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Implementing Precaution in the Legal Framework for Seabed Mining in the Arctic

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Abbreviations

ABNJ	Areas Beyond National Jurisdiction
AMAP	Arctic Monitoring and Assessment Programme
AWNJ	Areas Within National Jurisdiction
BBNJ	Biodiversity Beyond National Jurisdiction
CLCS	Commission on the Limits of the Continental Shelf
EIA	Environmental Impact Assessment
ICJ	International Court of Justice
ILBI	International Legally Binding Instrument
IMR	Institute of Marine Research
ISA	International Seabed Authority
ITLOS	International Tribunal for the Law of the Sea
LTC	Legal and Technical Commission
MAR	Mid-Atlantic Ridge
OEMMR	Office of Environmental Management and Mineral Resources
REMP	Regional Environmental Management Plan
VME	Vulnerable Marine Ecosystem
WWF	World Wide Fund for Nature

1 Chapter I – Introduction

1.1 Framing the Problem

Minerals from the Arctic soil have facilitated human developments for centuries.[1] This extractive activity has primarily targeted mineral resources on land,[2] but preliminary studies show that the volcanic spreading ridges of the Arctic seabed might hold significant amounts of highly sought-after minerals.[3]

While commercial factors like profitability and technical feasibility may still delay exploitation of these minerals in the Arctic, regulatory efforts are being made on a national and international level to bring about long-drawn-out launch of large-scale seabed mining.[4] The legal framework may be ready for the onset of exploration activities on Norwegian continental shelf as soon as 2023,[5] and would allow for exploitation activities areas beyond national jurisdiction (ABNJ) around 2026.[6] When the regulatory framework is established, large-scale

[1] Ingrid Bay-Larsen, Berit Skorstad and Brigt Dale in 'Mining and Arctic Communities' in B Dale, I Bay-Larsen and B Skorstad (eds), *The Will to Drill - Mining in Arctic Communities* (Springer International Publishing 2018) 2

[2] Small-scale seabed mining is already taking place in near-shore areas of the Arctic, See, e.g., Marcel JC Rozemeijer and others 'Seabed Mining' in Johnson K, Dalton G and Masters I (eds), *Building Industries at Sea: 'Blue Growth' and the New Maritime Economy* (River Publishers 2018) 74

[3] See, e.g., Rystad Energy, 'Marine Minerals Norwegian Value Creation Potential' [PowerPoint slides] (2020), available at <https://www.norskoljeoggass.no/contentassets/f7a40b81236149ea898b87ff2e43a0e3/20201120-marine-minerals---norwegian-value-creation-potential.pdf> accessed 19 March 2021

[4] At the international level The Draft Standards and Guidelines for the Exploitation Regulations of the Area closed for stakeholder consultation in July 2021, see ISA 'Stakeholder consultation and status of preparation' (ISA 2021) https://isa.org.jm/mining-code/standards-and-guidelines, accessed 14 July 2021; at the national level the Norwegian Government closed the stakeholder consultation on the Norwegian *impact assessment program* in April 2021, see the Norwegian Government 'Høring - forslag til konsekvensutredningsprogram for mineralvirksomhet på norsk kontinentalsokkel' (NOR) available at https://www.regjeringen.no/no/dokumenter/horing-forslag-til-konsekvensutredningsprogram-for-mineralvirksomhet-pa-norsk-kontinentalsokkel/id2828123/?expand=horingsnotater accessed 20 June 2021

[5] Reuters, 'Environmentalists Call on Norway to Stop Plans for Deep-Sea Mining' (Reuters, 12 April 2021) <https://www.reuters.com/world/europe/environmentalists-call-norway-stop-plans-deep-sea-mining-2021-04-12/> accessed 6 June 2021

[6] BBC, 'Deep sea mining may be step closer to reality' (BBC, 1 July 2021) <https://www.bbc.com/news/science-environment-57687129t> accessed 29 August 2021

seabed mining on the Arctic seabed may become a reality at the opportune moment.[7] Thus, any uncertainties connected to the onset of large-scale seabed mining must be addressed in the legal framework currently under development.

A significant portion of the uncertainties connected to large-scale seabed mining concerns the possible effects the activity may have on the environment. The target minerals are typically located in deep, dark and distant parts of the seabed.[8] Although hard to access and observe, this environment plays an important, albeit less understood role in the world's ecosystems and climate.[9] While all extractive activity necessitate intervention in the natural landscape, the environmental knowledge gaps make the potential scope of environmental harm very hard to predict.[10] In this regard, the Arctic environment creates particular challenges as contaminants from seabed mining may have a compounding effect on the rapid changes of the landscapes and ecosystems because of climate change.[11]

On this basis, the core dilemma for regulators is how to create a balance between the developmental potential of seabed mining and the uncertain environmental cost of the activity.[12] While too rigid environmental standards come at the cost of profitability and development, too loose standards risk irreversible damage to the environment. One of the legal tools available to address environmental risk and protect the environment in the context of uncertainty is a

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[7] Absent national legislation for seabed mining in areas within national legislation is considered a major challenge for seabed mining companies, see Ecorys 'Study to Investigate the State of Knowledge of Deep-Sea Mining—Final Report to the European Commission under FWC MARE/2012/06—SC E1/2013/04' (28 August 2014) 88 <https://webgate.ec.europa.eu/maritimeforum/sites/maritimeforum/files/FGP96656%20DSM%20Interim%20report%20280314.pdf> assessed 04 Jul 2021

[8] Massive sulphides are typically located at depths between 2,000-3,000 meters; manganese nodules between 4,000-6,000 meters; and cobalt crusts between 800-2,500 meters, see, e.g., Rystad Energy, n 3

[9] See, e.g., FFI 'An Assessment of the Risks and Impacts of Seabed Mining on Marine Ecosystems' [Online], <https://cms.fauna-flora.org/wpcontent/uploads/2020/03/FFI_2020_The-risks-impacts-deep-seabed -mining_Report.pdf> accessed 6 June 2021

[10] For an overview of the risk and impacts of seabed mining, see FFI, n 9, 15 and WWF 'An Investigation into Deep Seabed Mining and Minerals' (WWF, 2020) ii <https://wwfint.awsassets.panda.org/downloads/an_investigation_into_deep_seabed_mining_and_minerals_for_wwf_full_report_2020.pdf> accessed 14 May 2021

[11] AMAP 'Pops And Chemicals of Emerging Arctic Concern:Influence of Climate Change' (Summary for Policy-Makers) (2021), 7 <https://www.amap.no/documents/doc/pops-and-chemicals-of-emerging-arctic-concern-influence-of-climate-change.-summary-for-policy-makers/3511> accessed 07 June 2021

[12] WWF, n 10, ii

precautionary approach.[13] This raises the question of how to effectively incorporate and implement a precautionary approach into and within the legal framework applicable to large-scale seabed mining in the Arctic.

1.2 Purpose and Research Questions

The object of this thesis is to examine and assess how a precautionary approach has been incorporated and implemented in the legal regimes for seabed mining in the Area and on the Norwegian continental shelf. Both regimes apply to seabed areas in the Arctic. The overarching goal of the thesis is to contribute to a broader discussion on how to best protect the marine environment in the Arctic.

In order to arrive at these objectives, the thesis will discuss and conclude on the principal legal question:

- To what extent do the legal frameworks applicable to seabed mining in the Area and on the Norwegian continental shelf incorporate and effectively implement a precautionary approach to ensure the protection of the Arctic marine environment?

The examination and research of the following preliminary legal questions will facilitate the assessment and conclusion on the principal legal question:

- What is the legal status of a precautionary approach as it relates to seabed mining beyond and within areas of national jurisdiction?
- What is the international legal framework for seabed mining and how does this framework apply to seabed mining in the Arctic?
- To what extent is a precautionary approach incorporated and implemented within the legal regime for seabed mining in the Area and on the Norwegian continental shelf?

1.3 Delimitation of Scope and Terminology

As there is no universal definition of 'the Arctic', the geographical coverage of the term will in this thesis correspond to the Arctic Monitoring and Assessment Programme (AMAP)

[13] AL Jaeckel 'The International Seabed Authority and the Precautionary Principle – Balancing Deep Seabed Mineral Mining and Marine Environmental Protection' (Brill Nijhoff 2017) 15

circumpolar region.[14] The thesis will only focus on two specific legal regimes regarding the incorporation and implementation of a precautionary approach in this area: namely the regime of the Area and on Norwegian domestic legislation applicable to seabed mining.

Regarding the Area, this study will only focus on a specific element of the regime, that is how a precautionary approach is incorporated and implemented by the International Seabed Authority (ISA). Although it is likely that the vast majority of seabed of the Arctic will fall within the limits of the coastal State's national jurisdiction,[15] the regime of the Area and the regulatory role of the ISA are still relevant regarding seabed mining in the Arctic for two reasons. Primarily because the ISA, under the 1982 United Nations Convention on the Law of the Sea[16] Part XI, will have jurisdiction in areas that should fall beyond the national jurisdiction of the coastal State. Second, an examination of a precautionary approach under the ISA regulations has the potential to inform domestic legislation pertaining to seabed mining in the Arctic.

In areas within national jurisdiction (AWNJ), this study will solely focus on Norwegian domestic legislation applicable to seabed mining on the Norwegian continental shelf. As Norway may issue the exploration licenses on the continental shelf as soon as 2023,[17] Norway has made significant efforts to legislate seabed mining, most prominently trough the adoption of a Seabed Minerals Act, which entered into force in 2019. On this basis, Norwegian legislation makes for a suitable study object for this thesis.

This thesis will only cover legislation relevant to seabed mining on the Norwegian continental shelf. This focus corresponds with the legislative purpose of the Norwegian 2019 Seabed Minerals Act, where Section 1-1 states that 'the Act shall facilitate exploration for and extraction of mineral deposits on the Continental Shelf'. However, the geographical scope of the Act applies to all maritime zones under Norwegian jurisdiction, under Section 1-3. On this

[14] AMAP 'AMAP Assessment Report: Arctic Pollution Issues (1998) Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. xii+859 9

[15] For an overview of continental shelf submissions to the CLCS, see The International Boundaries Research Unit, 'IBRU Arctic Maps Series' (Durham University, 2020) https://www.durham.ac.uk/research/institutes-and-centres/ibru-borders-research/maps-and-publications/maps/arctic-maps-series/ accessed 29 June 2021

[16] United Nations Convention on the Law of the Sea (LOSC) (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3

[17] Reuters, 'Norway Eyes Sea Change in Deep Dive for Metals Instead of Oil' (*Reuters*, 12 January 2021), 73-74 <https://www.reuters.com/business/environment/norway-eyes-sea-change-deep-dive-metals-instead-oil-2021-01-12/> accessed 6 June 2021.

basis, discussions relating to the Seabed Minerals Act may apply to all areas where the Act applies. Regarding the maritime zones of Svalbard, Section 11-2 III of the Act states that it does not apply to Svalbard. Observing the controversy regarding the geographical scope of the 1920 Svalbard Treaty[18], this thesis will apply to all areas of the Norwegian continental shelf where the Seabed Minerals Act applies. Thus, this thesis will not cover issues relating to the geographical application of the Svalbard Treaty.

The term *seabed mining* only covers the exploration and exploitation of non-living 'resources' as defined by United Nations Convention on the Law of the Sea (LOSC)[19] Article 133. For this thesis, the term *seabed mining* will only refer to large-scale mining of mineral resources on the continental shelf and in the Area. This is to delimit large-scale seabed mining in greater depths from near-shore mining, which is already taking place at a global scale, including in seabed areas in the Arctic.[20]

The term *incorporation* points to how a legal framework represents a legal norm, whilst the term *implementation* concerns how a legal term is operationalised and given practical effect within a legal framework.

Issues regarding delimitation and delineation of the continental shelf will not be covered. For this thesis, it suffices to conclude that the future Arctic seabed will comprise areas governed by both Part XI and Part VI of LOSC.[21]

The future international legally binding instrument (ILBI) under LOSC on biodiversity beyond national jurisdiction (BBNJ) is likely to have important implications for a range of activities in ABNJ in the Arctic,[22] such as seabed mining. At the same time, the ILBI is currently being negotiated and the full extent of its implications for seabed mining remains unknown. On this basis, this thesis will exclusively focus on the incorporation and

[18] See, e.g., Peter Ørebech 'The Geographic Scope of the Svalbard Treaty and Norwegian Sovereignty: Historic – or Evolutionary – Interpretation?' Croatian Yearbook of European Law and Policy (2017), 53–86

[19] United Nations Convention on the Law of the Sea (adopted 10 December 1982, in force 16 November 1994) 1833 UNTS 396

[20] For a discussion on "offshore mining" vs "near-shore mining", see Rozemeijer and others, n. 2, 74

[21] The International Boundaries Research Unit, n 15

[22] See, e.g., Vito De Lucia, 'The Arctic environment and the BBNJ negotiations. Special rules for special circumstances?' (2017) 86 Marine Policy 234; De Lucia V, 'The BBNJ negotiations and ecosystem governance in the arctic' Marine Policy (2019) <https://doi.org/10.1016/j.marpol.2019.103756}>

implementation of a precautionary approach by the ISA. The potential relevance of the Polar Code for seabed mining in the Arctic will not be covered by this thesis.

It should also be noted that the incorporation and implementation of a precautionary approach by the ISA to activities in the Area would create an obligation for States to implement a precautionary approach with regard to seabed mining in the Area. However, as Norway has not adopted regulations for seabed mining in the Area, this topic will not be discussed in the scope of this thesis.

This thesis will consistently apply term *approach* when referring to precaution. While there is an ongoing debate with regard to whether *approach* or *principle* is the correct terminology for precaution, [23] terminology does not determine the legal effect of precaution.[24] The term *approach* will exclusively refer to the legal effects of precaution and does not intend to contribute to the discussion on terminology.

1.4 Method and Legal Sources

The thesis will apply a doctrinal legal analysis to examine relevant international sources of law as stipulated in Article 38 (1) of the Statute of the International Court of Justice (ICJ). By the method of legal analysis, the relevant sources will be interpreted under articles 31 to 33 of the Vienna Convention on the Law of Treaties (VCLT) in as far as these reflect international customary law.[25]

The doctrinal method of legal analysis sets up the basic parameters to measure how a precautionary approach is incorporated and implemented in the selected legal regimes. However, the nature of precaution under international environmental law creates a need for additional parameters to measure how precaution is operationalised and given practical effect in these legal regimes. For this purpose, this thesis will apply an analytical framework that seeks to measure how the selected legal regime is capable of giving practical effect to the elements of precaution in such a way that a precautionary approach is fully implemented. This framework

[23] For a general discussion on this debate, see, e.g., Jonathan B Wiener, 'Part V Key Concepts, Ch.25 Precaution' in Bodansky D, Brunnée J, Hey E (ed.) 'The Oxford Handbook of International Environmental Law' (*Oxford Public International Law 2008*)
[24] Jaeckel, n 13, 22
[25] Norway is not a party State to the VCLT, but accepts the articles the rules of interprentation as a reflection of international custumary law, see The Norwegian Government 'Meld. St. 32 (2015–2016) Report to the Storting (white paper)',

is based on two theoretical legal models for precaution. Trouwborst's analytical model of the precautionary three-legged tripod [26] will be used to conceptualise the core elements of precaution. Jaeckel's concept of implementation of precaution in three dimensions[27] will be used to assess the practical implementation of precaution in the selected legal regimes. This analytical framework will be further explored in Chapter III of this thesis.

The relevant legal sources will comprise the legal instruments that applies to the Norwegian continental shelf and in the Area. Relevant regulation will include international legal instruments such as LOSC and the ISA Mining Code, besides regional agreements, multilateral agreements, and national legislation. Soft law instruments, legal theory and case law will be examined to interpret the relevant regulatory instruments. As the thesis seeks to analyse an emerging industry with significant environmental risk, peer reviewed scientific reports, national policy documents, industry reports, reports from non-governmental organisations, and global interest groups will inform the legal analysis.

Norwegian national legislation will be examined to determine the applicable legal framework for seabed mining in the Norwegian marine Arctic, with the exception of Svalbard. As commercial seabed mining is still an emerging industry, the thesis will not cover State practice.

1.5 Thesis Outline

The thesis will consist of six chapters. The first chapter introduces the research questions, the context of these questions, and the methodology used in this thesis. The second chapter will provide a brief examination of seabed mining and discuss the core environmental concerns related to this activity in an Arctic context. This chapter will form the backdrop for the analyses in the following chapters.

The third chapter focuses on the first preliminary question. This chapter will examine the legal status and the content of a precautionary approach as it relates to seabed mining. This chapter will also establish the analytical framework for the thesis.

The fourth chapter will focus on seabed mining in ABNJ. The chapter will first examine the international legal framework for seabed mining and how the elements of a precautionary

[26] Arie Trouwborst, *Precautionary Rights and Duties of States* (Brill Nijhoff 2006) 30
[27] Aline Jaeckel, n 13

approach are incorporated into this framework. The chapter will then examine and discuss how the ISA has incorporated a precautionary approach in the regulations applicable to seabed mining in the Arctic. Last, the chapter will examine and discuss how the ISA has implemented elements of a precautionary approach to seabed mining in the Arctic.

The fifth chapter shifts the focus to AWNJ. The chapter will first focus on requirements to incorporate a precautionary approach to seabed mining under international, regional, and domestic obligations. Then, the chapter will analyse how a precautionary approach is incorporated in domestic legislation as pertains to seabed mining on the Norwegian continental shelf. Last, the chapter will examine how the regulatory framework of seabed mining on the Norwegian continental shelf has implemented a precautionary approach.

The sixth and final chapter will conclude on the primary legal question. In addition, the chapter will provide a short summary conclusion for the preliminary questions. This chapter will also comment on regulatory gaps in the legal framework for seabed mining in the Arctic in the selected legal frameworks. Last, the chapter will seek to contribute to the general discussion on how to regulate seabed mining on the Arctic seabed.

2 Chapter II - Seabed Mining

2.1 The Concept of Seabed Mining

Seabed mining is the Act of recovering minerals from the soil and subsoil under the water column of the ocean. While most details of how companies plan to explore and extract minerals from the seabed remain confidential for commercial purposes, the general elements of seabed mining are available. First, it requires excavating equipment on the seabed to extract minerals; second, the minerals need to be transported to the surface using a lift system; third, the minerals need to be transferred to surface support vessels, and then on to logistics vessels for transport to production facilities on land.[28] The process will also require a process that separates target minerals from non-targeted substances, such as mud and organic substances.[29]

[28] Ecorys, n 7, Ch. 4
[29] The Norwegian Government 'Høring - forslag til konsekvensutredningsprogram for mineralvirksomhet på norsk kontinentalsokkel', n 4

The general complexities of large-scale seabed mining constitute significant obstacles for seabed mining companies. Not only does the distance from surface operations to seabed operations create a range of challenges related to manoeuvring, maintenance and repair of vessels operating on the seabed, but the immense water pressure at 2.000 meters, exceeding 1.2 tons of force per square inch, makes any operation at these depths a challenge. Operations in the Arctic climate may complicate matters further.

2.1.1 Seabed Mining in the Arctic

It is still uncertain whether or when large-scale seabed mining will begin in the Arctic, but seabed mining in the Arctic is viewed as an attractive prospect. First, all coastal States in the Arctic are emphasising the value potential of minerals in the Arctic, with Norway and Russia specifically pointing to the potential value of seabed mineral resources.[30] Second, technological advancements and a warmer climate may provide easier access and thus reduce costs of seabed mining in the Arctic.[31] In addition, the development of low-carbon technologies may increase the demand of certain seabed minerals in the Arctic. For instance, massive sulphides on the

[30] The Norwegian Government considers seabed mining as a new and potentially important industry for Norway, see The Norwegian Government 'Meld. St. 9 (2020–2021) - Mennesker, muligheter og norske interesser i nord', 99 (NOR) <https://www.regjeringen.no/no/dokumenter/meld.-st.-9-20202021/id2787429/> accessed 15 July 2021; The Russian Goverment considers its Arctic continental shelf a strategic reserve for mineral resources, see The Russian Government 'Указ Президента РФ от 26 октября 2020 г. N 645 О Стратегии развития Арктической зоны Российской Федерации и обеспечения национальной безопасности на период до 2035 года' [5] (RUS) (Russian Federation Presidential Order No. 645 of 26 October 2020) https://base.garant.ru/74810556/ accessed 14 July 2021; The Canadian Goverment is investing in prospecting the potential for mineral resources in their Northern regions, See The Canadian Government 'Statement On Canada's Arctic Foreign Policy' (2010), 10 https://www.international.gc.ca/world-monde/assets/pdfs/canada_arctic_foreign_policy-eng.pdf accessed 12 July 2021; The United States of America notes that there is a vast potential mineral resources in the Arctic that may drive commercial initiatives, See The United States Goverment 'National Strategy For The Arctic Region' (2013), 5 nat_arctic_strategy.pdf (archives.gov) accessed 12 July 2021, The Danish Government also emphasises the development of mineral resources in the Arctic, but does not mention of seabed minerals, see The Ministry of Foreign Affairs of Denmark 'Kongeriget Danmarks Strategi for Arktis 2011–2020' (2011) (DAN) https://um.dk/~/media/um/danish-site/documents/udenrigspolitik/udenrigspolitik-ny/lande%20og%20regioner/arktisk/arktis%20strategi.pdf?la=da accessed 12 July 2021

[31] Arctic Council 'Arctic Ocean Review (AOR) (2011-2013), Final Report' (2011) <https://oaarchive.arctic-council.org/bitstream/handle/11374/67/AOR%20Final%20report%202013.pdf?sequence=1&isAllowed=y>

Arctic seabed contain cobalt (Co), copper (Cu) and zinc (Zn),[32] which are used to produce low-carbon technologies such as solar panels and wind-mills.[33]

While the prospect of mining the Artic seabed may be promising, industrial endeavours in the Arctic climate are also extremely challenging, primarily due to the effects of the significant seasonal changes in solar radiation.[34] Adding to the general complexities of commercial seabed mining operations, Arctic and sub-Arctic conditions may - depending on season and location – significantly increase the complexities of seabed mining by introducing sub-zero temperatures and sea ice, strong winds, darkness, and significant distances between logistics hubs.[35] Of key importance in this regard is that research on safety aspects on hydrocarbon industries in Arctic and sub-Arctic conditions have indicated that these conditions do not only complicate surface, water column, and seabed activities, but these conditions also make post-accident responses very difficult, highlighting that accidents could have 'tremendous and irreversible consequences on this extremely vulnerable ecosystem'.[36] On this basis, regulators and the hydrocarbon industry are strongly advised to carry out the these offshore operations with the highest possible safety standards.[37]

In sum, regulators of seabed mining in Arctic regions face the general complexities and uncertainties of large-scale seabed mining with the added complexities of Arctic conditions, affecting several links of the value chain. The question is how these issues will play out in relation to large-scale seabed mining in Arctic conditions.

2.1.2 The Potential for Adverse Effects on the Environment

As noted in the introductory chapter above, seabed mining comes with a number of environmental concerns.[38] The potential negative effects of large-scale seabed mining on the

[32] See, e.g., Rystad Energy, n 3, 14, 25 or Ingrid Bay-Larsen, Berit Skorstad and Brigt Dale Brigt Dale, n 1, 6-7
[33] Ingrid Bay-Larsen, Berit Skorstad, and Brigt Dale Brigt Dale, n 1, 6
[34] Stefano Tarantola, Andrea Rossotti and Evangelos Flitris 'Safety Aspects of Offshore Oil and Gas Operations in Arctic and Sub-Arctic Waters' (EUR 29572 EN) (Publications Office of the European Union 2019) 9
[35] Ibid.
[36] Ibid. 3
[37] Ibid. 3
[38] See for example, FFI, n 9, 15

environment have caused environmental organisations to call for a global temporary moratorium on seabed mining.[39]

Much is uncertain as to how seabed mining will affect the environment, but it should be noted that seabed mining is an extractive industry and will require intervention in the natural landscape. While the direct effects of extractive industries on the environment might be severe, long-term and irreversible, such as the creation of so-called sacrifice zones within land-based mining,[40] even severe adverse effects might still be acceptable in a cost-benefit assessment. What differentiates large-scale seabed mining from other extractive industries is the high-level of uncertainty involved in assessing the severity and scope of these negative effects on the marine environment.

The difficulties in precise assessment are complex, but may in general be attributed to a lack of knowledge on how the industry will operate, limited knowledge on how the marine environment in deep-sea areas function, particularly in a systems perspective. In short, the challenge lies in assessing how one set of uncertain data points might affect another set of limited datapoints.

A key regulatory task for extractive industries is to achieve an acceptable cost-benefit ratio between the adverse effects on the environment with the benefits of the activity. Faced with strong historical data points and an accurate damage prognosis, regulators can create instruments that ensure this cost-benefit ratio.[41] For industries with less historical data points, the regulatory task of balancing adverse effects against benefits naturally becomes more complicated. As an emerging industry, seabed mining falls within this category.[42]

Scholars and environmental organisations have voiced concerns that seabed mining has the *potential* to have disastrous effects on marine ecosystems.[43] Scientific endeavours have contributed to new insights on the role that deep-sea seabed ecosystems play in both maintaining healthy ocean habitats and a functional global climate.[44] We know that strong

[39] Reuters, 'Google, BMW, Volvo, and Samsung SDI sign up to WWF call for temporary ban on deep-sea mining' (Reuters, 31 March 2021) <https://www.reuters.com/article/us-mining-deepsea-idUSKBN2BN0I6> accessed 16 June 2021
[40] Ingrid Bay-Larsen, Berit Skorstad, and Brigt Dale Brigt Dale, n. 1, 6.
[41] Ingrid Bay-Larsen, Berit Skorstad, and Brigt Dale Brigt Dale, n. 1, 6
[42] WWF, n 10, ii
[43] Ibid.
[44] FFI, n 9, 7-8

currents in the boundaryless ocean create complex and interconnected systems where both biological organisms and contaminants can travel great distances, both horizontally and vertically.[45] At the same time, we have a limited understanding of fundamental biological and biochemical processes in the oceans. [46] What we know about the oceans, combined with what we know that we don't know, makes predicting how these systems will develop a very difficult task.[47] In addition, this also makes it hard to assess the possibility of systemic damage.[48] Seabed mining introduces more unknown factors, such as pollution and landscape intervention, which amplifies the potential for adverse systemic damage with irreversible effects.[49] At the same time, this may not happen. This uncertainty is in itself a significant regulatory issue.

In the Arctic perspective, these concerns are arguably even more potent. While scientists have monitored some ocean areas of the Arctic extensively for more than a century, they have primarily directed these efforts towards fishery resources and single species.[50] We now know that the Arctic environment and the Arctic seabed play a vital part in the larger context of the interconnected and global ocean spaces.[51] The development of holistic monitoring of areas in the Barents Sea over the last decades has resulted in significant scientific insight.[52] While increasing the general level of knowledge, this insight has also identified large knowledge gaps and made visible the scientific efforts that are still required to fill these gaps.[53] In addition, the scientific knowledge regarding the marine ecosystems on the Arctic seabed limited.[54]

While these knowledge gaps make it difficult to make predictions on the effects of seabed mining on these systems, they also create a risk of unintended and unidentified single species

[45] Ibid., 14
[46] Ibid., 14
[47] FFI, n 9, 7-8
[48] Ibid., 14
[49] Ibid., 7-8
[50] E Eriksen and others, 'From single species surveys towards monitoring of the Barents Sea ecosystem' (2018) 166 Progress in Oceanography 4
[51] See AMAP, 'Key Trends And Impacts - Summary For Policy-Makers' (Arctic Climate Change Update 2021) (AMAP 2021), 15 https://www.amap.no/documents/download/6730/inline (accessed 07 June 2021)
[52] Ibid.
[53] E Eriksen and others, n 46
[54] See, e.g., Kiesel Joshua and others 'Variability in Benthic Ecosystem Functioning in Arctic Shelf and Deep-Sea Sediments: Assessments by Benthic Oxygen Uptake Rates and Environmental Drivers' (2020) 7 Frontiers in Marine Science 426; Eva Ramirez-Llodra and others, 'Benthic Communities on the Mohn's Treasure Mound: Implications for Management of Seabed Mining in the Arctic Mid-Ocean Ridge' (2020) 7 Frontiers in Marine Science 490, 2

extinction. These are not Arctic specific issues. What complicates seabed mining in the Arctic context is that the ongoing effects of climate change are more prominent in the Arctic. [55] In addition, the Arctic environment is also highly vulnerable to human activities.[56] Last, the Arctic Ocean is also the smallest and shallowest of the world's oceans, which highlight that the effects of seabed mining should also consider the cumulative stresses of human activities in the Arctic. This trifecta suggests that the potential adverse effects of seabed mining in the Arctic are not only more likely in the Arctic, but that it may also speed up these effects in this region. The practical implication is that gathered data may need to be updated more frequently not to become obsolete, which raises the level of uncertainty connected to environmental data and predictions in this region.

The combination of potential for serious harm, scientific uncertainty and time criticality suggests that a precautionary approach may be of relevance as a legal tool to guide regulatory action for seabed mining in the Arctic.

3 Chapter III – The Relevance of a Precautionary Approach to Seabed Mining

This chapter will first discuss the relevance of precaution to seabed mining, followed by a discussion on the legal status of precaution under international law. This will form a basis for an examination of the content of a precautionary approach. The chapter will conclude with a section on how to measure incorporation and implementation of a precautionary approach within the selected legal regimes.

3.1 The Relevance of a Precautionary Approach to Seabed Mining

International courts and legal instruments vary in how they define a precautionary approach.[57] While no authoritative definition of precaution exists, Principle 15 of the soft law Rio

[55] See, Vito De Lucia and Philip Peter Nickels, 'Reflecting on the Role of the Arctic Council Vis-à-Vis a Future International Legally Binding Instrument on Biodiversity in Areas Beyond National Jurisdiction' (2020) 11 Arctic Review 189, 191; AMAP, n 9

[56] See, Vito De Lucia and Philip Peter Nickels, n 55; AMAP, n 9

[57] For an overview over precaution in international instruments relating to environmental law, see, e.g., Philippe Sands and Jacqueline Peel, *Principles of International Environmental Law* (4th edn, Cambridge University Press 2018), n 51, from p. 230; for a disussion on the different versions of precaution, see, e.g., Jonathan B Wiener, n 25

Declaration[58] reflects the core rationale of a precautionary approach under international environmental law.[59] Principle 15 states that ' [w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'. This phrase makes visible the three core the elements of a precautionary approach: first, threat of harm; second, uncertainty or probability connected to this threat; third, timely action.

The 2011 Advisory Opinion from the Seabed Chamber of the International Tribunal for the Law of the Sea (ITLOS) provides guidance on the content of a precautionary approach for seabed mining.[60] The Advisory Opinion concerned the scope and nature of the States' liabilities when they act as a sponsor for seabed mining activities in the Area.

Importantly, the Chamber did not engage in a discussion on the content of a precautionary approach as it applies to activities in the Area or seabed mining in general. Instead, the Chamber explicitly referred to the definition used in Principle 15 of the Rio Declaration.[61] In the specific context of the Advisory Opinion, the reference to Principle 15 is unsurprising as Principle 15 made a direct and binding obligation for sponsoring States under the relevant and applicable ISA regulations.[62] This raises the question of the relevance of Principle 15 to seabed mining beyond scope of direct obligations under ISA regulations.

While the Chamber progressed to discuss precaution under the general obligation of due diligence for sponsoring States,[63] it still refrained from deliberating the content of precaution. This suggests that the Chamber implicitly found Principle 15 sufficient to express the obligation for sponsoring States to apply a precautionary approach as part their due diligence obligation. As this indicates that the rationale of precaution in Principle 15 is relevant to the obligations of sponsoring States in the Area, the rationale of Principle 15 would presumably be relevant to other due diligence obligations applicable to seabed mining in the Area. This line of argument would also suggest that, at least the rationale of precaution as reflected in Principle 15 is relevant to similar seabed mining activities.

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[58] Rio Declaration on Environment and Development (adopted 14 June 1992) 31 ILM 874
[59] Jacqueline Peel and Philippe Sands, n 57, 230
[60] Responsibilities and obligations of States with respect to activities in the Area (Advisory Opinion) (Seabed Disputes Chamber, Case No. 17, 1 February 2011) [2011] ITLOS Rep 10
[61] Ibid., [126]
[62] Ibid., [127]
[63] Ibid., [131]

The Chamber did not engage in a detailed discussion on the relevance of a precautionary rationale the context of seabed mining**.** To assess the incorporation and implementation of a precautionary approach in the context of seabed mining, it is necessary to examine how the rationale of a precautionary approach and the elements of precaution may be of relevance to seabed mining.

3.1.1 Threat of Harm and Seabed Mining

A threshold of 'serious or irreversible damage'[64] sets a relatively high threshold for the scope of threats where a precautionary approach is applicable.[65] Read together with the object of precaution, that is 'to prevent environmental degradation',[66] the threshold is connected to preventing degradation effects to ecologic systems or network of species. This threshold suggests that damage with only local or short-term effects would not be covered. However, local damage could also reach this threshold if the damage is particularly long term or irreversible, which would typically encompass risk of species extinction.

As regard seabed mining, it is significant that the Seabed Chamber in the 2011 Advisory Opinion noted that the precautionary obligation under due diligence 'applies in situations where scientific evidence concerning the scope and potential negative impact of the activity in question is insufficient but where there are plausible indications of potential risks'.[67] The words 'plausible indications of potential risks' do not mirror the wording of Principle 15. This raises the question of whether the words 'plausible indications of potential risks' indicate a different threshold of harm for a precautionary approach than the one reflected in Principle 15 with regard to the due diligence obligations in the context of seabed mining.[68]

If the words 'plausible indications of potential risks' are a reference to the threshold of harm under a precautionary approach, this would suggest that the Chamber applies a different and more stringent threshold under obligation of due diligence for sponsoring States on than what is required by the sponsoring States under the direct obligation in the ISA regulations. In

[64] The Rio Declaration, Principle 15
[65] Ibid.
[66] Ibid.
[67] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, [131]
[68] Duncan French, 'From the Depths: Rich Pickings of Principles of Sustainable Development and General International Law on the Ocean Floor—the Seabed Disputes Chamber's 2011 Advisory Opinion' (2011) 26 The International Journal of Marine and Coastal Law 525, 551

addition, this would arguably suggest a more stringent threshold of harm under a precautionary approach than previously applied by international courts.[69]

However, an alternative way to interpret the words 'plausible indications of potential risks' is that they refer to the level of the scientific certainty needed to indicate a potential risk of damage. This is not a question of damage potential, but rather of the scientific probability connected to whether the threat materialises or not. While it is ambiguous, it seems likely that the Chamber referred to *scientific* 'plausible indications of potential risks', rather than to imply two separate thresholds of harm under precaution for sponsoring states. This suggests that the threshold of harm in Principle 15 would presumably be relevant both for all activities of sponsoring States. In other words, this suggests that the Seabed Chamber applied the same threshold for a precautionary approach for the direct obligations and the due diligence obligations of the sponsoring States.

At the same time, the Chamber's discussion of the 'due diligence' obligations of Sponsoring states is of particular relevance to the threshold of risk under precaution.[70] This is because of the Chamber's statement that the standard of 'due diligence' has to be more severe for riskier activities. [71] As the Chamber identified a precautionary approach as an essential part of the 'due diligence' obligation for sponsoring States,[72] a stricter standard for 'due diligence' would imply a stricter standard of a precautionary approach under the 'due diligence' obligation for precaution to be effective in this context. On the one hand, to have the standard of precaution vary dependent on the sensitivity of the environment would seem inconsistent. [73] On the other, the flexible nature of precaution suggests that the standard of 'serious damage' would need to be determined in light of sensitivity of the environment. Thus, while the threshold of precaution may be set at 'serious damage', the threshold would necessarily be easier to reach in particularly vulnerable environments. Considering the particularly vulnerable environment of the Arctic, this would suggest that the threshold of 'serious damage' would be easier to reach, and as such,

[69] ITLOS used the term 'serious harm' as a qualification under the precautionary rationale, see the Southern Bluefin Tuna Cases (New Zealand v. Japan; Australia v. Japan) (Provisional Measures) (ITLOS Cases No. 3 & 4, 27 August 1999) [1999] [77]
[70] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, [131]
[71] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, [117]
[72] Ibid., [131]
[73] Duncan French, n 68, 553

in practice indicate a stricter standard of a precautionary approach of this riskier form of seabed mining.

In sum, what makes up 'serious or irreversible damage' regarding seabed mining would need to be considered in a specific context, but the general damage potential connected to seabed mining is characterised by a high damage potential because of the risk of single species extinction and the risk of systemic and irreversible damage, particularly in the Arctic context. In addition, there are no known ways to reverse or lessen the impact of the effects of seabed mining beyond avoidance and minimisation,[74] further buttressing the long-term effects of the activity. These characteristics of the potential damaging effects associated with seabed mining suggest that the element of harm under a precautionary approach would apply to seabed mining in general and to seabed mining in the Arctic in particular.

3.1.2 Degree of Uncertainty and Seabed Mining

When applicable, the rationale of precaution requires that 'lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'.[75] The term 'full scientific uncertainty' is not restricted to a particular form of uncertainty within the scope of what is considered 'scientific', which is buttressed by state practice.[76] Given that the note by the Seabed Chamber in the 2011 Advisory Opinion 'plausible indications of potential risks'[77] refers to the threshold of scientific certainty needed for precaution to apply, as suggested in Section 3.1.1 above, this indicates that there is a lower threshold of scientific evidence required connected to the potential risk for precaution to apply, alternatively expressed as 'reasonable grounds for concern'.[78]

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[74] See, The Norwegian Polar Institute, 'Svar på høring - forslag til konsekvensutredningsprogram for mineralvirksomhet på norsk kontinentalsokkel', (NOR) (NPI 2021), p. 5 available at https://www.regjeringen.no/contentassets/38540fd07b4346b781278199f47febce/norsk-polarinstitutt.pdf?uid=Norsk_Polarinstitutt, accessed 4 August 2021; Holly J Niner and others, 'Deep-Sea Mining With No Net Loss of Biodiversity – An Impossible Aim' (2018) 5 Frontiers in Marine Science 53

[75] Rio Declaration, Principle 15

[76] Arie Trouwborst, n 26, 118

[77] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, [131]

[78] Arie Trouwborst, n 26, 136

The uncertain damage potential of seabed mining encompasses both severity of damage and scope of damage.[79] Although somewhat counterintuitive, as the scientific knowledge of the seabed and its connected ecosystems accumulates, the possible scope of damage has also increased.[80] In the Arctic context, the uncertainty connected to the damage potential of seabed mining is arguably increased by the particular vulnerability of the environment and made more potent due to the rapid environmental changes. This makes visible that the element of uncertainty is particularly relevant in the context of seabed mining in the Arctic.

3.1.3 Timely action and Seabed Mining

When the threshold of threat and probability harm is reached, the criteria of timely action under a precautionary approach are reflected in the requirement of not 'postponing cost-effective measures to prevent environmental degradation'.[81]The phrase makes visible the time critical element of a precautionary approach, as preventing degradation is connected to the time critical requirement not to postpone. In the Southern Bluefin Tuna Cases, ITLOS highlighted the connection between timely action and prevention by noting that 'measures should be taken as a matter of urgency to preserve the rights of the parties and to avert further deterioration'.[82] This indicates that the main challenge lies not in defining what constitutes a precautionary measure, which is a matter of State discretion, but in taking timely remedial action in relation to the specific threat to mitigate further deterioration. However, as scientific research is vital in the early detection of potential environmental harm,[83] scientific research is considered an indispensable tool to implement to take precautionary action. [84]

Considering that the potential risks of seabed mining are primarily connected to the onset of large-scale seabed mining and the lack of mitigating measures, as noted in Section 3.1.1 of this thesis, timely action would require measures to be implemented in practice before the onset of exploitation activity.[85]

[79] For instance, while it is likely that deep-sea mining will result in biodiversity loss, the implications of this loss for the ecosystem is unknown, see, Holly J Niner and others, n 74
[80] FFI, n 9, 8
[81] Rio Declaration, Principle 15
[82] Southern Bluefin Tuna Cases, n 69
[83] Aline Jaeckel, n 13, 195
[84] Arie Trouwborst, n 26, 143
[85] Aline Jaeckel, n 13, 18

Timely action is necessarily also connected to scientific knowledge, particularly as scientific research is key to identifying potential environmental threats. The topic of scientific research also raises the question of who should bear the *burden of proof*.[86] The ICJ stated in the *Pulp Mills Case on the River Uruguay*,[87] that the precautionary approach does not necessitate a shift in the burden of proof.[88] However, a shift in the burden of proof may be an indication of a stricter standard of implementation of a precautionary approach.[89]

The qualification of 'cost-effective' measures may also clarify content of timely action.[90] This suggests that timely action could be postponed if they are not considered proportionate to their effectiveness. Two factors make the application of this qualification complicated regarding seabed mining. First, there are no mitigating measures after the onset of extractive activities. Second, if mitigating measures become available, the economic costs of implementing such measures in the high-cost activity of seabed mining would likely be very expensive. Thus, a literal reading of this qualification regarding seabed mining would risk quite absurd results.

Although decidedly varied, State practice indicates that the qualification of cost-effective would encompass more than what is indicated by a literal reading of Principle 15 of the Rio Declaration.[91] This practice suggest that the cost-effective qualification encompasses a wide balancing of interests, not just economic interests, and that the implemented measures must be effective.[92] While economic costs may be a relevant factor, State practice indicates that economic cost would not be a deciding factor especially when there is a threat of irreversible harm.[93] Besides requiring a wide balancing of interests, it is not clear how a requirement of cost-effective measures would be operationalised with regard to seabed mining.

Of note, a second qualification is provided by Principle 15 of the Rio Declaration as it states that precautions should be applied by States in 'according to their capabilities'. It is

[86] For a general discussion on the burden of proof, see, e.g., Jonathan Wiener, n 23, 606; or Arie Trouwborst, n 26, 226-227
[87] Case Concerning the Pulp Mills on the River Uruguay (Argentina v Uruguay) (Provisional Measures) [2006] ICJ Rep. 113
[88] Ibid., [164]
[89] Aline Jaeckel, n 13, 269
[90] Rio Declaration, Principle 15
[91] For a comprehensive analyses of cost-effective measures under precaution, see, e.g., Arie Trouwborst,n 26, 254- 270
[92] Ibid.
[93] Ibid., 269

sufficient for the scope of this thesis to note that the Seabed Chamber of ITLOS statement that what counts with regard to 'capabilities' is the 'scientific knowledge and technical capability available to a given State in the relevant scientific and technical fields'.[94] This suggests that the qualification would have little immediate relevance to seabed mining in the Arctic, particularly considering the high developmental status of the Arctic coastal States.

3.2 The Legal Status of Precaution under International Environmental Law

The legal status of a precautionary approach under international environmental law has been extensively covered by international courts[95] and in legal theory.[96] This thesis will only examine the status and content of precaution under international environmental law in as far as this is needed to conclude on the legal status of a precautionary approach as relates to seabed mining in areas beyond and within areas of national jurisdiction.

In the 2011 Advisory Opinion on the *Responsibilities of States Sponsoring Activities in the Area*, the Seabed Chamber of ITLOS noted that the wide appliance of a precautionary approach in international legal instruments and by international Courts had initiated a trend towards making a precautionary approach part of customary law.[97] While the statement went further than other international courts have gone with regard to defining the status of precaution under international law, [98] the Chamber did not declare precaution part of customary international law. In fact, as the Chamber did not base its statement on state practice and opinio juris, but on a general summation of trends, it is not clear to what degree the assessment of the Chamber satisfies the criteria of customary obligation as reflected in Article 38 (1) (b) of the

[94] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, 162
[95] See, e.g., Gabčíkovo-Nagymaros Project (Hungary v. Slovakia) (Judgment) [1997] ICJ Rep. 78; Case Concerning the Pulp Mills on the River, n 89; Southern Bluefin Tuna Cases, n 69; The MOX Plant Case (Ireland v UK) (Provisional Measures) (ITLOS Case No. 10, 3 December 2001) [2001]; Responsibilities and obligations of States with respect to activities in the Area, n 60
[96] See, e.g., Philippe Sands and Jacqueline Peel, n 57, 229; Arie Trouwborst, n 26
[97] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, [135]
[98] Duncan French, n 68, 550

Statute of the ICJ.[99] Legal scholars have not been able to provide a sufficiently uniform to answer to whether a precautionary approach satisfies the criteria of customary law.[100]

On this basis, the status of a precautionary approach as a customary obligation relevant to seabed mining may best be described as controversial and unresolved. This suggests that the status of a precautionary approach should be considered as a soft law norm. As such, a precautionary approach may inform State policy and decision making, and would also be relevant when interpreting treaty-based obligations.[101] However, it would create legally binding obligations.[102]

However, as noted in Section 3.1, the rationale of precaution is to guide action when there is a certain risk and a certain degree of scientific uncertainty connected to this risk. Thus, when the criteria of precaution are met, the State may decide how to act, but not whether to act.[103] The demand for discretionary action arguably adds a dimension to a precautionary approach beyond that of the typical soft law norm. On this basis, the status of a precautionary approach under international law may be described as a 'twilight' legal norm within the realm of soft law.[104]

The status as a 'twilight' norm has two important implications for the analytical framework needed to measure precaution. First, it makes visible the inherent flexibility of a precautionary approach as a precautionary approach as any measure can be precautionary if it satisfies the rationale of precaution.[105] Second, the analytical framework would need to encompass the 'twilight' dimension of precaution, that is to measure whether a precautionary approach is operationalised in a way that guides action.

[99] Duncan French, n 68, 550
[100] Thomas Ebben, 'The Implementation of the Precautionary Principle into International Fishery Law: A Move towards Green Fisheries' (2011) 15 New Zealand Journal of Environmental Law 113, p. 118
[101] Case Concerning the Pulp Mills on the River Uruguay, n 91, [164]
[102] Christopher R Rossi, 'The Club within the Club: The Challenge of a Soft Law Framework in a Global Arctic Context' (2015) 5 The Polar Journal 8
[103] Ulrich Beyerlin, 'Different Types of Norms in International Environmental Law Policies, Principles, and Rules' in Bodansky D (ed), *The Oxford Handbook of International Environmental Law* (Reprinted, Oxford Univ Press 2010), 441
[104] Ulrich Beyerlin, n 103, 448
[105] Arie Trouwborst, n 26, 179

3.3 Measuring Incorporation and Implementation of a Precautionary Approach Within Legal Frameworks for Seabed Mining

The incorporation and implementation of a precautionary approach are connected, but they are also two distinct processes and could be measured as such. This demands a separate analytical framework for measuring incorporation of precaution on the one hand, and the implementation of precaution on the other.

To measure the incorporation of a precautionary approach primarily entails identifying how relevant sources of law reflect this approach. Thus, the analytical framework for measuring incorporation is to apply general rules of interpretation under international law to identify elements of precaution and to define the thresholds of risk and scientific uncertainty.

To measure the implementation of a precautionary approach presents other challenges. While there is no relevant customary law determining how to measure implementation of precaution, legal theory has commented extensively on this topic.[106]

In light of the description of a precautionary approach as a 'twilight' norm, an analytical framework needs to balance the need for analytical rigidity against the flexible nature of precaution.

From a narrow perspective, the implementation of a precautionary approach could be measured based on whether or not a precautionary approach has been incorporated into a legal framework. While it may be argued that a rigid analytical framework would improve reliability of the assessment, it would not be a valid measure of whether a precautionary approach is has been implemented in a way that demands precautionary action.[107] Thus, to merely identify the incorporation of a precautionary approach or 'precautionary measure' in a legal framework would not sufficiently encompass the flexible nature of precaution.

To mitigate the issue with a too narrow scope, Jaeckel adopts an analytical framework that covers institutional structures, procedural elements and environmental protective measures.[108] Jaeckel identifies several non-exhaustive steps that could contribute to an effective

[106] See, e.g., Elizabeth Charlotte Fisher, Judith S Jones and René von Schomberg *Implementing the Precautionary Principle: Perspectives and Prospects* (Edward Elgar Publishing 2006); Nicolas De Sadeleer (ed), *Implementing the Precautionary Principle: Approaches from the Nordic Countries, EU and USA* (Routledge 2014); Aline Jaeckel, n 13
[107] See Section 3.2
[108] Jaeckel, n 13, 44, 48

implementation of precaution within these dimensions.[109] Within this framework, Jaeckel adopts two elements against which to measure whether remedial action has implemented a precautionary approach.[110] First, remedial action needs to be *effective* in achieving the desired level of protection. Second, it needs to achieve *proportionality* between effectiveness and restrictiveness.[111]Thus, this framework provides a most comprehensive framework aimed at assessing a given legal framework has implemented a precautionary approach.[112]

A weakness in applying this analytical framework in this thesis is that the limited space of this thesis would not allow a full application of the framework. For example, this would not allow a full examination of all the steps identified by Jaeckel. This raises a question of whether and to what degree an incomplete use of the framework would provide valid conclusions. Wiener notes that the aim is not to implement maximum precaution, but optimal precaution.[113] This underscores that the implementing precaution is not a question of quantity. Rather, the aim is to implement enough quality steps to operationalise the elements of precaution. Thus, the primary function of Jaeckel's analytical framework in this thesis is to identify the different aspects of a legal framework that may implement elements of a precautionary approach. However, the limited scope of the thesis will introduce some uncertainty in the assessment of whether the investigated legal framework has achieved a 'full implementation' of a precautionary approach.[114]

Lastly, it is also important to keep in mind that the principal legal question of this thesis seeks to assess the implementation of a precautionary approach by the ISA *and* in domestic legislation. An important difference is the role that domestic courts play in implementing a precautionary precaution in legal frameworks on the national level.[115] Thus, when the analytical framework applies to the domestic legal framework, the procedural dimension will encompass domestic court practice, although Jaeckel's framework do not include this element.

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[109]Jaeckel, n 13, 66
[110] Jaeckel, n 13, 39-41
[111] Trouwborst notes that precautionary measures must be effective and proportionate, see Arie Trouwborst, n 26, 157-158
[112] Aline Jaeckel, n 13, 68-69
[113] Jonathan B Wiener, n 25, 610
[114] Aline Jaeckel, n 13, 68
[115] See, e.g., Ellen Margrethe Basse, 'Denmark' in Nicolas De Sadeleer (ed), n 106; Erkki Hollo, 'Finland' in Nicolas De Sadeleer (ed), n 106; Hans Christian Bugge, 'Norway', in Nicolas De Sadeleer (ed), n 106; Nicolas De Sadeleer 'Legal Status of Precaution in the Nordic Countries: A Comparative Analyses' in Nicolas De Sadeleer (ed), n 106;

Thus, the thesis will apply a wide analytical framework to examine the primary legal question. To increase the reliability of this framework, the dimensions will build on the framework proposed by Jaeckel. Importantly, the formal requirement of the thesis will only allow for a few steps to be assessed under these dimensions. However, given the noted flexibility of precaution, a wide, although condensed approach would be a more valid measure of an effective implementation of precaution regarding seabed mining in the selected legal regimes.

3.4 Summary

Three elements are worth highlighting in this chapter. First, a precautionary approach needs to be incorporated into hard law to a become binding obligation under international law. Second, precaution may be relevant as a tool for interpreting rules applicable to seabed mining under international law. Third, to incorporate and implement a precautionary approach in the selected legal regimes requires precautionary action beyond a literal inclusion of a precautionary rationale in legal instruments to operationalise the approach in practice fully.

4 Chapter V - Obligations to Incorporate and Implement a Precautionary Precaution for Seabed Mining in ABNJ in the Arctic

4.1 Introduction – LOSC and the Arctic

LOSC provides the general principles governing the rights and obligations of seabed mining in the Arctic. These obligations are supplemented by global, regional and bilateral instruments and bodies, making the legal framework in the marine Arctic multi-faceted and complex.[116] While LOSC does not contain any explicit reference to a precautionary approach in seabed mining, such obligations may be derived by applying principles of treaty interpretation in international law. Before examining obligations to apply a precautionary approach to seabed mining in the selected legal frameworks, it is necessary to reflect on how the system of maritime zones and sectorial approach under LOSC affect seabed mining in the arctic context.

[116] Erik J Molenaar, 'The Arctic, the Arctic Council, and the Law of the Sea' in Beckman RC, Henriksen T, Kraabel KD, Molenaar EJ, and Roach JA (eds) *Governance of Arctic Shipping: Balancing Rights and Interests of Arctic States and User States* (Brill Nijhoff 2017), 33

The sectoral approach implies that different activities are assigned to separate authoritative bodies, which corresponding differences with regard to prescriptive and enforcement jurisdiction. While responsibility for seabed mining beyond national jurisdiction is assigned to the ISA, who also has the corresponding prescriptive and enforcement jurisdiction over the activity, seabed mining within areas of national jurisdiction is under the jurisdiction of the coastal State. Importantly, the sectoral approach also creates regulatory overlaps between bodies. Regarding the protection of the marine environment, Article 197 obligates States to cooperate on different levels, directly or through competent international organizations. Article 197 requires the States to take into account characteristic regional features in this cooperation, which in the Arctic context suggests that the environmental characteristic of the Arctic should of be taken into consideration in any cooperation connected to seabed mining in the Arctic.

The system of maritime zones distinguishes between areas under costal state jurisdiction and areas beyond coastal state jurisdiction. While the regime of the Area governs seabed mining on areas of the Arctic seabed that lie beyond coastal State jurisdiction, seabed mining in areas of the seabed that lie within national jurisdiction is governed by the regime of the respective maritime zone.

The implication of this system in the Arctic context is visible from the current submissions from the Arctic coastal States to the Commission on the Limits of the Continental Shelf (CLCS) under LOSC Article 76 (8) for recommendations on the limits of the continental shelf beyond 200 nm.[117] Following Russia's two Addenda to their 2015 submission in March 2021,[118] only two minor pockets of seabed remain unclaimed in the Central Arctic Ocean.[119] In addition, a single pocket comprised of 2,450 square nautical miles of the seabed area between Jan Mayen and Svalbard, will fall under the regime of the Area in the Arctic parts of the Atlantic Ocean.[120] Thus, the system of maritime zones suggests that the Area will play a minor part in the Arctic given that most of the Arctic seabed should fall under coastal State jurisdiction.

[117] The International Boundaries Research Unit, n 15
[118] The International Boundaries Research Unit, 'Briefing notes for IBRU Arctic map series' (Durham University, 2020) https://www.durham.ac.uk/media/durham-university/research-/research-centres/ibru-centre-for-borders-research/documents/BriefingNotesArcticMapApril2021.pdf accesses 29 June 2021
[119] The International Boundaries Research Unit, n 15
[120] The International Boundaries Research Unit, n 114, Note 3

However, the sectorial approach suggests that the ISA will be a major player with regard to determining rights and obligations applicable to seabed mining under LOSC, including for the incorporation and implementation of a precautionary approach. The following section in this chapter will examine the role of the ISA in further detail.

In addition to LOSC and its system of maritime zones and sectorial approach, the legal framework consist of global, regional, subregional and national components, including both soft and hard law instruments.[121] While a fragmented legal regime is not unique to the Arctic region, the fragmented nature means that incorporation and implementation of precaution needs to be examined in a broad perspective to identify and interpret legal obligations relevant to incorporating and implementing a precautionary approach to seabed mining in the selected legal regimes. The relevant instruments will be examined under the appropriate following chapters.

4.2 A Precautionary Approach under LOSC Part XII

LOSC adopts a precautionary approach regarding environmental protection and preservation of marine environment and seabed mining, but makes no explicit reference to a precautionary approach. To examine the extent to which a precautionary approach has been incorporated within the legal regime for seabed mining in the Area must be based on applying principles of treaty interpretation under customary law.

Part XII sets out general obligations for protecting the marine environment under LOSC. The Preamble of LOSC states that the object of Part XII is to address the interrelated problems of ocean space and to consider these 'as a whole'.[122] In contrast to the general sectoral approach, Part XII adopts a comprehensive approach to protecting the marine environment.[123]

For seabed mining in ABNJ, articles 192, 194, 206 and 209 are of particular importance. LOSC Article 192 reflects the general obligation for states to protect and preserve the marine environment. This requirement applies to all 'States' in all maritime zones and acting in any capacity.[124] This suggests that the obligations in Part XII is binding on State parties that engage in seabed mining in the Area, but also have an indirect binding effect on other entities through

[121] Erik Jaap Molenaar, n 116, 33
[122] LOSC, Preamble
[123] Aline Jaeckel, n 13, p. 121
[124]South China Sea Arbitration (Philippines v China) (Award) (PCA Case No 2013-19, ICGJ 495) [2016], [940]

the system of state sponsorship, as noted in above. Regarding the ISA, the obligation to take necessary measures under 'this Convention' to ensure effective protection for the marine environment shows the binding effect of the relevant regulations in Part XII on the activities of the ISA, although not a state party under the Convention.

4.2.1 Precaution under the obligation to 'protect and preserve'

Article 192 obligates States conduction or wanting to conduct seabed mining in the Area to 'protect and preserve' the marine environment. As noted by ITLOS in the 1999 Southern Bluefin Tuna Cases, the general obligation to protect and preserve the marine environment encompasses the obligation to conserve the living resources of the sea,[125] connecting Article 192 to the preambular intention of LOSC, namely the 'conservation of [the seas and oceans] living resources'.[126]

Judge Laing, in his separate opinion in the Southern Bluefin Tuna Cases, argued that LOSC adopts a precautionary approach particularly for the conservation of living resources, pointing in particular to articles 116 and 119 concerning fishery resources and to the right to proscribe provisional measures on the basis of preventing serious harm to the marine environment in Article 290 (1).[127] This not only suggests that the obligation under Article 192 incorporates an obligation to adopt a precautionary approach, but also that there is a connection between a duty to prevent environmental harm and precaution.

The connection between prevention and precaution is of particular interest as the obligations in Article 192 are supplemented by Article 194. Article 194 (1) obligates States to 'take all measures' consistent with LOSC that are 'necessary to prevent, reduce and control pollution of the marine environment from any source'. Article 194 (1) would clearly obligate states to reduce 'pollution'[128] resulting from seabed mining operations in ABNJ. However, read together with the obligation in Article 194 (5) requiring states to include measures 'necessary to protect and preserve' 'rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life', Article 194 extends beyond measures

[125] Southern Bluefin Tuna Cases, n 69, [70]
[126] LOSC, Preamble
[127] Southern Bluefin Tuna Cases, n 69, Separate Opinion of Judge Laing, [17] [18]
[128] LOSC Article 1 (4) defines 'pollution' as 'the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life (…)'

strictly focused on pollution prevention, also encompassing measures focused on conservation and protection of marine ecosystems.[129]

This raises the question of whether the obligation to 'take all measures' 'necessary to prevent' such pollution incorporates an obligation to apply a precautionary approach with regard to pollution prevention from seabed mining. The word 'prevention' suggests that the object is to keep damage from occurring or materialising. As such the word 'prevention', similarly to precaution, implies timely and relevant action from an actor to mitigate such emerging risks. As such, the word 'prevention' carries elements of precautionary thinking, creating an overlap between prevention and precaution.[130]

Prevention has been linked to precautionary thinking by international courts. In the 1999 Southern Bluefin Tuna case for provisional measures, ITLOS stated in that the parties should act 'with prudence and caution to ensure that effective conservation measures are taken to prevent serious harm to the stock of southern bluefin tuna' whilst noting the context of 'scientific uncertainty'.[131] While the Court did not point to precaution, the separate opinions of Judge Lang and Judge Treves indicate that the Court built its argument on a precautionary rationale.[132] On this basis, it would be difficult to see how a State would be able to meet its obligation to prevent environmental harm by pollution from seabed mining without at least applying a precautionary rationale, which suggest that Article 194 (1) incorporates a precautionary approach to seabed mining.

4.2.2 Precaution as Part of the Due Diligence Obligation 'To Ensure'

Article 194 (2) obligates for States to take all measures necessary 'to ensure' that activities under their control or jurisdiction do not result in transboundary harm by pollution. The obligation applies to activities in ABNJ providing these are under the control or jurisdiction of the State, which is the case for seabed mining under Article 153 (2).[133] International courts have interpreted an obligation 'to ensure' as an obligation of due diligence, that is an obligation of

[129] In the Matter of Chagos Marine Protected Area Arbittration (Mauritius v United Kingdom), Annex III Arbitral Tribunal (18 March 2015) [PCA], [538]
[130] For a discussion on the relationship between prevention and precaution, see, e.g., Aline Jaeckel, n 13, 35
[131] Southern Bluefin Tuna Cases, n 69, [77]
[132] Southern Bluefin Tuna Cases, n 69, Separate Opinion of Judge Laing, [12] and Southern Bluefin Tuna Cases, n 69, Separate Opinion of Judge Treves, [8]-[9]
[133] South China Sea Arbitration, n 124, [944]

conduct but not to achieve a result.[134] The connection between 'due diligence' and a precautionary approach has been discussed in this thesis under section 3.1.1.

4.2.3 Precaution as part of the obligation to conduct an Environmental Impact Assessment

Article 206 provides that States have an obligation to assess and inform other States when activities could have potential adverse effects on the marine environment. In the South China Sea Case, The Arbitral Tribunal noted that Article 206 reflected a direct obligation under LOSC and an obligation under customary law to conduct an environmental impact assessment (EIA).[135]

The relevance of Article 206 to precaution is visible in that the obligation to assess and inform applies to 'planned activities' and where the State has 'reasonable grounds for believing' that such activity may lead to qualified adverse effects on the environment. First, the phrase 'future activities' indicates a future-oriented element of Article 206, suggesting that the aim of the Article is to prevent potential adverse effects to the environment.[136]Although the phrase 'reasonable grounds for believing' suggests that the State is given a wide discretion to decide whether a planned activity qualifies as an activity that 'may cause substantial pollution of or significant and harmful changes to the marine environment'.[137]

In addition to the conventional obligation to conduct an EIA, the customary obligation to conduct an EIA is of particular relevance for a precautionary approach. With regard to the customary obligation to conduct an EIA, the Seabed Chamber of ITLOS, referring to the *Pulp Mills Case on the River Uruguay*,[138] noted that this obligation applied to the *shared resources* of the Area under the common heritage of mankind.

In sum, this interpretation of articles 192 and 194 makes visible that Part XII requires a precautionary approach to satisfy the obligations to protect the marine environment.

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[134] Ibid., [944]
[135] Ibid., [948]
[136] Article 204 provides a complimentary obligation to Article 206, requiring State to monitor, assess and 'keep under surveillance' also on-going activities with regard to pollution.
[137] The scope of State discretion under Article 206 was commented on in the South China Sea Arbitration, n 124, [948]
[138] Case Concerning the Pulp Mills on the River Uruguay, n 91

4.3 Precaution under Part XI and the 1994 Implementation Agreement

Article 209 (1) in Part XII requires that international rules, regulations and procedures are established to prevent, reduce and control pollution of the marine environment from activities in the Area and that they are established in accordance with Part XI. In accordance with the 1994 Implementation Agreement,[139] the obligations under Part XI shall be interpreted and applied together with LOSC as a single instrument.[140]

The regime of the Area in Part XI of LOSC governs seabed mining in ABNJ.[141] Under the regime of Part XI, the resources in the Area are the 'common heritage of mankind' and places 'the Authority', that is the ISA,[142] as custodians over the rights to mineral resources in the Area.[143]

The environmental mandate of the ISA is provided by Article 145, which build on the obligations of Article 209 (1) in Part XII. In accordance with Article 145 the ISA is required 'to ensure' the effective protection for the marine environment from 'harmful effects which may arise from such activities' and the corresponding prescriptive jurisdiction to adopt rules, regulations and procedures in this regard.

Importantly, the mandate of Article 145 clearly goes beyond the effects from pollution, which is the focus of Article 209 (1), as it covers 'harmful effects' in general. While Article 145 does not mention precaution, the obligation 'to ensure' implies a precautionary approach as part of the 'due diligence' obligation. The formal jurisdiction is provided in letter *a* and *b* of Article 145, but is non-exhaustive and supplemented by other provisions, such as Article 17 (2) (f) of Annex III.

This means that the ISA is obligated to apply a precautionary approach under its environmental mandate in Article 145. Moreover, the regulation adopted by the ISA will be binding on all entities conducting seabed mining in the Area under the system of exploration and exploitation in Article 153. The next question is to what extent the ISA has incorporated a precautionary approach under its environmental mandate under Article 145.

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[139] Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea (adopted 28 July 1994, entered into force 28 July 1996) 1836 UNTS 3
[140] Ibid., Article 2
[141] Article 1 (1)
[142] Article 1 (2)
[143] Article 136; Article 137 (2)

4.4 Incorporation of a Precautionary Approach by the ISA

To incorporate the obligations under international law, the ISA has long been developing a comprehensive legal framework 'the Mining Code'.[144] At the completion of the last instrument, Exploitation Regulations[145], the mining Code will regulate prospecting, exploration and exploitation of marine minerals in the Area,[146] including areas under the regime of the Area in the Arctic.

In contrast to the obligations under LOSC, the regulations under the Mining Code issued by the ISA are not treaty-based obligations, but become binding on States through the contractual obligation needed to conduct activities in the Area under Part XI.

4.4.1 The Exploration Regulations

The exploration regulations of the Mining Code, which comprise the Nodules Exploration Regulations,[147] the Sulphides Exploration,[148] and the Crusts Exploration Regulation.[149] These exploration regulations contain binding obligations for the ISA, sponsoring States and contractors to apply a precautionary approach to both 'prospecting' and 'exploration' activities, as defined in the respective regulations.[150]

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[144] The Mining Code comprises 'Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, ISBA/6/A/18 (13 July 2000), amended by ISBA/19/C/17 (22 July 2013), ISBA/19/A/12 (25 July 2013), and ISBA/20/A/9 (24 July 2014) (Nodules Exploration Regulations) <https://isa.org.jm/files/files/documents/isba-19c-17_0.pdf> accessed 25 July 2021'; 'Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area, ISBA/16/A/12/Rev.1 (15 November 2010), amended by ISBA/19/A/12 (25 July 2013) and ISBA/20/A/10 (24 July 2014) (Sulphides Exploration Regulations) <https://isa.org.jm/files/files/documents/isba-16a-12rev1_0.pdf> accessed 25 July 2021'; ISA, Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area, ISBA/18/A/11 (27 July 2012), amended by ISBA/19/A/12 (25 July 2013) (Crusts Exploration Regulation) < https://isa.org.jm/files/files/documents/isba-18a-11_0.pdf> accessed 25 July 2021; See the ISA 'The Mining Code' {<HYPERLINK https://www.isa.org.jm/mining-code>} accessed 25 July 2021

[145] ISA, Draft Regulations on Exploitation of Mineral Resources in the Area, ISBA/25/C/WP.1 (22 March 2019) (Draft Exploitation Regulation) <https://isa.org.jm/files/files/documents/isba_25_c_wp1-e_0.pdf}> accessed 25 July 2021

[146] Ibid.

[147] A precautionary approach is incorporated under the Nodules Exploration Regulations, n 144, reg. 2 (2); 5 (2); 31 (2) and (5) and Annex IV 5.1.

[148] A precautionary approach is incorporated under the Sulphides Exploration Regulations, n 144, reg. 2 (2) 5 (1); 33 (2) and (5) and Annex 4 5.1

[149] A precautionary approach is incorporated under the Crusts Exploration Regulation, n 144, reg. 2 (2); 5 (1); 33 (2) and (5) and Annex IV 5.1

[150] 'Prospecting' and 'exploitation' is defined, respectively, in the Nodules Exploration Regulations, n 144, reg. 3 (a) and (e), in Sulphides Exploration Regulations , n 144, reg. 3 (a) and (e); in the Crusts Exploration Regulation, n 144, reg. 3 (c) and (e)

The regulations obligate the relevant institution of the ISA and State parties to apply 'a precautionary approach as reflected in Principle 15'.[151] A similar obligation to apply 'a precautionary approach as reflected in Principle 15' applies to 'prospectors' and 'contractors'.[152] While the latter regulations includes an additional qualification in the phrase 'as far as reasonably possible, applying a precautionary approach', the comma after the word 'possible' indicate that the qualification does not refer to the application of a precautionary approach, but refers to and sets a qualification to necessary measures.[153] The exploration regulations of the Mining Code turn a precautionary approach as reflected in Principle 15 into a binding obligation for all activities in the Area, including in the Arctic.

4.4.2 The Exploitation Regulations

Although still in draft form and not binding, the Draft Exploitation Regulations[154] applies a similar technique for incorporating a precautionary approach as the exploitation regulations. The Draft Exploitation Regulations obligates '[t]he Authority, sponsoring States and Contractors to 'each, as appropriate', 'plan, implement and modify measures necessary for ensuring effective protection for the Marine Environment from harmful effects', further stating in letter *a* that 'To this end, they shall', besides the other principles listen in letters *b* to *d,* '[a]pply the precautionary approach, as reflected in principle 15 of the Rio Declaration on Environment and Development, to the assessment and management of risk of harm to the Marine Environment from Exploitation in the Area'.

In addition, Regulation 2 (e) (ii) of the Draft Exploitation Regulations requires that 'the precautionary approach, as reflected in principle 15 of the Rio Declaration' applies to the effective protection of the Marine Environment 'from the harmful effects which may arise from Exploitation'. Importantly, Regulation 2 (e) (ii) derives the requirement to apply a

[151] With regard to prospecting, See the Nodules Exploration Regulations, n 144, reg. 2 (2); the Sulphides Exploration Regulations, n 144, reg. 2 (2); the Crusts Exploration Regulation, n 144, reg. 2 (2). With regard to exploration, see the Nodules Exploration Regulations, n 144, reg. 31 (2); the Sulphides Exploration Regulations, n 144, reg. 33 (2); the Crusts Exploration Regulation reg 31 (2). As regard 'prospectors', see the Nodules Exploration Regulations, n 144, reg. 5 (1); the Sulphides Exploration Regulations, n 144, reg. 33 (2); the Crusts Exploration Regulation, n 144, reg 33 (2). With regard to 'contractors', see the Nodules Exploration Regulations, n 144, reg. 31 (5) and Annex VI [51]; the Sulphides Exploration Regulations, n 144, reg 33 (5) and Annex 4 [5.1]; the Crusts Exploration Regulation, n 144, reg. 31 (5) and Annex IV [5.1]

[153] For a discussion on this topic, see, e.g., Duncan French, n 68, 548; Aline Jaeckel, n 13, 177

[154] ISA, n 144

precautionary approach regarding exploitation activities from the environmental mandate of the ISA under Article 145. This suggests that the ISA considers a precautionary approach as an integral part of its obligations under Article 145. As noted in section 4.3 of this thesis, the obligation 'to ensure' under Article 145 implies a precautionary approach. Arguably, Regulation 2 (e) (ii) builds and expands on the finding of the Seabed Chamber of ITLOS that the obligation of 'due diligence' requires the application of a precautionary approach.[155]

4.5 Implementation of a Precautionary Approach by the ISA

While incorporating a precautionary approach in the regulatory framework for the ISA is an important step towards giving practical effect to a precautionary approach, an optimal implementation would require that institutional, procedural and protective dimension of the ISA facilitate the implementation of a precautionary approach.

4.5.1 Institutional dimensions

To accomplish its custodian responsibilities with regard to the Area, LOSC grants the ISA with the required jurisdictions and competencies[156] and establishes the ISA with a legal personality and as an autonomous institution.[157] The juridical status and autonomy of the ISA is relevant to the implementation of a precautionary approach as this allows the ISA to enter into agreements with relevant organisations.

Article 153 (2) establishes a system where 'activities in the Area', that is exploration and exploitation of seabed minerals, [158] shall be carried out by and in association with the ISA, States parties or 'state enterprises or natural or juridical persons'. The purpose of this system is to bind entities that conduct seabed mining in the Area to the obligations of LOSC and its related instruments, either directly or through the system of state sponsorship.[159] Thus, under LOSC seabed mining in the Area may only be conducted by the Enterprise, State parties or

[155] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, [131]
[156] See, e.g., LOSC articles 137 (2), 145, 153, 157, 160 (2), 162 (2)
[157] LOSC, Article 153 (1)
[158] LOSC Article 1 (3) defines) 'activities in the Area' as 'all activities of exploration for, and exploitation of, the resources of the Area'
[159] Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, n 60, [75]

entities sponsored by States, making the obligations under LOSC or its related instruments applicable to all seabed mining in the Area.

A relevant question is whether and to what extent non-parties to LOSC may take part in the regime of Part XI. This issue applies to the Arctic seabed since the US is a non-member to LOSC. Considering this thesis, it suffices to note that the seabed mining regime in LOSC has been argued to establish a customary law obligation to refrain from unilateral exploitation of mineral resources in the Area.[160] Further discussions on this topic fall outside this thesis.

While an in-depth analysis of the ISA institutions is not the aim of this section,[161] two bodies of the ISA are important for the implementation of a precautionary approach. The first is that of the Secretariat,[162] which is the administrative body of the ISA. The Secretariat also carries out the necessary functions of the Enterprise[163] while this body is non-operational.[164] This means that the Secretariat carries a significant responsibility to implement mechanism to reduce scientific uncertainty and monitoring the marine environment.[165] This raises a question of the institutional capacity of the Secretariat to implement a precautionary approach.

Under the Secretariat, the Office of Environmental Management and Mineral Resources (OEMMR) is the body responsible for, among other tasks, supporting EIAs and environmental monitoring, in addition to encouraging marine scientific research, developing international collaborations and disseminating the results of scientific research, a core function of the ISA under LOSC Article 143 (2).[166] These tasks are both complicated and central to facilitating identification of plausible indications of environmental harm relevant to a precautionary approach.

At the same time, the OEMMR staff comprises ten people, of which four positions are dedicated to natural scientists, including one environmental analyst.[167] Considering the vast

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[160] For a discussion on the right to seabed mining for non-Parties to LOSC, see, e.g., Joanna Dingwall, 'Commercial Mining Activities in the Deep Seabed beyond National Jurisdiction: The International Legal Framework' in Catherine Banet (ed), *The Law of the Seabed: Access, Uses, and Protection of Seabed Resources* (Brill Nijhoff 2020), 151-155

[161] For a discussion of the institutional structure of the ISA, see, e.g., Aline Jaeckel, n 13, 90-115

[162] LOSC Article 166

[163] ISA, 'Organs of the International Seabed Authority' (ISA 2021) <<https://www.isa.org.jm/index.php/organs> accessed 28 July 2021

[164] Jaeckel notes that a lack of State funding may cause the Enterprise to fail, see Aline Jaeckel, n 13, 100

[165] Aline Jaeckel, n 13, 289, 292

[166] ISA, 'The Secretariat' (ISA 2021) <https://www.isa.org.jm/secretariat> accessed 6 August 2021

[167] ISA, 'The Secretariat' (ISA 2021) <https://www.isa.org.jm/secretariat> accessed 6 August 2021

area of seabed under in the Area and that the ISA is currently engaged in 31 exploration contracts with 22 contractors,[168] the number of natural scientists under the Secretariat and the OEMMR seems disproportional to the portfolio of responsibilities. While the number of exploitation contracts has increased by 4 since 2017,[169] the number of natural scientists under the OEMMR is equal to that of 2017.[170] In addition, the limited number of natural scientists in the Secretariat has previously been assessed to be a contributing factor a lack of building regional environmental baseline data by commissioning and conducting marine scientific,[171] as envisioned by LOSC Article 143 (2).

The second relevant body is the Legal and Technical Commission (LTC),[172] which is subsidiary to the executive body of the ISA – the Council.[173] The LTC also has responsibilities that are relevant to implement a precautionary approach in the ISA, such as to conduct supervision of exploration or mining activities and to conclude assessment of the environmental implications of activities in the Area.[174] While the workforce capacity of the LTC has increased from 24 to 30 members since 2017,[175] it consists of just a small number of experienced scientists.[176] It should also be noted that neither the LTC or the ISA have a dedicated environment department with an environmental compliance assurance function.[177]

Although the scientific capacity of the OEMMR and the LTC suggest a disproportionality between the task and resources, it is problematic to assume that the ISA would not be able perform tasks that are needed to implement a precautionary approach. At the same time, the scientific data on marine ecosystems has increased in recent years, particularly

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[168] Aline Jaeckel, n 13, 293
[169] ISA, 'Exploration Contracts' (ISA 2021) available at 'https://www.isa.org.jm/index.php/exploration-contracts', accessed 8 August 21
[170] Aline Jaeckel, n 13, 293
[171] Ibid.
[172] The LTC is established by LOSC Article 163 (1) (a) and carries out the functions of the non-operational Economic Planning Commision (EPC), envisioned by LOSC Article 162(2)(y)
[173] LOSC articles161-169
[174] ISA 'The Legal and Technical Commission' (ISA 2021) <https://isa.org.jm/authority/legal-and-technical-commission> accessed 16 August 21
[175] ISA 'Members of the Legal and Technical Commission (1997-2021)' <https://isa.org.jm/files/files/documents/LTC_Membership_1997-2021.pdf> accessed 19 August 2021
[176] Kevin Murphy 'Assuring Environmental Compliance in Deep-Sea Mining: Lessons from Industry and Regulators' (KM Environmental Consulting) (The Pew Charitable Trusts 2020), 35 https://www.pewtrusts.org/-/media/assets/2020/06/seabed_mining_white_paper.pdf accessed 19 August 2021
[177] Ibid., 35

in the Arctic,[178] which indicates that the workload for environmental analysts has increased in proportion. This is particularly thought-provoking with regard to the ability of the OEMMR to analyse the scientific data that may indicate potential threats in vulnerable areas such as the Arctic.

Lastly, it should be noted that the ISA lacks an autonomous inspectorate to monitor compliance of contractors and states, although an inspectorate body is envisioned in Part XI of the Draft Exploitation Regulation.[179] However, should this inspectorate not be established, it would likely further increase the workload for the LTC and the Secretariate.

4.5.2 Protective dimensions

The ISA has taken important steps to facilitate implementation of precaution, primarily by its work to establish a regional environmental management plan (REMP) in the Clarion-Clipperton Zone and through its involvement in marine scientific research.[180] These lines of effort have been further developed in the recent years under the umbrella of a strategic plan.[181]

The efforts to develop a REMP for the Area of the northern Mid-Atlantic Ridge (MAR) is of particular importance in the Arctic context, considering that it has produced a Regional Environmental Assessment of the Northern Mid-Atlantic Ridge that assesses the pelagic environment as far north as South of the Iceland Extended Continental Shelf Submission and encompasses current systems crossing into the Arctic.[182] While REMPs are policy documents and not legal instruments, implementing a precautionary approach to activities in the Area is a stated core purpose of ISA REMPs.[183] The strategic plan also has implications for marine scientific research, as it explicitly provides a precautionary approach as assessment criteria for the effective protection of the marine environment from harmful effects that may arise from seabed activities.[184]

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[178] E Eriksen and others, n 46, 5
[179] ISA, Draft Regulations on Exploitation of Mineral Resources in the Area, Part XI
[180] Aline Jaeckel, n 13, 224-225
[181] ISA 'Decision of the Assembly of the International Seabed Authority relating to the implementation of the strategic plan for the Authority for the period 2019–2023' ISBA/25/A/15 (ISA 2019)
[182] PPE Weaver and others 'Regional Environmental Assessment of the Northern Mid-Atlantic Ridge' (ISA 2019) 229 pages, p. 44, 85, available at https://isa.org.jm/files/documents/rea-feb2020-reduc.pdf accessed 6 August 2021
[183] ISA, 'Guidance to facilitate the development of Regional Environmental Management Plans (REMPs)' (ISA 2019), 3, available at <https://isa.org.jm/files/files/documents/remp_guidance_.pdf> accessed 6 August 2021
[184] ISA, n 181, strategic direction 3, Section 12 and 13.

The adoption of a strategic plan is an important step to operationalise precaution in the protective dimension, as this facilitates a balancing of environmental protection and seabed mining, since the lack of a strategic vision may hinder the effective implementation of a precautionary approach.[185] While the efforts to improve scientific research and develop a REMP for the northern MAR will have positive effects to building the baseline knowledge needed to prevent potential 'harmful effects' and 'significant adverse change' in Areas connected to the Arctic, the ISA still lacks effective protective measures that both effectively identify Vulnerable Marine Ecosystem (VME)[186] and operationalise warnings from the scientific community through independent and effective compliance reporting and review systems,[187] which is assessed as essential to prevent irreversible damage.[188] This critique is especially relevant in relation to the particularly vulnerable environment in the Arctic. Deliberations on establishing identification criteria for VMEs have been part of the development of establishing the REMP in the northern MAR,[189] which is showing progress.

It may also be noted that, while the strategic plan encourages regional cooperation, it employs no Arctic-specific strategies.[190] At the same time, the ISA has long perused a cooperative strategy in the Arctic.[191] With regard to cooperating with the Arctic Council[192], the early focus of the ISA was on revenue sharing under LOSC Article 82 and developing marine scientific research under LOSC Article 143.[193] In 2012, to realise these goals, the ISA proposed to formalise a cooperation with the Arctic Council as a competent regional *sui generis* organization[194], noting matching goals between the Arctic Council and the ISA to ensure the effective protection of the marine environment.[195] However, the ISA has to not attained

[185] Aline Jaeckel, n 13, 226
[186] ISA 'Report Of The Workshop On The Regional Environmental Management Plan For The Area Of The Northern Mid-Atlantic Ridge' (ISA 2020), 56 <https://isa.org.jm/files/files/documents/evora_workshop.pdf> accessed 8 August 2021
[187] Komaki Kanae and Fluharty David 'Options to Improve Transparency of Environmental Monitoring Governance for Polymetallic Nodule Mining in the Area' (2020) 7 Frontiers in Marine Science 247
[188] Aline Jaeckel, n 13, 225
[189] ISA, n 186, 56
[190] ISA, n 181
[191] Michael M. Lodge, 'The International Seabed Authority and the Arctic' in Wasum-Rainer S, Winkelmann I, Tiroch K (eds) Arctic Science, International Law and Climate Change (Springer 2012)
[192] The Declaration on the Establishment of the Arctic Council, Ottawa, 19 September 1996 (The Ottawa Declaration)
[193] Michael M. Lodge, n 191
[194] Ibid.
[195] Ibid.

observer status in the Arctic council. Regarding the North East Atlantic, ISA and OSPAR[196] have developed a cooperation based on a 2008 memorandum of understanding[197], including establishing mutual observer status in each other's organisations.[198] Among the topics discussed in the framework of this cooperation was the development of an environmental management plan for the Mid-Atlantic Ridge.[199] This suggests that the formalised efforts have been effectual regarding developing protective measures that operationalise a precautionary approach, showing that a formalised cooperation in the Arctic could facilitate a precautionary approach in the Arctic.

4.5.3 Procedural Dimensions

The core of procedural measures is to achieve timely precautionary action, which is critical to achieve an effective implementation of precaution.[200] This means that procedural safeguards that ensure that precautionary action is taken when the threshold of precaution is reached. The Exploration Regulations and the Draft Exploitation Regulations sets procedural safeguards in the case of 'serious harm', which are defined as 'significant adverse change in the Marine Environment'.[201] The practical content of 'significant adverse change' is to be determined in accordance with the 'rules, regulations and procedures adopted by the Authority', which are to be adopted on the basis of 'internationally recognised standards and practices.[202] The responsibility to define these standards is delegated to the LTC.[203]

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[196] Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) (adopted 22 September 1992, in force 25 March 1998) 2354 UNTS 67, 32 ILM 1069 (1993); for an examination of the OSPAR Convention, see Section 5.1.4 below.
[197] ISA, 'Status of consultations between the International Seabed Authority and the OSPAR Commission' ISBA/21/C/9 (ISA 2015) <https://isa.org.jm/files/files/documents/isba-21c-9_7.pdf> accessed 9 August 2021
[198] ISA, 'Observers' (ISA, 2021) <https://isa.org.jm/observers> accessed 8 August 2021; OSPAR, 'Observers' (OSPAR 2021) < https://www.ospar.org/organisation/observers>8 August 2021
[199] ISA, n 189, [3]
[200] Aline Jaeckel, n 13, 229
[201] ISA, Nodules Exploration Regulations, n 144, reg. 1 (3) (f); Sulphides Exploration Regulations, n 144, reg. 1 (3) (f); the Crusts Exploration Regulation, n 144, reg. 1 (3) (f); the Draft Regulations on Exploitation of Mineral Resources in the Area, n 125, 117
[202] The Nodules Exploration Regulations, n 144, reg. 1 (3) (f) and reg. 31 (4); the Sulphides Exploration Regulations, n 144, reg. 1 (3) (f) and reg. 33 (4); the Crusts Exploration Regulation, n 144, reg. 1 (3) (f) and reg. 33 (4); the Draft Regulations on Exploitation of Mineral Resources in the Area, n 125, 117
[203] The Nodules Exploration Regulations, n 144, reg. 31 (4), in Sulphides Exploration Regulations, n 144, reg. 33 (4); the Crusts Exploration Regulation, n 144, reg. 33 (4);

When the LTC have defined these standards, these definitions will provide important thresholds for precautionary action. At the same time, it is also necessary to set clear parameters for reporting procedures from the contractors or the State that conducts activities in the Area to the ISA. However, procedures on how to communicate the level of uncertainty connected to these potential threats within the ISA-system have yet to be developed.[204] Experiences from implementing a precautionary approach to fisheries in the Arctic suggest that Arctic States are less inclined to take action based on inadequate scientific information if this would result in negative effects on earnings potential.[205] Thus, a lack of clearly formulated procedures on how to communicate uncertainty would likely impair the full implementation of a precautionary approach.

5 Chapter V – Obligations to Incorporate and Implement a Precautionary Precaution for Seabed Mining in AWNJ in the Arctic

The legal regime of the Norwegian continental shelf is primarily governed by the regime set out under LOSC Part VI, read together with Part XII. The coastal State's continental shelf extends to a distance of 200 nautical miles from the baselines and includes both the seabed and subsoil.[206] Within this zone, the coastal state has the 'sovereign rights' to explore and exploit 'natural resources', such as seabed minerals.[207] Under customary international law, the right to the resources on the continental shelf belongs to the coastal State regardless of whether the coastal State has claimed a continental shelf.[208] This means the obligation to apply a precautionary approach in relation to seabed mining would depend on national jurisdiction of

[204] Sabine Christiansen, Aline Jaeckel and Katherine Houghton, 'Ecological Safeguards for Deep Seabed Mining' (2019 the German Environment Agency), 134 <https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-07-11_texte_113-2019_deep-seabed-mining.pdf> accessed 20 August 20
[205] Tore Henriksen, 'The Precauiotanry Approach and Fisheries: A Nordic Perspective' in in De Sadeleer N (ed), *Implementing the Precautionary Principle: Approaches from the Nordic Countries, EU and USA* (Routledge 2014), 174
[206] LOSC Article 76 (1)
[207] LOSC Article 77 (1) (4)
[208] North Sea Continental Shelf (Germany v Denmark) (Merits) (Judgment) [1969] ICJ Rep 3

the coastal State. However, the coastal State needs to observe obligations under international law, regional agreements and national law.

This raises the question of whether there exist obligations under international law, regional agreements and national law for the arctic coastal State to apply a precautionary approach with regard to seabed mining within areas of national jurisdiction.

5.1 Obligations under International Law

As the coastal State, Norway has sovereign rights and jurisdiction to conduct seabed mining on its the continental shelf.[209] This jurisdiction is subject to obligations under international law, including an obligation to apply a precautionary approach. The obligation to apply a precautionary approach may be derived from international law and domestic legislations.

5.1.1 LOSC

Under Part XII of LOSC, articles 192, 194 and 208 are particularly relevant to Norway's obligation to incorporate and implement a precautionary approach. As articles 192 and 194 apply to both areas beyond and within national jurisdiction, the obligation to apply a precautionary approach under these articles, as concluded in section 5.1.4 of this thesis, equally applies to seabed mining on the continental shelf.

Article 208 (1) requires 'coastal States' to adopt laws and regulations to 'prevent, reduce and control' pollution of the marine environment 'arising from or in connection' with activities on the continental shelf. Article 208 (3) requires the coastal States laws, regulations and measures 'be no less effective' than 'international rules, standards and recommended practices and procedures'. Thus, Article 208 sets up a mandatory minimum for the obligations of the coastal State under Article 208 (1) and (2), which implies that an obligation to apply a precautionary approach to seabed mining in such international instruments or practices encompassed by Article 208 (3) would need to be implemented by the coastal State. The question is what constitutes international instruments and recommended practices under Article 208 (3).

Read together with such instruments and practices would need to be established by 'competent international organisations'. The ordinary meaning suggests that the organisation

[209] LOSC Article 77 (1) (4)

has the relevant expertise and is given a mandate by the international community to develop regulations for seabed mining and environmental protection in AWNJ. While the international community has entrusted the ISA regarding seabed mining in ABNJ, this mandate does not extend to AWNJ.[210] This indicates that the ISA is not a 'competent organisation' with regard to seabed mining in AWNJ.[211] Thus, Article 208 (5) provides no clear guidance for coastal States regarding the whether the mandatory minimum refers explicitly to rules and regulations developed by the ISA, showing that regulation and practices regarding a precautionary approach would not have a binding effect on coastal States as a mandatory minimum.

However, the authoritative status of the ISA for seabed mining activities in the Area suggest that the regulations and guidance under the auspices of the ISA would have a strong normative guiding effect on States and their seabed mining activities.[212] In addition, while a strict interpretation of Article 208 (5) would not necessarily create a binding effect of the ISA regulations, subsequent State practice may decide that the ISA will be interpreted and considered as a mandatory minimum requirement under Article 208 (5).[213]

5.1.2 The Rio Declaration

Principle 15 of the Rio Declaration applies to the regime of seabed mining on the continental shelf as a soft law obligation, but has also been incorporated as hard law obligations relevant to seabed mining on the continental shelf. Two hard law instruments of particular relevance to seabed mining on the Norwegian continental shelf are the Convention on Biological Diversity (CBD)[214] and OSPAR Convention[215].

[210] LOSC Article 145
[211] Andrew Friedman, 'Article 208 of UNCLOS and National Regulation of Seabed Mining' in IA Laird, B Sabahi and AM Whitesell (eds) *Natural Resources and the Law of the Sea – Exploration, Allocation, Exploitation of Natural Resources in Areas Under National Jurisdiction and Beyond* (International Law Institute Series on International Law) (JurisNet 2017) 276
[212] Ibid., n 195, 287
[213] Subsequent State practice is reflected as a relevant interpretation factor in VCLT, Article 31 (3) (b)
[214] United Nations Convention on Biological Diversity (adopted 5 June 1992, in force 29 December 1993) 1760 UNTS 69
[215] Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) (adopted 22 September 1992, in force 25 March 1998) 2354 UNTS 67, 32 ILM 1069 (1993)

5.1.3 The Convention on Biological Diversity

The obligations under the CBD are binding on Norway.[216] The CBD is an international instrument and applicable to components of biological diversity is limited to AWNJ.[217] While there is no explicit reference to precaution, the preamble states that a lack of full scientific certainty 'should not be used as a reason for postponing measures to avoid or minimise' a threat of significant reduction or loss of biological diversity.[218] This is generally regarded as a promotion of a precautionary approach.[219] Thus, the obligation to apply a precautionary approach applies to seabed mining as needed to conserve biological diversity.[220] Here articles 7 (c) and 14 (1) (c) require the State to implement measures that are mitigate potential adverse effects on the marine environment, and thus incorporates and operationalises key elements of a precautionary approach as implicitly referred to in the Preamble of the CBD.[221]

5.1.4 OSPAR

The OSPAR Convention[222] is a regional instrument with legally binding effects for Norway as a party State. OSPAR requires Norway to work against pollution and the adverse effects of human activities on the marine environment in the North East Atlantic.[223] Article 2 (2) (a) obligates parties to 'apply the precautionary principle' to take 'preventive measures' when there are 'reasonable grounds for concern' that substances introduced into the marine environment may cause *inter alia* 'hazards to human health' or 'harm living resources and marine ecosystems'. The thresholds of 'hazards' and 'harm' suggest a lower threshold of harm than 'serious or irreversible harm', which is used in Principle 15 of the Rio Declaration. However, it is also important that the thresholds of precaution in the OSPAR Convention connected to

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[216] Ot.prp. nr. 52 (2008-2009) Om lov om forvaltning av naturens mangfold (naturmangfoldloven)' (NOR) (Proposition No. 52 (2008–2009) to the Storting concerning an Act relating to the management of biological, geological and landscape diversity [Nature Diversity Act]) 104 [4.2.1.1]
[217] CBD Article 4 (a)
[218] CBD Preamble
[219] Arie Trouwborst, n 26, 48-49
[220] CBD Article 1
[221] For a detailed discussion on the obligation to conduct an EIA under the CBD , see Ingvild Ulrikke Jakobsen, *Marine Protected Areas in International Law: An Arctic Perspective* (BRILL 2016), pp. 185 – 196.
[222] Ot.prp. nr. 52 (2008-2009) Om lov om forvaltning av naturens mangfold (naturmangfoldloven)' (NOR) (Proposition No. 52 (2008–2009) to the Storting concerning an Act relating to the management of biological, geological and landscape diversity [Nature Diversity Act]), Section 4.2.2.3
[223] OSPAR Convention Article 1 (a)

effects on systems, that is 'human health' or 'living resources and marine ecosystems', suggesting that the damage would need to be of a certain magnitude to have systemic effects.

The obligation to apply precautionary measures applies 'even when there is no conclusive evidence of a causal relationship between the inputs and the effects',[224] which clearly expresses the element of uncertainty. Of note, in contrast to Principle 15 of the Rio Declaration, the obligation to apply a precautionary approach under OSPAR does not require measures to be cost effective.[225]

The OSPAR Convention provides a general obligation to prevent and eliminate pollution by dumping or incineration of wastes and by pollution from offshore sources.[226] The obligation to prevent pollution and dumping would suggest that emissions from seabed mining, including emissions on the soil- or subsoil or in the water column would obligate Norway to apply a precautionary approach to these threats. This suggests that pollution from seabed mining on the Norwegian continental shelf would need to apply the threshold of harm as expressed in the OSPAR Convention.

5.1.5 Assessment

Under international law, Norway is obligated to incorporate and implement a precautionary approach to seabed mining on the continental shelf. In addition to the general obligations to apply a precautionary approach to protect the marine environment under LOSC and, at least, the normative pull of the ISA regulations, obligations under CBD and OSPAR obligate Norway to incorporate and implement a precautionary approach in measures to prevent significant reduction or loss of biological diversity and to adopt preventive measures to prevent pollution and dumping to harm living resources and marine ecosystems. This raises the question of how Norway has incorporated and implemented these obligations to apply a precautionary approach to seabed mining under domestic law.

[224] OSPAR Convention Article 2 (2) (a)
[225] OSPAR Convention Article 2 (2) (a)
[226] OSPAR Convention articles 3 & 4

5.2 Obligations Under Domestic Law

In domestic legal framework, an explicit obligation to apply a precautionary approach to environmental protection is found in Section 9 of the Nature Diversity Act.[227] The purpose of the Nature Diversity Act is to ensure environmental protection and sustainable use of natural resources.[228] The Act is anchored in the constitutional right to a good quality environmental.[229] Of note, there exists a separate discussion of whether an obligation to apply a precautionary approach may be derived from the Norwegian constitution, but this is a controversial issue in the Norwegian legal debate.[230] However, it is not contested that there exists an obligation to incorporate and implement a precautionary approach under international law.

Section 9 of the Nature Diversity Act states that

> '[w]hen a decision is made in the absence of adequate information on the impacts it may have on the natural environment, the aim shall be to avoid possible significant damage to biological, geological or landscape diversity. If there is a risk of serious or irreversible damage to biological, geological or landscape diversity, lack of knowledge shall not be used as a reason for postponing or not introducing management measures'

The focus of the first sentence is to avoid significant damage to the environment when a decision is made in the context of uncertainty. The second sentence emphasises that lack of knowledge is not to be used as a reason not to implement measures when the environmental risk is serious or irreversible. A strictly substantial obligation to apply precaution would risk creating an incentive not to gather the information needed to achieve adequate knowledge. However, the obligation to use a precautionary approach in Section 9 is supplemented by the obligation in Section 8 (1) to base official decisions concerning the environment 'as far as reasonable' on 'scientific knowledge' and requires knowledge in this regard in proportion to 'the nature of the case and the risk of damage'.

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[227] Lov 19. juni 2009 nr. 100 om forvaltning av naturens mangfold [Naturmangfoldloven]) (NOR) Act relating to the management of biological, geological and landscape diversity [Nature Diversity Act] <https://www.regjeringen.no/en/dokumenter/nature-diversity-act/id570549/>

[228] Nature Diversity Act, Section 1

[229] Ot.prp. nr. 52 (2008-2009) Om lov om forvaltning av naturens mangfold (naturmangfoldloven)' (NOR) (Proposition No. 52 (2008–2009) to the Storting concerning an Act relating to the management of biological, geological and landscape diversity [Nature Diversity Act]) 58

[230] For a discussion on the constitutional obligation apply a precautionary apporach, see, e.g., Hans Chr. Bugge, *Lærebok i miljøforvaltningsrett* (3. utg, Universitetsforl 2011), p. 138

As both Section 9 and 8 apply to the Norwegian territorial sea and the continental shelf, they create a procedural and substantial obligation for Norway to incorporate and implement a precautionary approach to seabed mining on the continental shelf.[231]

5.3 Incorporation of a Precautionary Approach

First, it is necessary to point out that Norway adopts a dualistic approach to international law, which means that obligations under international law requires both ratification and legislative procedure to become part of Norwegian law. In addition, the Norwegian legal system adopts a 'principle of presumption', under which Norwegian law is presumed to be in accordance with obligations under international law. As such, the main rule is that Norwegian law shall be interpreted and implemented in accordance with obligations under international law.[232]

The Norwegian Seabed Minerals Act[233] entered into force in 2019. The Seabed Minerals Act governs the exploration and extraction of mineral deposits on the seabed and the subsurface within the geographical scope of application,[234] which is defined as Norwegian internal waters, territorial waters and the Norwegian continental shelf.[235] The Act does not apply to activities in the Area,[236] although it clarifies that the Act shall be applied within the limits of applicable international law and agreements.[237] In accordance with the 'principle of presumption', this means that the Seabed Minerals Act shall be applied in accordance with the obligations to incorporate and implement a precautionary approach as identified in Section 4.2 above.

The Seabed Minerals Act does not include an explicit obligation to incorporate and implement a precautionary approach with regard to seabed mining.[238] While several

[231] Nature Diversity Act, Section 2 (1) & (3)
[232] Hans Christian Bugge, n 111, 109
[233] Lov 22. mars 2019 nr. 7 om mineralvirksomhet på kontinentalsokkelen) (NOR), Act relating to mineral activities on the Continental Shelf [Seabed Minerals Act] <https://app.uio.no/ub/ujur/oversatte-lover/cgi-bin/sok.cgi?type=LOV>
[234] Seabed Mining Act, Section 1-2 (1)
[235] Seabed Mining Act, Section 1-3 (1)
[236] Seabed Mining Act, Section 1-3 (4), Norway has not adopted the legislation necessary to act as a sponsoring State under LOSC Article 153 (2) (b), See Prop.106 L (2017-2018) Lov om mineralvirksomhet på kontinentalsokkelen (havbunnsmineralloven) (NOR) p. 32
[237] Seabed Minerals Act, Section 1-2 (4)
[238] Of note, Seabed Minerals Act Section 1-7 provides that '[a]ll reasonable precautions shall be taken to avoid damage to the diversity of nature in the sea' and 'to avoid pollution and littering'. While the 'reasonable precautions' allude to elements of a precautionary approach, the Norwegian language nullifies this assumption. The word 'precautions' in Section 1-7 is a translation of the Norwegian word 'foranstaltninger' - a wide term encompassing a multitude of measures – while the Norwegian translation of a 'precatutinary apporach' is 'føre-var prinsippet'.

stakeholders argued that a precautionary approach should be included in the wording of the Act,[239] an explicit reference to a precautionary approach was not included in the Act. The Norwegian Ministry of Petroleum and Energy reasoned that an inclusion of a precautionary approach was unnecessary as the obligations under the Nature Diversity Act would apply to activities on the Norwegian continental shelf.[240]

Section 9 of the Nature Diversity Act includes core elements of precaution as reflected in international law, which were also a stated intention in the preparatory works of the Act.[241] The preparatory works highlight that the phrase 'serious or irreversible damage' is intended reflect a phrase similar to that used in international law, but presumed to be a reflection of the threshold implied in the word 'significant'. [242] Thus, a precautionary approach incorporated under Section 9 largely reflects the threshold used in Principle 15 in the Rio Declaration.

Section 9 of the Nature Diversity Act is not the only version of a precautionary approach in under Norwegian domestic law. Notably, Section 7 of the Svalbard Environmental Protection Act[243] obligates the administration to act when it lacks 'adequate information on the effects that an undertaking may have on the natural environment'. Section 7 does set no threshold of 'significant' or 'serious' damage, which proposes a lower threshold for a precautionary approach than the one applied under Nature Diversity Act. The preparatory works confirm this by characterising Section 9 as a general rule, while the Svalbard Environmental Protection Act a special rule for the particularly vulnerable environment of Svalbard.[244]

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[239] Prop.106 L (2017-2018) Lov om mineralvirksomhet på kontinentalsokkelen (havbunnsmineralloven) (NOR) (Proposition No. 106 (2017-2018) to the Storting concerning Act relating to mineral activities on the Continental Shelf [Seabed Minerals Act]) (Currently not available in English), 28

[240] Prop.106 L (2017-2018) Lov om mineralvirksomhet på kontinentalsokkelen (havbunnsmineralloven) (NOR) (Proposition No. 106 (2017-2018) to the Storting concerning Act relating to mineral activities on the Continental Shelf [Seabed Minerals Act]) (Currently not available in English)

[241] Ot.prp. nr. 52 (2008-2009) Om lov om forvaltning av naturens mangfold (naturmangfoldloven)' (NOR) (Proposition No. 52 (2008–2009) to the Storting concerning an Act relating to the management of biological, geological and landscape diversity [Nature Diversity Act]), Section [8.6.6.3] & [8.6.2.4]

[242] Ibid., [8.6.6.3]

[243] Lov 15. juni 2001 nr. 79 om miljøvern på Svalbard [Svalbardmiljøloven] (NOR), 'Act relating to the protection of the environment in Svalbard [Svalbard Environmental Protection Act]', <https://app.uio.no/ub/ujur/oversatte-lover/cgi-bin/sok.cgi?type=LOV>

[244] Ot.prp. nr. 52 (2008-2009) Om lov om forvaltning av naturens mangfold (naturmangfoldloven)', p. 104

While this makes clear that a precautionary approach is fully incorporated under the Seabed Minerals Act, it is also clear that the Norwegian government opted for the general rule and thus a higher threshold for a precautionary approach than the one applied in particularly vulnerable environment of Svalbard. This also raises the question of whether the general rule of a precautionary approach under the Nature Diversity Act is suited for the particularly vulnerable environment of the Arctic and the Arctic seabed. In addition, the chosen method of incorporation provides no clear guidance on how much weight a precautionary approach should be given in the decision process or by courts in the specific context of seabed mining. This is a notable difference compared to how the ISA has emphasised a precautionary approach throughout its regulations, as noted in Section 4.4 above.

Lastly, with regard to LOSC Article 208 (1) that the preparatory works state that the ISA guidance on impact assessments 'may be relevant to look at'[245] when deciding on the criteria for impact assessments under the Seabed Mining Act.[246] The formulation suggests that the guidelines are viewed primarily as non-obligatory, although useful guidance outside the scope of Article 208.

5.4 Implementation a Precautionary Approach

5.4.1 Institutional dimensions

The Norwegian Ministry of Petroleum and Energy responsible for the management of seabed minerals on the Norwegian continental shelf. This clarifies that seabed mining on the Norwegian continental shelf is fully under political control. Thus, how to conduct seabed mining on the Norwegian continental shelf is a question of how to balance seabed mining against other relevant political interests, such as fisheries and environmental considerations.

This balancing of priorities is done through a system of holistic ecosystems management plans.[247] A stated intention behind the ecosystems management plans is to observe the

[245] Author's translation

[246] Prop.106 L (2017-2018) Lov om mineralvirksomhet på kontinentalsokkelen (havbunnsmineralloven) (NOR) (Proposition No. 106 (2017-2018) to the Storting concerning Act relating to mineral activities on the Continental Shelf [Seabed Minerals Act]) (Currently not available in English), 28

[247] Meld. St. 20 (2019 –2020) Melding til Stortinget 'Helhetlige forvaltningsplaner for de norske havområdene Barentshavet og havområdene utenfor Lofoten, Norskehavet, og Nordsjøen og Skagerrak' (NOR) (Report to the Storting (white paper) 'Norway's integrated ocean management plans — Barents Sea–Lofoten area; the Norwegian Sea; and the North Sea and Skagerrak')

obligation to protect the marine environment under LOSC and implement a holistic and ecosystem-based management by assessing all human activity.[248] The political control facilitates the application of a precautionary approach in accordance with the stated intention for the Seabed Mining Act.[249] However, this also raises the question of how the development and implementation of these ecosystems management plans ensures the implementation of the political intention.

The Steering Group for the management plans consists of representatives from the Ministries, including the Ministry of Petroleum and Energy and the Ministry of Climate and Environment.[250] This suggests a functional balance between exploitation incentives and environmental protective incentives. Importantly, the responsibility for the subject content lies with two advisory bodies - an advisory forum that ensures a holistic ecosystems management and an advisory group responsible for the monitoring the marine ecosystems.[251] The advisory forum is led by the Norwegian Environment Agency, while the advisory group is led by the Institute of Marine Research (IMR), but both organisations are represented in both bodies. The advisory bodies shall ensure that the subject content of the environmental plans is based on scientific knowledge.[252]

The diverse competence available to the Steering Group suggest that the holistic ecosystems management plan would effectively facilitate the implementation of the elements of a precautionary approach under the political intentions prior to the onset of extractive seabed mining activities on the Norwegian continental shelf.

5.4.2 Protective measures

Protective measures that implement precaution need to be effective, proportionate and implemented at an early stage.[253] Section 2-2 of the Seabed Minerals Act requires that the

[248] Ibid., 11
[249] Prop.106 L (2017-2018) Lov om mineralvirksomhet på kontinentalsokkelen (havbunnsmineralloven) (NOR) (Proposition No. 106 (2017-2018) to the Storting concerning Act relating to mineral activities on the Continental Shelf [Seabed Minerals Act]) (Currently not available in English)
[250] Meld. St. 20 (2019 –2020) Melding til Stortinget 'Helhetlige forvaltningsplaner for de norske havområdene Barentshavet og havområdene utenfor Lofoten, Norskehavet, og Nordsjøen og Skagerrak' (NOR) (Report to the Storting (white paper) 'Norway's integrated ocean management plans — Barents Sea–Lofoten area; the Norwegian Sea; and the North Sea and Skagerrak'), 12-13
[251] Ibid., 12-13
[252] Ibid., 12
[253] Aline Jaeckel, n 13, 194

Ministry of Petroleum and Energy conduct a preliminary impact assessment. The requirement of an impact assessment prior to opening an area for seabed mining requires acquisition of knowledge of the effected marine environment. In contrast to the ISA, the Norwegian government has significant research capabilities and has cross collected scientific data over several decades that may apply to creating baseline environmental data needed to monitor potential effects of seabed mining. Examples of such research programmes are the Norwegian-Russian joint survey activity in the Barents Sea[254] and the seabed research MAREANO programme.[255]

Marine scientific research must also be operationalised for precaution to be implemented. Establishing MPAs is one of the key ways a precautionary approach is to be operationalised under the CBD and OSPAR. The Seabed Mining Act does not contain any explicit obligation to establish MPA regimes for seabed mining. To date, there exists no marine protected areas on the Norwegian continental shelf that may restrict seabed mining. Marine protection areas may be established under Section 39 of the Nature Diversity Act, but this section is not to areas outside the limits of the territorial sea.[256] In fact, Norway has yet to adopt a statutory authority to establish marine protective areas in areas beyond the territorial sea.[257] Instead, Norway maintains a sectoral approach where measures to protect the marine environment in these areas must be done under industry specific rules, such as fisheries law, petroleum law, pollution law, and indeed seabed minerals law.[258]

Of note, the ongoing work of the High Level Panel for Sustainable Ocean Economy will create a soft law commitment for Norway to develop plans for areal protection for all sea areas under national jurisdiction.[259] But, as these commitments will need to be incorporated with other developments in international law, such as the completion of negotiations of a new framework for marine protection under the CBD and new BBNJ-instrument,[260] there is

[254] E. Eriksen, n 46
[255] MAREANO, 'Årsrapport 2020 - Arkivnummer: 2020/8621', (MAREANO 2021), 9 available at https://mareano.no/resources/files/resultater/Arsrapporter/Aarsrapport_2020.pdf, accesses 08 August 2021
[256] Nature Diversity Act, Section 2 (3)
[257] Meld. St. 29 (2020 –2021) Melding til Stortinget Heilskapleg nasjonal plan for bevaring av viktige område for marin natur' (NOR) (Currently not available in English), 40
[258] Ibid.
[259] Ibid.
[260] Ibid.

considerable uncertainty as to the timeframe for these implementations. Considering the timeliness demanded by a precautionary approach, postponing the implementation of precautionary elements because of administrate difficulties is problematic.

However, a key function of the Seabed Mining Act is that it requires an impact assessment under before an area can be opened for exploration or exploitation activity.[261] The Seabed Minerals Act also sets up a licence regime requiring regime in areas opened for minerals activity.[262] The impact assessment shall, among other objectives, highlight the effects that a potential opening could have for the environment.[263] The criteria of this impact assessment is currently under development, but it would seem that neither protective areas nor area-based management tools have been included into this development process, although the Institute of IMR expect such criteria will form part of the final assessment procedure.[264]

In addition, Section 4-4 (1) obligates the contractor to submit a plan for extraction for approval by the Ministry of Petroleum and Energy. The plan shall include both commercial and environmental factors, including preventive and remedial measures, in addition to an assessment for how a facility may is to be decommissioned after the completion of the extraction activities. [265] The cessation of the activity also requires an additional impact assessment under Section 5-2.

5.4.3 Procedural Elements

Although a precautionary approach may require several procedural elements to be adequately operationalised,[266] within the scope of this theses these have been narrowed down to a question of whether Norway has the capacity to assess the risks and uncertainties associated with seabed mining and whether the procedure allows for sufficient transparency and public participation in decision-making.

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[261] Seabed Minerals Act, Section 2-3
[262] Seabed Minerals Act, Section 2-3 (1)
[263] Seabed Minerals Act, Section 2-2 (2)
[264] IMR, 'Marint vern - Havforskningsinstituttets ekspertvurdering av utfordringer og status for arbeid med marint vern og beskyttelse i Norge' (MRI 2021) Rapport fra havforskningen 2021-9, [4.1] (1), available at https://www.hi.no/hi/nettrapporter/rapport-fra-havforskningen-2021-9#sec-4-1, accessed 3 August 2021
[265] Seabed Minerals Act, Section 4-4 (2), Cessation of activity is regulated under the Seabed Minerals Act, Chapter 5
[266] See, e.g., Aline Jaeckel, n 13, 229

Section 9-1 (1) sets out a supervisory regime, where the Ministry of Petroleum and Energy is obligated 'to ensure' that the obligations under the Seabed Minerals Act are observed by actors engaged in mineral activity covered by the Act. This regime establishes a supervisory authority under the Ministry with the power to access and inspect facilities and ships engaged in minerals activity.

A comparable obligation is also set up for contractors in Section 9-3, by requiring licensees and participants in mineral activities to implement 'systematic measures' 'to ensure' compliance 'with the Act, regulations issued in accordance with this Act and individual decisions made pursuant to the Act'.[267] The obligation of the licence also include a responsibility 'to ensure' that 'any party performing work for him' complies with provisions in the Act.[268] In cases of non-compliance, the Ministry may fine the licensee or suspend the activity.[269]

In addition to guiding the decision at the political and governmental level, domestic courts may give a clear indication of whether or not the domestic legal system has fully implemented a precautionary approach. A precautionary approach was recently addressed by the Supreme Court of Norway in a case regarding the validity of three decisions regarding culling of wolves by the Ministry of Climate and the Environment.[270] The Court considered whether the uncertainty attached to the wolf population's future development required that the special safety margins of a precautionary approach under Section 9 was applied.[271] As the Court considered the available information to be solid, it decided that the qualification of 'adequate information' Section 9 of the Nature Diversity Act was adequately fulfilled and that the special safety margins of a precautionary approach was not applicable.[272]

While this suggest that the Court's application of Section 9 must be considered an obiter dictum, the decision is interesting in the context of seabed mining and a precautionary approach. First it may be noted that the general corpus of domestic case law covering a precautionary

[267] Seabed Minerals Act, Section 9-3 (1)
[268] Seabed Minerals Act, Section 9-3 (2)
[269] Seabed Minerals Act, Section 9-6 to 9-9
[270] The Supreme Court HR-2021-662-A, (case no. 20-055609SIV-HRET), civil case, appeal against judgment
[271] Ibid., [63]
[272] Ibid.

approach is very limited.[273] In fact, this is the first time a precautionary approach has been commented on by the Supreme Court. Prior to the Nature Diversity Act entered into force, the Borgating Court of Appeal noted in a case concerning the culling of wolves from 2008, that a precautionary approach had a prominent position in Norwegian environmental law and entailed a wide-ranging duty for the government to investigate the issue at hand prior to the decision.[274] In this regard, The Supreme Court Case from 2021 confirms the role of a precautionary approach under Norwegian law, both as a legal rule and as a factor of interpretation.

The Supreme Court did not apply a precautionary approach under Section 9. The Court found that the qualification of 'adequate information' was fulfilled as the decision on culling wolves was based on solid available information.[275] In particular, the Court noted that the information basis rested on years of relevant experience in the responsible administration that made it possible to predict possible future damage.[276] The weight placed on historical experience may show that the lack of analogous experience regarding seabed mining may be a convincing argument to apply the special safety margins of a precautionary approach in Section 9 of the Nature Diversity Act before deciding to conduct seabed mining. The court did not engage in a discussion on the threshold of a precautionary approach in Section 9, so much is still uncertain how Norwegian courts will apply the thresholds of a precautionary approach in Section 9 regarding seabed mining.

6 Chapter VI – Conclusion

This thesis sought to examine and conclude on the principal question, that is to what extent the legal frameworks applicable to seabed mining in the Area and on the Norwegian continental shelf incorporate and effectively implement a precautionary approach to ensure the protection of the Arctic marine environment. The thesis examined the primary legal by researching the three preliminary questions of i) the legal status of a precautionary approach as pertains to seabed mining, ii) the international legal framework for seabed mining and its application in

[273] Hans Christian Bugge, n 111, 107
[274] Borgating Court of Appeal – Dom LB-2007-14564 – RG-2008-577, Section 4.3 (4)
[275] Ibid.
[276] The Supreme Court HR-2021-662-A, n 226, [63],[85]

the Arctic, and iii) the which extent a precautionary approach is incorporated and implemented within the legal regime for seabed mining in the Area and on the Norwegian continental shelf.

It is clear from the analyses in Chapter 4 and Chapter 5 that the legal frameworks applicable to seabed mining in the Area and on the Norwegian continental shelf have incorporated a precautionary approach. The conclusion must be that the legal regime of the Area and the regime of the Norwegian continental shelf have both incorporated a *general* version of a precautionary approach, as both regimes adopt a version of a precautionary approach that applies across a wide range of areas within environmental law. None of the selected legal regimes have incorporated a version of the precautionary approach that is specially adapted to suit the particular challenges of seabed mining in the Arctic, as discussed in Chapter 2 of this thesis. Chapter 3 clarified that the flexibility inherent to a precautionary approach as a 'twilight' norm would allow the elements of precaution to adopt to the specific characteristic of the environment. Particularly when the approach is part of a 'due diligence' obligation.

Based on the analysis of the international legal framework for seabed mining and its application in the Arctic in sections 4.1.-4.3, section 4.3 provides that the ISA would need to incorporate a precautionary approach to seabed mining in the Arctic, and similarly concluded in sections 5.1-5.2 that Norway is under a similar obligation regarding the regime of the continental shelf. Based on the analyses in Chapters 4 and 5, the conclusion must be that the legal frameworks for seabed mining in Area and on the Norwegian continental shelf fully incorporate a precautionary approach as a legal tool to protect the marine environment in the Arctic.

The question of implementation is more complicated. First, both the ISA and the Norwegian government have implemented several steps in the institutional, protective and procedural dimension that are needed to facilitate the implementation of a precautionary approach for seabed mining in the Arctic. However, because of the uncertainties of seabed mining in the Arctic and the flexibility of the precautionary approach, which is discussed in Chapter 2 and Chapter 3 of this thesis respectively, it is unclear whether either of the selected frameworks have achieved an optimal implementation of a precautionary approach.

As regard the ISA, the analyses in Chapter 4 shows that there are significant obstacles to achieve an optimal implementation of a precautionary approach in the Arctic. First, the ISA has

not formulated clear criteria identifying VMEs. This may hinder the flexibility of a precautionary approach to differentiate the threshold of harm from one seabed area to the next. As the responsibility of formulating VMEs lies with the LTC and the Secretariat, this raises a question of institutional capacity within these organs to prioritise the work of formulating VMEs in time for the onset of seabed mining. Which in turn raises a question concerning whether establishing VMEs close to the predicted start of seabed mining will achieve the timeliness needed for a precautionary approach. It is also worth noting that the ISA has no specific Arctic strategy or formalised cooperation with the Arctic council facilitating Arctic specific VMEs or precautionary measures. At the same time, the ISA is in the process of mitigating some of these deficiencies. which is indicated by the envisioned inspectorate and the deliberations on the VMEs. This progress indicate that the institutional capacity of the ISA is sufficient to make the changes needed to implement a precautionary approach.

On this basis it may be concluded that the ISA has implemented a precautionary approach applicable to the Arctic environment, but that there are significant gaps in this implementation. These gaps suggest that an optimal implementation of a precautionary approach has not been achieved by the ISA.

As regard the implementation of a precautionary approach within the legal regime for seabed mining on the Norwegian continental shelf, it is clear that the institutional, protective and procedural dimensions include elements that may facilitate the implementation of a precautionary approach to seabed mining on the Norwegian continental shelf. In particular, that a precautionary approach was recently invoked in a Supreme Court Case clearly indicate that a precautionary approach has achieved sufficient precision and strength in this framework to set limits for seabed mining on the Norwegian continental shelf.[277] However, much is still uncertain as to how the Norwegian courts will apply the elements of precaution both in general and in the context of seabed mining. Neither the Seabed Mining Act nor its preparatory work give clear guidance on the how a precautionary approach should be weighed against other factors, which adds to this uncertainty. On this basis, it may be concluded that a precautionary approach has been implemented in the legal framework for the Norwegian continental to an extent that ensures the basic protection of the Arctic marine environment.

[277] The question of whether a precautionary approach would achieve sufficient precision and strength under Norwegian law was raised by Bugge in 2012, See, see Hans Christian Bugge, n 111, 117

Lastly, and possibly the most striking issue with regard to implementing a precautionary approach to seabed mining in the Arctic is made visible by LOSC Article 208. Even if coastal States do not regard the ISA regulations as a mandatory minimum for seabed mining activities, State practice in Norway suggest that the ISA regulations are used as a reference point by the costal State when adopting domestic regulations. This suggests that whether or not the ISA regulations are considered a mandatory minimum by the coastal state is not the main concern in a discussion on how to fully implement a precautionary approach for seabed mining in the Arctic. What is more concerning is the lack of an international organisation with the jurisdiction to establish regional rules with regard to seabed mining in the Arctic, in-line with the general object of LOSC Article 208. The question is if the individual Arctic coastal State or the ISA has the oversight and incentive to assess possible serious environmental damage caused by the cumulative effects of seabed mining in the Arctic region. If this task should fall to the Arctic council, it would be unwise to postpone this assignment until it is certain that such regional coordinative efforts are needed.

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