fisheries in the CAO? Will this agreement be effectively implemented by States? To what extent does the Agreement adopt a precautionary approach to conservation and management of high seas fisheries in the Arctic? How will governance regimes in major Arctic States, such as Norway and Russia, respond to changing the Arctic marine ecosystem?

Against this backdrop, the book brings together a number of leading and emerging scholars from across the world, including Australia, Belgium, Brazil, China, Canada, Denmark, France, Germany, Norway, Russia, and the United States, from diverse disciplines such as international

⁹ Sigmar Arnarsson and Debra Justus, 'Changing Nature of Arctic fisheries' in Adam Stepien, Timo Koivurova and Paula Kankaanpää (eds), *Strategic Assessment of Development of the Arctic* (Arctic Centre, University of Lapland 2014) 57.

¹⁰ See for example, Njord Wegge, 'The Emerging Politics of the Arctic Ocean: Future Management of the Living Marine Resources' (2015) 51 *Marine Policy* 331–8; Lauren V. Weatherdon, Alexander K. Magnan, Alex D. Rogers, U. Rashid Sumaila and William Cheung, 'Observed and Projected Impacts of Climate Change on Marine Fisheries, Aquaculture, Coastal Tourism, and Human Health: An Update' (2016) *Frontiers in Marine Science* 1–21.

¹¹ For a comprehensive analysis of the Agreement, see Valentin J. Schatz, Alexander Proelss and Nengye Liu, 'The 2018 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean: A Critical Analysis' (2019) 34 *International Journal of Marine and Coastal Law* (forthcoming).

law, international relations, political science and marine biology as well as a representative from CCAMLR to examine the above-mentioned questions. The book focuses on a key theme: how to develop governance regimes in the Polar Regions that effectively reconcile human needs and environmental protection. It aims to provide a comprehensive assessment of Polar governance regimes on marine living resources and shed light on the future.

PART I ANTARCTICA

The book is divided into three parts. Part I focuses on the conservation of marine living resources in Antarctica, which centres on the work of CCAMLR. In Chapter 2, Press, Hodgson-Johnston and Constable state that ‘the CAMLR Convention has established world benchmarks for the conduct and management of fisheries, which is often used as an exemplar of fisheries “best practice”’. The authors examine the nature of the CAMLR Convention and argue that while CCAMLR has the attributes of a RFMO, it is fundamentally a conservation instrument with some of its provisions related to regulating fishing activities, rather than a fisheries management agreement that has conservation provisions. Chapter 2 also elaborates on the meaning of ‘rational use’, as used in Article II of the CAMLR Convention.

Reid, CCAMLR’s Science Manager, explores the origins of CCAMLR in Chapter 3. The chapter examines CCAMLR’s ‘Olympic-style’ approach to fisheries management. It emphasizes that conservation is a key operative term of CCAMLR and adds some further discussions on the interpretation of ‘rational use’. Reid also shares his view regarding some future challenges for successful management of marine living resources in the Southern Ocean.

In Chapter 4, based on interviews with CCAMLR diplomats and scientists from the 24 Member States to understand the barriers to negotiation and adoption of CCAMLR MPAs proposals, Brooks focuses on the time period through the 2015 CCAMLR annual meeting, and reveals that CCAMLR MPA process has been divisive in recent years. Brooks gives several reasons regarding this divisiveness, including: procedural issues surrounding the MPA policy process; economic trade-offs in the perceived costs and benefits over MPAs and fisheries access; internal institutional issues within CCAMLR (e.g., interpretations of ‘rational use’); and external issues that occur outside of CCAMLR, yet alter the dynamics of negotiations within CCAMLR (e.g., global level international relations).

Vanstappen in Chapter 5 deals with a major challenge for CCAMLR: non-compliance. This chapter argues that one way CCAMLR can promote – and has promoted – compliance is by ensuring that its decision-making process is legitimate. The focus is specifically on two principles guaranteeing legitimate decision-making, namely inclusive participation and evidence-based decision-making. The normative content of these principles is discussed, as well as their legal status and substance under international fisheries law. CCAMLR's design and decision-making process are studied in the context of these principles.

PART II ARCTIC

Part II of the book examines multilevel governance of marine living resources in the Arctic. VanderZwaag in Chapter 6 highlights international efforts to prevent unregulated high seas fisheries in the central Arctic Ocean (CAO) through a two-part discussion. 'Cooperative currents' are first described, that is, the two main texts negotiated to prevent future unregulated CAO fishing, namely, the Oslo Declaration (2015) and the Agreement to Prevent Unregulated High Sea Fisheries in the Central Arctic Ocean (2017). The 'foggy future' is then reviewed with five uncertainties looming in the CAO governance horizon. Those uncertainties include, for example, how the new legally binding agreement on CAO fisheries will be implemented in practice and future directions for scientific research and coordination.

Sergunin, a Russian Arctic scholar, provides a comprehensive analysis of Russia's Arctic fisheries management policies in Chapter 7. Given that Russia has the longest coastline in the Arctic, its practice under international law is essential for sustainable management of Arctic marine living resources. The chapter first analyses Russian law and policy on conservation of Arctic marine living resources. Second, it reviews bilateral efforts to regulate Arctic fisheries with Norway and the United States. And, finally, the chapter discusses Russia's Arctic fishery management policies in the multilateral arena, such as the Arctic Council, and the recent CAO Agreement. Special attention is given to Russia's role in fighting illegal, unreported and unregulated fishing in the Arctic region.

In Chapter 8, Cassotta and Tiller discuss practice of another important Arctic coastal State: Norway. The authors choose Svalbard as a case study. The chapter examines existing conflicts between Arctic nations with respect to the Archipelago of Svalbard, suggesting that these conflicts are driven by a race for resources, overlapping jurisdictional claims, uncertain fishing rights, and a lack of multiregional agreements. The chapter also

investigates if and how Norway has a proactive role in institutionalizing and regulating management claims over Svalbard versus what the international acceptance of practice is.

PART III FUTURE CHALLENGES AND PROSPECTS

Part III looks into some new challenges and prospects for governing marine living resources in the Polar Regions. Leary in Chapter 9 addresses legal implications of using new technology (Autonomous Underwater Vehicles (AUVs) and Unmanned Aerial Vehicles (UAVs)) in the Antarctic. In the Southern Ocean and along the Antarctic coastline and in the airspace above the Antarctic, AUVs and UAVs respectively are emerging as a potentially valuable tool for scientific research. This chapter explores the potential scientific role that these vehicles could play, while offering thoughts on how these 'robot' technologies could potentially enhance environmental governance of the region. Leary considers the implications for international law and policy and seeks to sketch tentative answers to some key questions: To what extent is the use of AUVs and UAVs regulated under existing international law? What issues merit a regulatory response from the international community?

Chapter 10, written by a group of Brazilian and French scholars, provides a balanced view on bioprospecting in Antarctica, an issue that has gradually attracted the attention of governments, scientists and the commercial sector in recent years. Given the fact that the ATS has no regulation of bioprospecting yet, the chapter examines some key legal and political challenges for regulating Antarctic bioprospecting in the future. Questions are raised such as: (1) whether the interest of humankind and the freedom of scientific research could be balanced with the appropriation of biological material from Antarctica; (2) whether the ATS should be self-contained to regulate bioprospecting (e.g., through a mandate of CCAMLR), or whether global regimes, such as the Convention on Biological Diversity, should be applicable in this case; and (3) who should benefit from Antarctic bioprospecting and how should potential benefits be shared among developed and developing countries?

Chapter 11, by Schatz, explores whether it is possible to establish a compulsory dispute settlement regime for the conservation of marine living resources in the Polar Regions. It addresses the adequacy of current regimes to address the future challenges posed by increasing fishing pressure in the Polar Regions. The chapter provides an overview of relevant case law in order to identify key jurisdictional challenges for the settlement of such disputes. This overview is followed by an analysis of the legal

effectiveness of the applicable dispute settlement framework based on the availability of comprehensive compulsory jurisdiction of judicial bodies. It highlights both commonalities and differences with the settlement of high seas fisheries generally.

Finally, in Chapter 12, Liu and Brooks predict future governance of Polar marine living resources in the context of technology development, climate change and a shifting geopolitical landscape.