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Deep Seabed Mining in Areas within National jurisdiction:

Analysis of the Norwegian legal framework in the context of the marine environmental law

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Master's thesis in Joint Nordic Master´s Programme in Environmental Law (NOMPEL) JUR-3920, May 2023.

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Preface

The process of writing a thesis is both incredible stimulating and fruitful. As the five month period of work comes to an end, not looking back to the beginning is impossible. The concept of this study holds a very personal motivation, combining both my work experience in the mining sector, and my interest in the dynamic between the global south and global north when it comes to the endowment and supply of natural resources. Therefore, the challenge of condensing several months of investigation and constant reading regarding this topic has confirmed my academic purpose within the environmental field.

I believe the making of a thesis both tests and strengthens the character and mentality of the person who elaborates it. Nevertheless, although quite a lonely endeavor, I have been truly lucky to have had companionship with my master fellow colleagues and my partner, as well as an incredible support from my supervisor, to whom I am deeply grateful for his comments, suggestions and patience in this project.

Finally, I would like to dedicate this master thesis to my family back in Peru, for their unconditional love and constant support across the seas. Be sure this achievement is not only mine but also yours.

Abstract

This study utilizes the legal dogmatic method to analyse the current state of the deep seabed mining regulation within the international landscape and Norwegian national legislation, providing an accessible overview of the Marine Environmental Law framework. This thesis aims to unveil the true dimension of the relationship between International Law and national jurisdiction, choosing the Norwegian framework as an emblematic case of sustainable development, currently undergoing a process to open mining areas in its continental shelf. Given the early stages of deep seabed mining especially in the Arctic region, the relevance of performing an assessment on the available international regulations, not only through legal provisions, but also acknowledging specific narratives – such as the Blue Economy– as well as environmental tools and strategies – such as the Marine Spatial Planning and Integrated Ecosystem-Based Marine Management –, will help determine how an activity within national jurisdiction may be shaped, confronted or stopped.

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Table of acronyms and abbreviations

ABNJ	Area Beyond National Jurisdiction
AMAP	Arctic monitoring and Assessment Program
AWNJ	Area Within National Jurisdiction
BAT	Best Available Techniques
CAFF	Conservation of Arctic Flora and Fauna
CBD	Convention of Biological Diversity
CFC	cobalt-rich ferromanganese crusts
CHM	Common heritage of mankind
CLCS	Commission on the Limits of the Continental Shelf
DISCOL	Disturbance and recolonization experiment
DSM	deep seabed mining
EEA	European Economic Area
EIA	Environmental Impact Assessment
EU	European Union
EEZ	exclusive economic zone
GAIRS	generally accepted international rules and standards
GBF	Kunming-Montreal Global Biodiversity framework
GHG	greenhouse gases
ICJ	International Court of Justice
ICZM	integrated coastal zone management
IRENA	International Renewable Energy Agency
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
ISA	International Seabed Authority
ITLOS	International Tribunal for the Law of the Sea
km	kilometres
MEL	Marine Environmental Law
MIDAS	Managing impacts of deep-sea resource exploitation
MPA	Marine Protected Area
MPE	Ministry of Petroleum and Energy
MSP	Marine Spatial Planning
NCS	Norwegian continental shelf

NEA	Norwegian Environment Agency
NDA	Natural Diversity Act
nm	nautical miles
NPD	Norwegian Petroleum Directorate
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PAME	Protection of the Arctic Marine Environment
PNM	Polymetallic nodule mining
REEs	Rare Earth Elements
RIA	Regulation on Impact Assessments
SDG	Sustainable Development Goals
SBM	Seabed Mineral Act
SDWG	Sustainable Development Program
SMS	Seafloor massive sulphides
SOP	Sustainable Ocean Plans
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environmental Programme

1 Introduction

The notion of a green or clean transition in itself is far from new, but has certainly changed lenses overtime. According to United Nations Environmental Programme ('UNEP') report back in 2011, the "concept carries the promise of a new economic growth […] friendly to the earth's ecosystems [as] it is compatible with the older concept of sustainable development"[1]. More recently, it has evolved including factors like justice, claiming "green or sustainable transitions are just one of the various perspectives that have been embraced in order to analyse processes of […] sociotechnical transitions"[2], and not just an economic perspective. Thus, the phenomena of the green transition can be one of flexible content since it is accompanied by social factors, technology and political agenda. Wind power generation, solar photovoltaic cells, energy storage and electric vehicles batteries are some of the key solutions currently promoted within the array of clean technologies needed for this transition, "heavily [focus] on renewable electrical energy generation"[3]. Nonetheless, the mere concept of transition may only refer to the idea of change, lacking any direction on its nature; this is the main reason why the International Renewable Energy Agency ('IRENA') prefers the concept of green transformation which reflects a deeper sense of urgency[4], which is the approach that will be assumed in this study. This study is set on a specific field: energy transformation and "the idea of the shift from traditional sources of energy – especially fossil fuels – to those which do not involve the emission of carbon dioxide – and other greenhouse gases"[5] without compromising an "inclusive economic growth [while] reorienting their economies towards development"[6].

1.1 Critical minerals an energy transformation

The international arena consolidated the idea of a green transition and the fight against climate change back in 2015 with the so-called Paris Agreement[7], agreement with legally-binding obligations, that demands concrete commitments from all countries to reduce their GHG emissions, shifting towards a net-zero emissions global scenario. In line of this, the implementation of this ground-breaking agreement is considered to be essential for the achievement of the Sustainable Development Goals ('SDG'), particularly SDG 7 which aims to

[1] UN Environmental Program (2011) The Transition to a Green Economy, p. 3.
[2] Cedergren et al. 2022, pp. 7.
[3] Hammond and Brady 2022, p. 626.
[4] Paterson 2022, p. 22.
[5] Ibid, p. 21–22.
[6] Henriques and Böhm 2022, p. 2.
[7] Paris Agreement, (adopted 12 December 2015, entry in force 4 November 2016) UN, Treaty Series, vol. 3156.

"ensure access to affordable, reliable, sustainable and modern energy for all, including renewable and clean energy"[8]. As consequence, the consolidation of a low-carbon economy will translate in a rapid growth in demand of certain minerals, from "rare earth elements ('REEs')[9] and others such as copper, nickel, lithium, cobalt, manganese, graphite, silicon"[10], to increase clean technologies such as turbine magnets and electric engines[11].

The obtention of these raw minerals is a crucial part towards the energy transformation; nevertheless, this critical step in the cleantech supply chain varies with resource endowment[12] suggesting certain geographic locations are more fortunate than others, in terms of mineral potential. Given the importance of these minerals, some now identify them as *critical materials* or *critical minerals*, as they "are at the same time (i) important to society's needs, (ii) subject to a significant supply risk, and (iii) there is a lack of (viable) substitutes" [13]. As the global energy transformation undergoes, "some minerals face higher levels of changes in demand from the shift to a low-carbon future, such as graphite and lithium whose current production would need to ramp up by nearly 500% by 2050"[14], situation that instantly creates pressure within the current mining scenario to provide these raw materials. Mineral demand can be huge, e.g., "making a 55-kWh battery for an electric car typically requires over 200 kg of critical minerals, […] compared with just 35 kg of copper for an internal engine"[15]. The prices of some of these critical minerals can range from USD 34930 per ton (cobalt), USD 24099 per ton (nickel)[16].

In consequence, the geographic identification of these minerals is "considered vital to the world's largest economies, [whose supply risk increases] due to geological resource deficit, geopolitical issues, trade policies or other external factors"[17]. Accordingly, a supplier-costumer dynamic has been established, where ironically the customers are usually developed countries while the suppliers are developing states with land-based mining traditions, such as the

[8] Buhmann 2018, p. 2.
[9] "Rare earth elements [refers to a] group of 15 lanthanide elements […] divided into light and heavy. Although relatively abundant in the Earth's crust, economic REE deposits are rather rare. REEs exhibit unique physical, chemical, and light-emitting properties and are very much needed in developing and implementing clean energy technologies" [Sakellariadou et. al. 2021, p. 331].
[10] International Energy Agency (2023) Energy, Technologies, Perspectives, p. 52.
[11] Ibid.
[12] Ibid, p. 23.
[13] Buhmann 2018, p. 5.
[14] World Bank (2020) Minerals for Climate Action, p. 12.
[15] International Energy Agency (2023) Energy, Technologies, Perspectives, p. 52.
[16] London Metal Exchange. "Metals" <https://www.lme.com/> (last accessed 10 May 2023).
[17] Nate et. al. 2021, p. 2.

Democratic Republic of the Congo, which "produces 60% of the world's cobalt"[18]. The problem arises when analysing the environmental and social impact of these land-based mines as well as the politically unstable condition of said countries. As a consequence, minerals "[found] in an area of armed conflict and [war conflicts], [including REEs] and cobalt"[19] are now acknowledged as *conflict minerals*.

In view of the above, alternative schemes and legal ways to obtain those minerals have been reassessed, such as deep seabed mining ('DSM') activities. Once dormant due to the lack of technology, now "perceived or predicted need to meet increased demand for minerals, including in support of a green transition, and the financial rewards that could flow from exploitation of metal-rich deposits"[20]. Certainly, "seabed mining was first mooted in the 1960s, when John L. Mero implied […] that manganese nodules grow so fast that the supply would be inexhaustible"[21]; since then, not only technology has come forward but also environmental warning signs regarding the vulnerability of ocean ecosystems. As already exposed to several stressors such as climate change, ocean acidification, and pollution[22], ocean ecosystems and the biodiversity may not be compatible with potential impactful activities such as DSM.

1.2 Definition and main types of deep seabed mining resources

In terms of the physical aspect of its scope, the concept of seabed is identified as the top-surface of the water-covered earth, also referred as seafloor or ocean floor, which holds a particular topography modified by oceanic currents and processes, with a critical use in favour of humankind[23], "covering around 360 million km2 of the Earth's surface and represents 95% of the global biosphere in terms of inhabitable volume"[24]. The richness of this particular area relies on the biological and geological resources it holds such as oil and gas to the now controversial deep-sea minerals. Within the deep seabed there are two types of deposits of interest: "ferro-manganese minerals and seafloor massive sulphides; where the former is created by oxyhydroxide minerals of iron and manganese carrying minor quantities of nickel, copper, cobalt and REEs"[25]. Defined as the extractive activity of minerals from the seabed or

[18] Massachusetts Institute of Technology. "Understanding the impacts of deep seabed mining" (5 December 2019) <https://news.mit.edu/2019/understanding-impact-deep-sea-mining-1206> (last accessed 10 May 2023).
[19] Buhmann 2018, p. 4.
[20] Miller et. al. 2021, p. 1.
[21] Thompson et al. 2018, p. 1.
[22] Ibid, p. 3.
[23] Braathen and Brekke 2020, p. 21.
[24] Miller et al. 2018, p. 2.
[25] Braathen and Brekke 2020, p. 34.

seafloor at depths exceeding 200m[26], DSM intents to introduce itself as a critical piece within the supply chain that aims to alleviate the global demand of critical minerals for the green transition. It must be noted that DSM activities are not equivalent to shallow water mining, such as the recent application of a Swedish seabed mining company for a research permit to explore the seabed in the Bothnian Sea, aiming to test-mine at depths of 60–150 m.[27]

As the "the utilization of hydrodynamic or mechanical methods to transport minerals from the seabed to the ocean surface and then transport [them] to the land-based processing plants by ships"[28], DSM has been directly linked with three main seabed mineral resources: "cobalt-rich crusts, manganese nodules and seafloor massive sulphides, additionally including phosphorites, iron sands and diamonds within continental shelf areas"[29]. Firstly, seafloor massive sulphides ('SMS') are form from the "precipitation of metals from the fluids at hydrothermal vents, typically at depths between 1000 and 3000m. [holding minerals such as] copper, gold, silver, zinc and lead"[30]. Moreover, is suggested that the biomass presented in these areas have a high level of endemism complemented by very complex biologic systems with highly adapted biodiversity[31], which are able to sustain despite the inhospitable environment that is the hydrothermal sulphides and vent fluids as well as adapt to high concentrations of metals[32]. Due to the critical minerals found within the SMS, the commercial interest to exploit them through the application of DSM has risen.

The next type of DSM mining focuses on "cobalt-rich ferromanganese crusts ('CFC') formed by precipitation from the seawater over millions of years over all rocky surfaces free of sediment in the deep oceans [specifically] at depths of 800–2500m"[33]. Cobalt is not the only mineral found within these areas, but also nickel and platinum which coexist with "geomorphological structures [that] provide substrate for a variety of sessile filter feeders, such as corals and sponges"[34]. The lack of scientific evidence regarding its biodiversity[35] within these areas has contributed to the pursuance of DSM mining within the SMS as well as Nodule-sites. Indeed, "different communities are associated with different depths along the seamount

[26] Kleiv and Thornhill 2022, p. 1.
[27] Kaikkonen and Virtanen 2022, p. 931.
[28] Ma et al. 2022, pp. 1.
[29] Thompson et al. 2018, p. 2.
[30] Ramirez-Llodra 2020, p. 56.
[31] Ibid.
[32] Sharma 2022, p. 35.
[33] Ramirez-Llodra 2020, p. 56.
[34] Ibid.
[35] Levin et al. 2020, p. 3.

flanks and the debris or plumes generated by mining could impact these, […] depending on the mining process and equipment used"[36]. Lastly, polymetallic nodule mining ('PNM') has been the most researched and explored alternative from the three types of DSM, as the *"*mineral that looked most promising [back] in 1873 by the crew of the research vessel hms Challenger*"*[37]. These polymetallic nodules "are rich in manganese, copper, cobalt and nickel"[38], which as mentioned in the previous chapter hold the key within the green energy transition. Usually found in abyssal plains, such as the Pacific Ocean[39], nodule retrieving is framed within a very specific process; nevertheless, the effects of nodule mining seemed to have exposed a complex ecosystem recovery which would advert of the potential DSM deeply impactful consequence but without a scientific support. The Clarion-Clipperton Zone[40] is a clear example, where even after "four decades of research [information of] biodiversity […] remains […] undiscovered".[41]

1.3 Historical background and the origin of deep seabed mining

In order to comprehend the accelerate progress of DSM throughout history, is crucial to recognize three factors: 1) the human desire to uncover and exploit resources, 2) the controversy of jurisdiction within maritime waters and, 3) the fixed belief in the future of technology. Resource exploitation has been a controversial but undeniable dynamic that humankind has developed towards the environment, reflected still when analysing the current pillar of ocean framework: the United Nations Convention on the Law of the Sea ('UNCLOS'). During its long negotiation process, Arvin Pardo reflected on this particular relationship: "humanity's interest in the hunt for 'sunken treasures' and 'archaeological treasures' [where the] penetration of the seafloor through 'sub-bottom mining' are examples of resources that humans had tried to exploit"[42]. In consequence, the discourse regarding minerals and its further development has not been far from the traditional perception of the use of natural resources, shaped and constricted by the notion of jurisdiction.

The spark of several claims regarding jurisdiction over national waters triggered the negotiation of UNCLOS, exposing the deep motivation for exclusiveness over maritime resources. This circumstance not only revealed the need for geographical limitations between

[36] Sharma 2022, p. 36.
[37] Meyer 2019, p. 128.
[38] Ramirez-Llodra 2020, p. 55.
[39] Ibid.
[40] International Seabed Authority "Clarion Clipperton Zone" (without date) <https://www.isa.org.jm/exploration-contracts/exploration-areas/> (last accessed 27 May 2023).
[41] Levin et al. 2020, p. 3.
[42] Meyer 2022, p. 67.

the members of UNCLOS, but also defined the concept of sovereign rights within the so-called Exclusive Economic Zone ('EEZ'), several continental shelf provisions and the first glimpse of DSM in areas beyond national jurisdiction ('ABNJ'). After a decade-long negotiation, UNCLOS concluded in 1982, containing, for the first time, provisions regarding mining and dredging of the deep seabed, subsequently amended by the 1994 Implementation Agreement of Part XI of UNCLOS ('Implementation Agreement')[43]. Regulating a so-far inexistent activity at the time can be considered a bold although reckless attempt from UNCLOS to predict the many ways DSM could unfold in the future; nevertheless, the expectation and belief in technology powered a great part of law provisions that showed the role of law as a rather vague and general approach. It was truly considered a remote alternative, since the "world situation [did] not require marine mining, because the materials [were] cheaper on land and [both] the 200mm zone and the continental shelf of the […] states [would] be sufficient"[44]; consequently, showing the early acceptance of DSM activities in areas within national jurisdiction ('AWNJ').

Indeed, the technological advance as a main driver, pushed the frontiers of both science and law. Since "the mid-twentieth century was a breeding ground for ideas around different forms of governance"[45], technology was one of the clearest manifestations of the progress and opportunities of DSM as a key activity within society. This idea was firstly invoked by Mann Borgese, who back in 1991 identified the role of technology in society and its power to redefine the economic order, clearing adverting this dynamic goes both ways[46]. This belief is not recent, since from "the 1960s [it was] characterised by a strong, sometimes overestimated belief in technological progress, and this was especially true of DSM technology"[47]. "Technological progress heralded the feasibility of offshore mining […]; [nevertheless] it is difficult to pinpoint [its main cause: from] scientific knowledge, the need for solutions [within] political circumstances"[48] to private motivations, that have been fuelling the DSM debate permanently.

1.4 Deep seabed mining in the Arctic: within or outside national jurisdiction?

In the midst of this controversy, the Arctic region appears as the new major source of land-based raw materials, teasing the idea of new economic opportunities with DSM, both

[43] Schwabach 2022, p. 40.
[44] Meyer 2022, p. 219.
[45] Ibid, p. 247.
[46] Ibid, p. 233.
[47] Ibid, p. 247.
[48] Ibid, p. 50.

within ABNJ as well as in AWNJ. This particular motivation arises as a result of China's current control over the "global market as a leading producer and user of critical […] minerals and metals, including the REE, [and as the] European Union and United States supplier"[49]. There have been several exploring projects regarding DSM in different parts of the world[50]. Accordingly, and "with [several] political commitments to green transitions around the globe […], Arctic supplies of minerals for the technical products required for a non-carbon economy are potentially attractive to the global market"[51]. Nevertheless, the "international power struggle to claim the Arctic [and its marine resources and minerals] between Canada, the U.S., Russia, Denmark, Norway, and China"[52], may be evidence of how the role of international, regional and national legal frameworks may be decisive of the future path towards DSM activities. As "the Arctic […] is one of the peripheries yet to be integrated into the global system of (ecological) exchange"[53], the uncertainties about DSM continues under debate.

1.5 Research questions for the present study

The connection established between the green energy transformation and the need for raw minerals allows a better understanding as to why DSM has resurfaced, mainly as an alternative to avoid land-based mining impact and mineral dependency. Although many concrete and real threats to marine biodiversity have been adverted, DSM exploration activities have been held both in AWNJ and in ABNJ. This study aims to expand into the DSM current legal scenario, both within the international sphere and a particular national sphere, with the purpose of ascertain their legal considerations and structures while also determine their legal relationship.

As DSM activities are mainly developed within the marine environment, subtracting the transportation and processing procedures as complementary activities, oceans are at the centre of this study. Regardless of the legal boundaries that establish both national jurisdiction and jurisdiction in ABNJ (also referred to as 'the Area'), the development of DSM exploitation activities, could jointly affect both legal zones regardless of their location, in addition to having several similarities in terms of their economic, social and environmental impact. This affirmation leads us to the first research issue: the development of any type of DSM activity seems to suggest a tight relationship between international and national law, mainly due to the

[49] Sakellariadou et al. 2021, p. 332.
[50] "Proposals for DSM, [...] within the EEZ of coastal States have been concentrated on six nations or areas [...] including Vanuatu and Cook Islands" [Roux and Horsfield 2020, p. 292].
[51] Buhmann 2018, p. 12.
[52] Henriques and Böhm 2022, p. 11.
[53] Ibid.

high connectivity as part of the ocean's nature. In consequence: How does the nature and complexity of the applicable international legal framework – including governance structure - condition the possibility of exploring deep seabed mining exploitation and commercial activities in AWNJ in the Arctic, particularly in Norway?

In this line, the Norwegian legal scenario will help to identify how this procedure is effectively influenced by the international legal framework, in order to assess the international legal parameters such as the precautionary approach as well as the duty to protect the environment within domestic legislation. This study aims to answer the following questions:

- Why should the international law be considered within the development of domestic regulations in the context of DSM? and, How does the Norwegian framework approach the international landscape of regulations?
- How does the Norwegian legal framework duly include the relevant international and regional provisions regarding DSM? and, What is the effective degree of alignment with its principles and main pillars?
- What is the role of regional governance structures with respect of the Norwegian legal framework? and, Are there specific conditions regarding the European Economic Area ('EEA') agreement[54] that could bear any impact regarding DSM activities in Norway?
- Are there specific non-legal narratives within the DSM debate? and more so, How does the legal framework in both international and national legislation tend to said narratives?

1.6 Methodology, sources of law, and delimitations

This thesis will apply the legal dogmatic method[55], as well as a parallel comparison of two legal spheres: international and domestic regulation regarding DSM, employing the Norwegian legal framework as main example and key player with a crucial role in this research. Regarding the international sphere, it will be imperative to address three main legal instruments: the UN Convention of the Law of the Sea ('UNCLOS')[56], the Convention of Biological Diversity (CBD)[57], as well as the main principles built as consequence of both the Stockholm

[54] Decision 94/1/EC, ECSC of the Council and the Commission on the conclusion of the Agreement on the European Economic Area [1993] OJ L 1, 3.1.1994, p. 1–3. (henceforth refer to as EEA agreement).
[55] Smits 2017, p. 8.
[56] United Nations Convention on the Law of the Sea, (adopted in 10 December 1982, entry in force 16 November 1994) (1833) 21 I.L.M. 1261 (henceforth refer to as UNCLOS).
[57] Convention on Biological Diversity (adopted in 5 June 1992, entry in force 29 December 1993,) 31 I.L.M. 818 (henceforth refer to as Convention of Biological Diversity).

Declaration[58] and the Rio Declaration[59]. These regulations have been chosen as a directly relevant for the DSM analysis, where both the Law of the Sea and Environmental Law blend into the so-called Marine Environmental Law ('MEL') field. Moreover, regional structures and agreements, such as the Convention for the Protection of the Marine Environment of the North-East Atlantic ('OSPAR')[60], will be address due to its relevant jurisdiction for this study.

Regarding the national legislation, the Norwegian case will be introduced, analysing the alignment of its recently published deep seabed regulation under the Seabed Mineral Act[61] as well as its current Regulations on Impact Assessment ('RIA')[62], the Natural Diversity Act ('NDA')[63] as well as the Pollution Act[64], as main legislations with specific remarks and legal impacts towards DSM. It is important to underline that the following issues are not analysed:

- The geopolitical competition over raw minerals globally and specific technical issues and concepts of DSM beyond the necessary terms for this study.
- The specific social and economic impacts of DSM, or socio-political concepts.
- The European Union ('EU') specific regulation on minerals and green transition nor its specific projects regarding DSM (e.g., DISCOL[65], MIDAS[66], or EURARE[67]).

This study intents to reflect the connection and impact between DSM in AWNJ and the legal treatment of ABNJ, where DSM "in the high seas provides a good indication of the nature, status quo and future of seabed mining in national jurisdictions and vice versa"[68]. Nevertheless, the main limitation of the methodology lies within two factors. One, the profound vast and complexity of DSM and its technical concepts regarding the different technologies to the specific minerals to the different stages of DSM and complementary activities. The chosen methodology in this study does not leave space for technical concepts to be utilised more than

[58] UNGA Res. 2994/XXVII, 2995/XXII and 2996/XXII, 15 December 1972. Stockholm Declaration: Declaration on the Human Environment (henceforth refer to as Stockholm Declaration).
[59] UNGA. Res A/CONF.151/26 (Vol. I), 12 August 1992. Rio Declaration on Environment and Development (henceforth refer to as Rio Declaration).
[60] Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted in 22 September 1992, entry in force 25 March 1998) (1993) 32 ILM 1069 (henceforth refer to as OSPAR).
[61] Act on the Mineral Activities on the Continental Shelf ACT-2019-03-22-7 (entry in force in 1 July 2019) (henceforth refer to as Seabed Mineral Act).
[62] Regulations on Impact Assessments. FOR-2017-06-21-854 (entry in force in 07 January 2017). (henceforth refer to as Regulations on Impact Assessment).
[63] Act on the Management of Nature's Diversity ACT-2009-06-19-100 (entry in force in 1 January 2016) (henceforth refer to as Natural Diversity Act).
[64] Act on Protection against Pollution and on Waste LAW-1981-03-13-6 (entry in force in 1 October 1983) (henceforth refer to as Pollution Act).
[65] Miller et al. 2018, p. 12.
[66] Ibid.
[67] Goodenough et al. 2015, p. 839.
[68] Roux and Horsfield 2020, p. 287.

in a descriptive and reference nature. And two, the phenomena of green transformation entail different components that have not been address fully within this study. The absence of components such as the global energy demand and the circular economy path do not offer a full spectrum of the international and national legal relationship.

1.7 Structure of the study

This study is divided in three main core parts. Firstly, I will delve into the normative description and partial analysis of the relevant international legal framework of DSM, considering the Arctic, and more specifically the North-East Atlantic zone, as the focus geographical area. Within said section, the difference between activities in ABNJ and the AWNJ will be addressed, duly elaborating on the correspondent provisions within UNCLOS with specific focus on Part XII on the protection and preservation of the marine environment. The third chapter will then complement the initial Law of the Sea perspective regarding DSM with the aid of the CBD legal framework and particular environmental tools and approaches, such as the precautionary and ecosystem approach. This first section will culminate with the analysis of regional agreements and institutions, such as OSPAR and the EU, utilising several official documents and policies.

The second part will focus on the description and legal examination of the Norwegian framework, highlighting the historical approach towards the exploitation of resources, and the intention to marry this approach with the concept of sustainable development. The fourth chapter is then entirely dedicated to the legal evaluation of both the seabed mining sector regulation, as well as three environmental regulations to be considered and assessed in order to pursue DSM activities within the Norwegian continental shelf.

Finally, the last chapter will intent to assess the dynamic and legal impact between both spheres, focusing on the considered implementation rules, acknowledging the specific structures in international law that might directly shape the Norwegian framework, including some non-legal concepts that would help understand the totality of the DSM discussion within the environmental law field.

2 Deep seabed mining and the Law of the Sea

2.1 Setting the scene

The initial claims regarding sovereignty and jurisdiction over certain types of maritime zones and areas, especially regarding the extension of the continental shelf in the case of some States, coincides with the irrefutable possibility of "exploration for deep sea minerals taking pace both in the continental shelf areas of coastal states and in the international seabed"[69]. To further analyse and respond to the research question within this study, is important that the difference between both geographical spaces – ABNJ and AWNJ – and their main components is evaluated, in order to assess their level of connection regarding the development of DSM.

2.2 National jurisdiction and deep seabed mining through the UN Convention of the Law of the Sea

The UNCLOS agreement focuses on the delimitation and general regulation of maritime zones, which contain provisions applicable to two zones relevant for DSM activities in AWNJ. Therefore, Part II (Territorial Sea and Contiguous Zone), Part V (EEZ), and Part VI (Continental Shelf) of UNCLOS are relevant. Firstly, understanding marine spaces under AWNJ as those who include "internal waters, territorial seas, international straits, archipelagic waters, the contiguous zone, the EEZ and, lastly, the continental shelf"[70]. The main difference between the aforementioned zones lies within the application of the principle of sovereignty. When addressing sovereignty, three characteristics are emphasized: "(i) comprehensive jurisdiction (both legislative and enforcement), (ii) over all matters within its territory (no limit *rationae materiae*), and (iii) over all people (no limit *rationae personae*)[71]. Sovereignty relies on its selectiveness, and its condition as a "spatial jurisdiction"[72], as it is shown specifically when exercised within the following marine zones: internal waters, territorial sea, international straits and archipelagic waters. Arguably, the contiguous zone, deserves a specific mention excluding the component of sovereignty where States can only to take enforcement measures for customs, fiscal, immigration and sanitary law[73]. For the purposes of the present study, I will focus on both the continental shelf as well as the EEZ, since those areas hold mineral potential and are object of the state's sovereign rights.

[69] Braathen and Brekke 2020, p. 33.
[70] Tanaka 2019, p. 7.
[71] Ibid p. 9.
[72] Ibid.
[73] UNCLOS, art. 33.

Sovereign rights are highlighted by specific features: exercised within limited space, coastal state may exercise legislative and enforcement jurisdiction exclusively, and the need of the coastal state's consent to undertake any exploration or exploitation of resources within those zones[74]. As considered within the international framework, UNCLOS duly "confers 'sovereign rights' [in favour of the coastal state] over almost all seabed activities taking place in waters up to 200nm from their coast, as well as on the seabed up to the edge of the continental margin"[75], which coincides with both the extension of the EEZ and continental shelf, two concepts with a specific regime under UNCLOS. The EEZ is commonly defined as the "area […] adjacent to the territorial sea, subject to the specific legal regime […] under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed"[76]. This definition underlines the delicate balance and dynamic between the specific coastal state and third states, compatible with the idea of sovereign rights instead of a strict sovereignty in favour of the coastal state. On one hand, UNCLOS grants the coastal state an undeniable advantage over the exploitation, conservation and managing of natural resources "of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone"[77], which informs about the "resources-oriented functional competence in the EEZ"[78].

Regarding the regime of the continental shelf, Part VI of UNCLOS suggests it is focused on the rights of the coastal state over the seabed and subsoil of the EEZ, the main object within this particular study. Indeed, the EEZ and continental shelf concurred geographically and, consequently, must be understand in conjunction, although having separate regimes within UNCLOS framework. The mixed regime over this geographical zone is reflected through specific legal considerations, such as: a) the regulation of sedentary species under the continental shelf regime despite their location within the EEZ, and b) the applicability of the continental shelf regime with regards to the laying of submarine cables and pipelines on the seabed and subsoil of the EEZ[79]. Indeed, the continental shelf regime is very particular and broad; nevertheless, two main provisions need to be highlighted: Article 77 of UNCLOS which refers to the rights over the continental shelf, as well as Article 76 of UNCLOS which elaborates on the delimitation of the limits of this zone, as an obligation of the coastal state. It must be

[74] Tanaka 2019, p. 10.
[75] Harrison 2020, p. 482.
[76] UNCLOS, art. 55.
[77] Ibid, art. 56.
[78] Nelson 2010, (E. Exclusive Economic Zone).
[79] Ibid, (F. Continental Shelf).

noted that, with regards of this particular delineation, coastal states may submit "continental shelf extension claims […] that are to be resolved by the Commission on the Limits of the Continental Shelf ('CLCS'), established by UNCLOS"[80], which would allow an […] extension of this […] maritime zone up to 350nm"[81], alongside "recommendations to each coastal state separately on the location of outer limits of the [it] without regard to the outer limits of the continental shelf of neighbouring states"[82]. Notably, there is a difference between continental shelf and continental margin, even when "both terms are defined in Article 76 [of UNCLOS] by incorporating both legal and scientific aspects"[83]. Continental margins are "characterised by high habitat heterogeneity, including sedimentary slopes, [which] support [ecosystem] functions"[84]; while, the continental shelf it is a natural prolongation of the coastal state territory that has a legal connotation which "may encompass the whole continental margin"[85]. Certainly, both concepts may overlap within DSM discussions; however, this distinction will not be relevant for the purposes of this study.

As the principal legal framework regarding the ocean space, the applicability of UNCLOS to the Arctic region is irrefutable, mainly due to: a) the unsolved disputes regarding the several continental shelf extensions claims of the coastal Arctic States, b) the principles, duties and rights that UNCLOS demands from its members, as well as c) the impact of the Area, which will be address briefly within Section 2.2.3. With regard to the first point, the Arctic region is composed by five coastal states under a system sectoral division where each one of them hold the right to "delimit themselves all seabed areas of the semi-enclosed Arctic Ocean as their continental shelf [where the possibility of] no seabed areas will be formed that fall into the category of the common heritage subject to Part XI of UNCLOS [could be faced]"[86]. The special challenge within this region still perdures partially, since "three of the five coastal states — Russia, Norway, and Denmark — have already submitted their applications to the LTC regarding their extended continental shelf in the Arctic"[87], with Canada submitting and addendum to its initial claim last December 2022[88], which "suggests that coastal states have

[80] Roux and Horsfield 2020, p. 288.
[81] Wiltshire 2019, p. 633.
[82] Brekke 2020, p. 89.
[83] Ibid p. 86.
[84] Ramirez-Llodra 2020, p. 41.
[85] Brekke 2020, p. 86.
[86] Todorov 2019, p. 79.
[87] Ibid.
[88] UN Oceans. "Submissions to the Commission" (last updated 17 April 2023) <https://www.un.org/Depts/los/clcs_new/submissions_files/submission_can1_84_2019.html> (last accessed 27 May 2023)

taken the path of recognizing the applicability of the provisions of the UNCLOS to the Arctic"[89]. Additionally, in 2021, Norway concluded agreements with Denmark and Iceland, concerning their continental shelf in the area between the Faroe Islands in Denmark, Iceland[90], proving how bilateral agreements constitute an important legal path to solve these claims. Despite the aforementioned, the initial determination of the 200nm in favour of the coastal state constitutes the basis towards resources exploitation and sovereign rights[91].

2.2.1 The right to exploit natural resources within national jurisdiction

As consequence of the sovereignty principle, according to Article 193 of UNCLOS any coastal state has exclusive rights to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment. This right includes the scope under Article 77 of UNCLOS, which indicates the faculty of the coastal state to exploit resources of the continental shelf, "specified as the resources of the seabed and the subsoil [including] the geological resources as […] seabed minerals, as well as biological resources [both] species living on or within the seabed"[92]. Moreover, throughout Articles 76 to 85 of UNCLOS, the rights within the continental shelf are specifically outlined, limiting its competence to the specific resources aforementioned[93], including DSM. Nevertheless, although this right is fully recognized and supported by the UNCLOS, it is legally constraint by two factors: (i) concrete environmental policies and, (ii) the correspondent duty to protect and preserve the marine environment. While the former recognizes the discretion of the States to develop its own legal framework to ensure the continuum of an equilibrium of the exploitation of resources and the duty to protect the environment; the latter, however, relies on a broad obligation intended to be abstract and vague, to fill it with significance according to future circumstances and challenges.

To counterweight the right to exploit, Article 192 of UNCLOS "creates a general obligation for states and the International Seabed Authority ('ISA') to protect the entire marine environment, both within and outside areas of national jurisdiction"[94]. This is considered a general obligation to protect the environment and includes the duty to "prevent, reduce and control pollution of the marine environment arising from or in connection with seabed activities

[89] Todorov 2019, p. 79.
[90] Das Neves 2021, p. 360.
[91] UNCLOS, arts. 57, 76.
[92] Brekke 2020, p. 102.
[93] Roux and Horsfield 2020, p. 289.
[94] Levin et al. 2020, p. 4.

subject to their jurisdiction"[95]. In order to fully understand the possibility of alignment between DSM in AWNJ and the current framework of UNCLOS, the identification and analysis of the correspondent articles that compose the duty to protect the environment must be adverted, to help understand "how to operationalise [this duty], particularly in light of the multiplicity […] ocean uses"[96], focusing on three major aspects.

2.2.2 Delineating the concept of pollution and serious harm

The principle of protection of the environment as described within UNCLOS demands an active conduct for the States compose by two obligations: avoidance of pollution and the conservation of resources. The concept of pollution is defined in Article 1 as the anthropogenic introduction of substances or energy to the marine ecosystem which carry negative effects for marine life. This concept is reflected throughout the entirety of the UNCLOS framework as: specific considerations – such as the level of serious harm or impact –, scale of impacts – mainly within domestic or transboundary scenarios –, and specific measures – such the incorporation of best practicable means and conservation of resources –, that are particularly synthesize in Article 194 under Part XII of UNCLOS. Therefore, the discussion involves a "duty on all states to take measures, both unilaterally and collectively, to conserve marine resources [anticipating] an ecosystem approach to [their] protection […] from all sources of pollution"[97]. Regarding an specific provision related to pollution from seabed activities subject to national jurisdiction, Article 208 of UNCLOS duly demands three legally-binding obligations of coastal states: a) the adoption of national regulations to prevent, reduce and control pollution, b) the incorporation of other necessary measures to guarantee the control of pollution, and c) the assurance that such regulations will be no less effective than any other existing generally accepted international rules and standards ('GAIRS'), to the maximum of their abilities.

The challenge imposed by Article 208 to consider DSM possible lies within the main concern of a legal scenario regarding pollution: the concept of serious harm. The ISA affirms that serious harm constitutes "any effect […] which represents a significant adverse change in the marine environment" [98], and accordingly, "science-based risk criteria will be required to formally evaluate serious harm, without which the results of risk assessment become open to interpretation"[99]. Moreover, serious harm has also been related to the concept of ecological

[95] Arnesen et al. 2020, p. 324.
[96] Rayfuse 2020, p. 531.
[97] Ibid.
[98] Hyman et al. 2022, p. 7.
[99] Ibid.

threshold which refers to a "point at which changes in an important ecosystem property […] have exceeded normal ranges of variability [being maybe] "tipping points" [where any] further change will [result] in a regime shift[100]. Several questions then arise when evaluating harm within a DSM scenario including the particular extent of harm to be considered tolerable, the parameters to measure it in order to inform the decision-makers about its impacts, and what are the special features of the deep seabed ecosystem that could be affected if companies proceed with a DSM approval scenario[101]. Recently, it has been concluded that "a [strong] key barrier is that DSM projects lack criteria for evaluating serious harm"[102], reflecting on the absence of scientific guidelines to execute a comprehensive analysis regarding DSM impact.

Several attempts of constructing an objective set of criteria to determine serious harm have been developed, such as the concept of ecosystem services to evaluate the degree of harm[103], as well as the "identification of ecological thresholds requires, at the very least, knowledge of long-term (years to decades) average baseline conditions and natural ecological variability"[104], both of these directly aligning to the framework of UNCLOS and the duty to protect the environment. Nevertheless, unless DSM stakeholders "have clear and comprehensive parameters for what constitutes both effective protection as well as serious harm there will be a risk that seabed mining could cause unacceptable impacts"[105]; hence the necessity of discussing the role of EIA under the precautionary approach within UNCLOS.

2.2.3 The impact assessment as an application of the precautionary approach

Recalling the specific obligations of Article 194 of UNCLOS, subsection 2 of said article clearly "provides for due diligence in the respect of marine environment protection"[106], including measures 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"[107], which is a mandate reflected in Article 194(5). Here another concept that should inform the correspondent regulation of the protection of the marine environment must be highlighted: the best available technology ('BAT') knowledge. Indeed, implementing a legal framework such as UNCLOS is in no way just a mere legal exercise but a sum of several technical expertise's in the field which,

[100] Levin et al. 2016, p. 248.
[101] Ibid, p. 246.
[102] Hyman et al. 2022, p. 7.
[103] Ibid.
[104] Levin et al. 2016, p. 248.
[105] Ibid, p. 246-248.
[106] Banet 2020, p. 6.
[107] Roux and Horsfield 2020, p. 289.

in the particular case of this study, will need to incorporate every DSM feature in order to establish the appropriate criteria for its further development. Therefore, the BAT knowledge can contribute to unveil the many environmental impacts related to DSM such as the "suspended sediment plumes; released toxins; and contamination associated with noise, light or chemical leakage"[108]. While there are currently many research and studies undergoing the technicalities of DSM, there are still "major knowledge gaps and uncertainties and these impel invocation of the precautionary approach"[109]; however, UNCLOS does not directly refers to it.

Despite the aforementioned, the precautionary approach is currently taken into consideration when interpreting UNCLOS provisions in different forms: from requirements to act carefully within any decision-making process to the burden of proof upon anyone who wishes to carry out a particular activity to prove it will not cause environmental harm[110]. The precautionary approach is adverted to hold an important role within the elaboration of impact assessments. Moreover, this interpretation appears to be congruent with the idea that the precautionary approach "does not prevent activities with unknown effects from proceeding; it merely requires that they [proceed] with caution, with awareness of unknown potential impacts"[111]; therefore, betting for a special tool capable of regulation: the Environmental Impact Assessments ('EIA'). According to Article 206 of UNCLOS, the assessment of potential effects of activities activates when a State has reasonable grounds for pollution scenarios; however, "UNCLOS does not provide any explicit requirements to further elaborate on [the conduction or content of] such assessments [pointing] at the discretion of each State, according to its own capabilities and requirements under domestic legislation"[112]. Moreover, regarding the specific scenario of DSM, the idea of discussing cumulative impacts instead of isolated environmental impacts within a specific ocean space has deeply echoed, where three factors should be considered: "1) sources of impact (either different types of mining operation, or different sectors such as fishing); 2) interactive processes (repetition leading to accumulation of impacts); 3) Different types of cumulative effects"[113]. Although a promising perspective, not every impact assessment has been standardized according to it.

[108] Levin et al. 2016, p. 256.
[109] Ibid.
[110] Rayfuse 2020, p. 532.
[111] Ibid, p. 533.
[112] Guilhon et al. 2022, p. 3.
[113] Clark et al. 2020, p. 5.

It must be noted that, the three components here briefly highlighted were crystallized within the *2011 ITLOS Advisory Opinion*[114], delving into the obligation of the protection of the environment with regard to DSM activities by contractors sponsored by such States, including private and commercial entities. This landmark decision "sets the highest standards of due diligence and goes ahead to endorse a legal obligation to apply the precautionary approach, best environmental practices, and EIA"[115], which even when aim to the Area's space, undoubtedly have impacts to DSM within national jurisdiction.

2.3 Beyond national jurisdiction: The Area

In the ABNJ, DSM is governed under UNCLOS, specifically Part XI and related Mining Codes[116]. UNCLOS identifies two zones: the high seas which covers the water column beyond the EEZ and, the Area that refers to the seabed within the high seas and represents around 50% of the seabed globally[117]. The importance of the Area is highlighted by the large amount of coverage it holds as well as the wealth of resources, including critical minerals. Notably, the delineation of the Area has been addresses as a "definition by negative"[118], since it is delimitated after the state's national jurisdiction, where sovereign rights are recognized. It should be noted that, the pursuance of sovereign rights and jurisdiction over the years has had a continuous impact in the current image of the geographical scope of the Area, as new discoveries of resources are found near the originally define state's maritime zones.

2.3.1 The role of the International Seabed Authority and main regulations

Since the focus of this study aims to unveil the complexity of the international framework regarding DSM, it becomes essential to address the two main pillars when discussing DSM in the Area: the nature and duties of the regulatory authority, as well as the status and conditions of the resources there located. Regarding the first point, UNCLOS creates the ISA as a specific autonomous international organization, to organize, structure and supervise any human activities set to develop within the Area[119]. Therefore, UNCLOS incorporates several vital elements to regulate: Benefit of Mankind, Protection of the Marine Environment, Accommodation of activities in the Area and, Participation of developing States in the Area[120].

[114] C 17 *ITLOS Advisory Opinion* (2011) *on the Responsibilities and obligations of States sponsoring persons and entities with respect to activities in the Area*, para 85–86, para 125–130, para 111–115.
[115] Egede 2020, p. 209.
[116] Roux and Horsfield 2020, p. 288.
[117] Levin et al. 2020, p. 3.
[118] Banet 2020, p. 5.
[119] UNCLOS, arts. 156, 157.
[120] Ibid, arts. 140, 145, 147, 148.

Said provisions need to be further developed by the ISA within a "comprehensive Mining Code, intended to augment the regime and govern the entire lifecycle of DSM operations"[121]. The ISA is then tasked with the regulation of the Area, mainly in the form of contracts or licenses[122]. The obligation to regulate the exploitation of mineral resources, lies within the Mining Code, still under construction, consisting of a set of rules and procedures that would aim to cover the different stages – prospecting, exploration and exploitation of minerals – of the DSM activity[123]. It should be added that if the DSM exploration activity is not carried out by the ISA's organ, the Enterprise[124], is the concept of sponsorship that refers to the basic conditions of prospecting, exploration and exploitation of resources in the Area that states "applicants, other than the Enterprise, shall be qualified if they have the nationality or control and sponsorship required by Article 153"[125]. As consequence, the ISA has already entered into 31 contracts for exploration so far: "seven contracts for exploration for polymetallic sulphides […]; and five contracts for exploration for cobalt-rich crusts"[126], although none are located in the Arctic.

Although the regulation of the Area may appear to have only commercial incentives, UNCLOS reveals a crucial obligation: provide "necessary measures […] with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects [adopting] appropriate rules, regulations and procedures"[127]. Since according to Article 156 of UNCLOS all members of UNCLOS are also members of the ISA, this obligation to protect the environment may result conflicting for the ISA to pursue, as "there is the stance that DSM should be facilitated and incentivized [hence] no requests for exploration contracts have been denied"[128]. The delicate balance between both objectives is now impacted by a claim invoked by the Republic of Nauru, "known as the 'two-year rule'[129] which essentially compels the ISA to complete the elaboration and adoption of the exploitation regulations within a prescribed time of two years starting from 9 July 2021"[130], which rushes ISA to avoid DSM exploitation approval without regulatory parameters.

[121] Dingwall 2020, p. 140.
[122] UNCLOS, art. 153.
[123] Blanchard et al. 2023, p. 2.
[124] UNCLOS, art. 170.
[125] Ibid, art. 4 (annex III).
[126] International Seabed Authority "Exploration Contracts" (without date) <https://www.isa.org.jm/exploration-contracts/> (last accessed 8 February 2023).
[127] UNCLOS, art. 145.
[128] Levin et al. 2020, p. 8.
[129] Implementation Agreement of UNCLOS, art. 1(15)(c).
[130] Pradeep 2021, p. 1.

2.3.2 Common heritage of mankind: ensuring the benefit for all

According to Article 136 of UNCLOS, the Area and its resources constitutes the common heritage of humankind ('CHM'). Moreover, Article 133 of UNCLOS defines resources as "all solid, liquid or gaseous mineral resources in situ […] at or beneath the seabed, including polymetallic nodules" and minerals as "resources when recovered from the Area"; therefore, considering both the Area and its resources as CHM. Certainly, "the general aim of incorporating the CHM principle into UNCLOS was to declare the Area to be outside the realm of state sovereignty [infusing it] with inter-generational and intra-generational equity" [131], which would, required specific arrangements in order to implement a clear benefit-sharing mechanism, between all States.

Historically, the application of CHM was not an obvious approach, due to the "tensions between coastal state's sovereign rights and maritime nations' interest in ensuring free access to oceans and straits" [132]. However, said debate was finally settled back "in 1967 [when] the question of the reservation exclusively for peaceful purposes of the seabed […], and the use of their resources in the interest of mankind [was examined]"[133]. Although the concept of CHM sounded rather compelling during the negotiations of UNCLOS, "by 1975 […] it was clear that the CHM [principle] would be restricted to the seafloor outside national jurisdiction [without a] holistic approach to ocean governance"[134]. While, many authors continue to question the true vision and role of CHM in the Area, DSM in AWNJ may found a different kind of legal constricts within the environmental law field.

[131] Jaeckel et al. 2017, p. 150.
[132] Banet 2020, p. 5.
[133] With Andersen 2020, p. 79.
[134] Meyer 2022, p. 244.

3 International environmental law, regional structures and deep seabed mining

3.1 Deep seabed mining across environmental regulations

The international legal framework of DSM in AWNJ may appear to be addressed solely within the Law of the Sea; nevertheless, the components and concerns surrounding its development have broaden the applicable regulations. This chapter aims to tackle the international legal framework taking into account the main formal sources of international law, recalled within Article 38(1) of the statute of the International Court of Justice ('ICJ')[135]: international conventions – both with a global and regional scope –, as well as general principles and customary law. It must be noted that, the juxtaposition between the obligations and rights detailed within the conventions might have crystallized consolidated customary law and principles "such as the precautionary principle or the prevention principle" [136]. Because of the geographical area of the present research, it becomes crucial to acknowledge the overlapping phenomena regarding the several regulations of sectors that impact directly or indirectly the deep-sea ocean, and how many international organizations are increasingly present within the international arena, such as the ISA and regional mechanisms like OSPAR. Subsequently, although there are different branches of law that may activate around DSM, our focus will emphasize on the biodiversity regime, developed under the CBD, specific regional governance structures and organizations, to finally leave the Norwegian framework for the next chapter.

3.1.1 The settlement of environmental principles: from Stockholm to Rio

As a re-discovered activity, DSM translates into a challenging scenario where "the basic framework supporting a given rule of law has been contradicted by the dynamic progress of science"[137]. Certainly, the rapid growth in technology and new scientific discoveries within specific exploration zones in ABNJ and AWNJ are a clear manifestation of the dynamism of DSM in comparison to consolidated treaties. As one of the main sources of law, principles have the role of informing other sources of law, such as treaties and conventions, while ensuring the continuity of their core content throughout time; therefore, they play an instrumental role. This study focusing mainly on the precautionary principle and the internationally well-know no harm rule, both of them first designed in two important international conferences.

[135] Statute of the International Court of Justice (adopted 26 June 1945, in force 24 October 1945*)* US.TS 993
[136] Banet 2020, p. 6.
[137] Biggs 1980, p. 225.

Two examples of their impact lie in both the United Nations Conference on the Human Environment in Stockholm back in 1972 which produced the Stockholm Declaration, and the 1992 United Nations Conference on Environment and Development which developed the remarkable Rio Declaration, both including provisions which "were understood to already reflect customary international law or expected to shape future normative expectations […] moreover, the Rio Declaration, […] building upon the Stockholm Declaration, reinforcing [its] significance"[138]. In the particular case of the Stockholm Declaration, the main principle already accepted as part of customary law is Principle 21 which reflects on the sovereign right to exploit their own resources according to their environmental policies as well as the responsibility to guarantee that said activities do not cause harm to other States beyond their national jurisdiction. According to Schwabach this principle "expresses two strands of customary international law […], beginning with the *Trail Smelter*[139] and *Corfu Channel*[140] principles of territorial integrity […]"[141]. The Stockholm Declaration extended the scope of the no-harm rule to the territory beyond a state's borders, not only to other states but also to areas beyond national jurisdiction. This prevention of harm has been recalled in several pieces of legislation, as well as case law, such as *Pulp Mills*[142] which elaborates on the concept of due diligence.

After 20 years, the Rio Declaration delve into two particular topics: sustainable development and the precautionary principle. In the first case, while the Stockholm Declaration emphasized the economic and social development as crucial[143], the Rio Declaration chooses to elaborate on an equitable notion of the right to development, looking out for future generations[144], suggesting social development through sustainable economic growth. This anthropogenic approach inserts humans as the centre of sustainable development[145]; this approach, however, "seems to weaken environmental protection of the marine environment from harm caused by DSM undertaken by non-party states"[146].

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[138] Handl, G. "Declaration of The United Nations Conference on The Human, Environment (Stockholm Declaration), 1972 And the Rio Declaration on Environment and Development, 1992" United Nations Audiovisual Library of International Law, 2012, p. 1–11. Available online: <https://legal.un.org/avl/ha/dunche/dunche.html> (last accessed on 17 May 2023).
[139] *Trail Smelter (USA v Canada)* (1941) 3 RIAA 1905, 1965.
[140] *Case concerning Corfu Channel Case (United Kingdom v. Albania); Assessment of Compensation*, 15 XII 49, Judgement ICJ, 15 December 1949.
[141] Schwabach 2022, p. 57.
[142] *Case concerning Pulp Mills on the River Uruguay* (Argentina v Uruguay) (Judgment), Judgement, ICJ. (2010)
[143] Stockholm Declaration, principle 8.
[144] Handl 2012, p. 4.
[145] Rio Declaration, principle 1.
[146] Schwabach 2022, p. 58.

To counterbalance the aforementioned, the precautionary principle "holds that some forms of environmental damage are potentially so severe that measures that might prevent them may have to be taken even before [their] efficacy […] can be determined"[147]. The apparition of this concept can be traced back to Principle 15 of the Rio Declaration which adverts of the dynamic between scientific knowledge and tolerable risk of serious harm. Given this circumstance, the legal perspective embraced by the coastal states has been cautious[148], utilizing several principles: from the precautionary principle to manage environmental risks, the governance principle to combat insufficient regulatory and institutional frameworks to cope with DSM, to the fairness principle to account for potential impacts on communities particularly small-scale [149]. Notwithstanding the essential role of these principles, their domestic implementation has been challenging and dissimilar.

3.1.2 The Convention of Biological Diversity and deep seabed mining

As the main international convention dedicated to promote sustainable development through the protection of ecosystems, the CBD "obeys the same principles of public international law [as UNCLOS]; [however] the areas of marine activity that the two conventions cover differ, and their goals diverge"[150]. One of these divergences lies in the concept of resources, where the "landscape built by the CBD around the term 'resource' is based on the notion of State [and] his role and powers, [while] UNCLOS stresses on the activities, resources and [their]"[151]. This scenario seems contradictory given the necessity of nurturing both perspectives and needs to ensure the inclusion of key factors within a decision-making process; therefore, it becomes necessary to disentangle the true dimension of biodiversity and marine resources to evaluate the possibility of developing DSM exploitation in AWNJ. The centre object of the CBD is biodiversity, a "mega-category of our age that is increasingly widely employed […], but means different things to different people"[152]. According to the CBD, 'biological diversity' refers to the "variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part"[153], which includes the marine environment under its protection.

[147] Schwabach 2022, p. 59.
[148] Roux and Horsfield 2020, p. 311.
[149] Ibid.
[150] Mazzega 2021, p. 3.
[151] Ibid, p 7.
[152] Diaz and Malhi 2022, p. 32.
[153] Convention of Biological Diversity, art. 2.

The application of the CBD within the DSM scenario is undeniable, given that Article 4 of the CBD considers as its jurisdictional scope any components of biological diversity in the AWNJ of its member states. As a multidimensional – across different levels - and filled with different values and meanings [154] concept, biodiversity is duly regulated by the CBD establishing specific obligations and rights regarding both its use and protection, which relies on several scientific assessments that inform its main objective. Some of these are: the "Global Biodiversity Assessment in 1995, the Millennium Ecosystem Assessment in 2005, and, the first intergovernmental global assessment, carried out by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services ('IPBES') in 2019"[155]. More recently, biodiversity was again centre forward in the international dialogue when the Kunming-Montreal Global Biodiversity framework ('GBF')[156] came into approval the past December 2022, including four (4) global goals and twenty-three (23) specific targets to be achieved by 2030. The ambitious GBF holds a direct connection to specific anthropogenic activities which may cause harm, such as DSM, mainly connected with two (2) goals and four (4) specific targets, which it is now address alongside three crosscutting issues.

3.1.2.1 The fragility of deep seabed ecosystems: impact towards biodiversity

The meaning of biodiversity is embedded in the notion of ecosystem. According to Article 2 of CBD, 'ecosystem' refers to a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit, which differs from the concept of 'habitat' that focuses on the specific location or site where certain organisms or populations thrive. Although mainly scientifically supported, the legal conceptualization of what an ecosystem implies is essential, since its consolidation in legal conventions and treaties such as the CBD will impose concrete obligations for the States to comply in order to avoid environmental degradation. Regarding DSM, the degradation of the marine ecosystem can be observed in different features of this vast ecosystem, depending on the type of mineral in particular: "the extraction of PMN […] in the abyssal plains, SMS around the hydrothermal vents that form along oceanic ridges […], [and] CFC […] from the flanks of seamounts"[157].

[154] Diaz and Malhi 2022, p. 34.
[155] Ibid, p. 32.
[156] Decision CBD/COP/DEC/15/4 of the Conference of the Parties to the Convention on Biological Diversity (adopted on the 19 December 2022) (henceforth refer to as Global Biodiversity Framework).
[157] Diaz and Malhi 2022, p. 52.

The main debate between DSM and biodiversity holds in its centre the overlapping richness of both minerals and unique biodiversity samples in the same areas. While some sectors of society may be prone to consider DSM development aligned a sustainable path, the fact that "corals, anemones, sponges, and echinoderms in nodule-rich areas [could be] more than two times higher than that in nodule-free areas, and some of the corals were found only in nodule-rich areas"[158] quickly installs the fear of an irreconcilable incompatibility between mining and total avoidance of biodiversity loss. Nevertheless, even when "most mining-induced loss may last forever on a human timescale, […] studies are addressing possible strategies to mitigate and reduce [its impact, such as] Dover's […] four-tier mitigation hierarchy strategy"[159]. Arguably, the concepts of avoidance, minimization, remediation and offset – as a last resort – have been terms mentioned in several policy documents, national legislation as well as transboundary treaties, with fairly similar content, especially regarding conservation as the first approximation any extractive industry should aim for.

The CBD calls for a legally-binding obligation to develop national regulation for the conservation and sustainable use of biological diversity, as well as the pursuance of integration between both of them into relevant sectoral or cross-sectoral policies[160]. This obligation is further developed within Article 8, where the promotion of actions, such as the establishment of a system of protected areas as well as the development of management regulations, inform about the protective perspective CBD. This obligation to conserve targets not only the preventive stage but also the maintenance of legislation within the context of sustainable use to "provide the conditions needed for compatibility between present uses and the conservation of biological diversity" [161], which could also point at rehabilitative and restorative actions of degraded ecosystems. The GBF reinforces the CBD's perspective maintaining that the "integrity, connectivity and resilience of all ecosystems are [to be] maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050"[162], which is directly linked with the objective to ensure that by 2030 at least 30 per cent of coastal and marine areas into systems of protected areas[163].

[158] Ibid.
[159] Sakellariadou et al. 2021, p. 343.
[160] Convention of Biological Diversity, art. 6.
[161] Ibid, art. 8(i).
[162] Global Biodiversity Framework, Goal A.
[163] Ibid, Target 3.

Elizabeth Maruma Mrema, current Executive Secretary of the Secretariat of the CBD, acknowledges the biodiversity within the Arctic as "undisturbed and unchartered waters important to maintain that [biological] richness"[164]. Arguably, the degree of serious harm towards biodiversity is still being mapped out; however, it seems that the main reason to continue evaluating DSM's future role in the region may be connected with the concept of sustainable use and right to exploit that both UNCLOS and the CBD legally recognize.

3.1.2.2 Between sustainable use and the right to exploit: recalling the EIA role

The CBD defines 'sustainable use' as the use of components of biological diversity in a way and at a rate that does not compromise its decline or the need of future generations[165]. The GBF recalls this concept, clearly aiming for biodiversity to be sustainably used and managed and nature's contributions to people, including its ecosystem functions and services to achieve in 2050[166]; moreover, the GBF demands the reduction of pollution risks to levels that are not harmful to biodiversity by 2030[167], in the attempt to link the obligation to conserve biodiversity while leaving to each State discretion how to fill in the significance of harmful effects, muchly similar to UNCLOS framework. Indeed, when discussing the use of a certain resource, no international framework is keen to suggest a specific formula for its management, on the contrary, the sustainable use concept – muchly linked to the principle of sustainable development – is preferred to be utilized in the attempt to limit the powerful sovereignty of the states. Following the principles of international law referred in the previous section, the CBD recognizes the "sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States"[168], which could hint to the application of impact assessments to protect the deep seabed from harmful activities.

Mirroring UNCLOS, the CBD shares both the concept of monitoring and minimizing adverse impacts through technical and scientific assessments, in order to legally justify the acceptance of a new activity that holds considerable environmental risks. Therefore, the identification and monitoring duty states that each contracting party is responsible for: 1) the identification of crucial components of biodiversity in need to conservate, 2) the monitoring all

[164] WWF. "The Convention on Biological Diversity: Looking Beyond 2020" (July 2020) <https://www.arcticwwf.org/magazine-issues/2020/a-new-deal-for-the-arctic/> (last accessed 26 May 2023)
[165] Convention of Biological Diversity, art. 2.
[166] Global Biodiversity Framework, Goal B.
[167] Ibid, Target 7.
[168] Convention of Biological Diversity, art. 3.

of those components with special focus on those needed urgent conservation measures as well as greatest potential for sustainable use, 3) the identification of activities likely to have significant impact towards biodiversity to then monitor their effects, and 4) the maintenance of all data and knowledge retrieved[169]. Moreover, Article 14 of CBD develops the obligation of each party, within their possible capacities, to introduce appropriate procedures requiring EIA of its proposed projects that are likely to have significant adverse effects on biological diversity. For this purpose, environmental policies and regulations must be in place previously, in order to be taken into account as guidelines.

Following the desire of the CBD to delve more into the content of what an EIA should incorporate, the notion of 'ecosystem approach' was introduced. The CBD maintains that it "is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way"[170]. As consequence, the ecosystem approach seems to be incorporated within the EIA scope as the integrated tool per excellence, which aims to reflect several factors such as "environmental parameters […], all components of the biological communities and the environment, synthesis to assess ecosystem function […] and extension to ecosystem services"[171]. This position is fortified by the GBF which upholds the necessity of a full integration of biodiversity into both strategic environmental assessments as well as the EIA[172].

Acknowledging the main features and purpose of an EIA under the CBD convention, the EIA baseline should be condition within the particular regional environment context, easily adapted towards[173]. Indeed, the application of an ecosystem approach within the assessment of DSM "facilitates the management of complex social-ecological systems [since it constitutes] an integrated approach to managing natural resources that considers how humans influence ecosystems as well as how they benefit from ecosystems" [174]. Here is interesting to notice that, "the ISA's draft exploitation regulations [also] include the ecosystem approach as a guiding principle for environmental management"[175], which is yet another reflection of the close application of the same approach in both law of the sea and biodiversity fields.

[169] Ibid, art. 7.
[170] Hyman et al. 2022, p. 9.
[171] Clark et al. 2020, p. 3.
[172] Global Biodiversity Framework, Target 14.
[173] Clark et al. 2020, p. 3.
[174] Hyman et al. 2022, p. 9.
[175] Ibid.

3.2 Relevant regional governance structures

Highlighting the main legal frameworks that may shape the possibility of pursuing DSM within national borders, it is the turn to explore the regional context, which provides with both opportunities as well as challenges, were key entities, such as those "with a mandate for sustainable development of deep-ocean areas [which] already recognize and address aspects of deep-ocean climate changes" [176]. Considering the national legislation to be analysed, there are two main regional structures, with both governance bodies and particular regulations, that provide relevant information regarding the future obligations regarding DSM in AWNJ.

3.2.1 The Convention for the Protection of Marine Environment (OSPAR)

There are a number of other international and regional instruments promoting important concepts and principles, many of which have emerged since the conclusion of UNCLOS itself, including common but differentiated responsibilities, the precautionary approach, the ecosystems approach, and the participatory approach. As a concrete manifestation of the duty of cooperation on a global or regional basis reflected by UNCLOS[177], OSPAR rises as one of the its best examples, as consequence of the unification of two convention – the Oslo Convention against dumping and the Paris Convention of 1974 regarding to offshore industry – which developed a strong mechanism exclusively for environmental protection purposes. Indeed, OSPAR departs from the recognition of an "inherent worth of the marine environment […] and necessity to provide coordinated protection for it"[178], holding the prevention of marine pollution as the central general obligation.

The achievement of OSPAR is reflected on its concrete application of both principles and approaches early defined within both UNCLOS and the CBD: the precautionary principle, the polluter-pays principle, the BAT knowledge, and the highly relevant ecosystem approach. Curiously, the main content of OSPAR locates within its Annexes, which addressed more specifically both the measures to take according to the specific sources of marine pollution, such as the Prevention and Elimination of pollution from Offshore sources[179], and the active actions towards the conservation of the environment recognizing the effective alignment of definition and concepts regarding ecosystems and biodiversity from the CBD[180]. Despite the aforementioned, perhaps the most important contribution of OSPAR can be traced to its

[176] Levin et al. 2020, p. 4673.
[177] UNCLOS, art. 197.
[178] OSPAR, preamble.
[179] Ibid, Annex III.
[180] Ibid, Annex V.

promotion of marine protected areas ('MPA')[181], which account of its active inclusion of the ecosystem approach. Indeed, "in 2003, the OSPAR Commission, as main regulatory authority, formally adopted the ecosystem approach as the basis for its management activities and adopted a strategy to establish a network of MPA"[182]. To date, "only two of the OSPAR MPA cover both the water column and the seabed (the Milne and Charlie Gibbs South MPA) [while] the others pertain to areas in which either Portugal or Iceland have claims to extended continental shelves[183], which denotes the role of national jurisdiction to reach a regional marine protection.

Either from the pollution from offshore resources [184] or the pollution from other sources[185], DSM activities can be placed as a new anthropogenic impactful activity that could be further guided by the OSPAR Commission[186] through decisions and recommendations[187], Within the DSM debate, the OSPAR Commission has not been oblivious of its members sparked interest, including Norway; therefore, in 2021 a consolidated assessment regarding DSM was elaborated, through its Offshore Industries Committee and the Committee on Environmental Impacts of Human Activities with the aim of "exchange information and positions related to DSM and help Contracting Parties ensure that obligations under OSPAR are upheld" [188]. Although said document did not provided with an answer of whether or not DSM was incompatible with the objectives of OSPAR and therefore the protection of the environment, it certainly reaffirmed the necessity of evaluating its alignment with the principles and provisions within the realm of the international environmental law.

3.2.2 The European Union as major leader towards green transformation

Although briefly mentioned in the introduction as a major consumer of critical minerals and metals, the EU constitutes a much complex and important actor within the DSM debate, with specific interests and concerns. The EU constitutes "an international organisation, created through agreements between States [whose] structure, functions, and powers [...] should rightly

[181] "According to OSPAR Convention, an MPA is an area within the maritime area for which protective, conservation, restorative or precautionary measures, consistent with international law have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment" [Becker-Weinberg 2023, p. 458.]
[182] Rayfuse 2023, p. 327.
[183] Ibid, p. 328.
[184] OSPAR, art. 5.
[185] Ibid, art. 7.
[186] Since, according to according to Article 10 of OSPAR, "it is duty of the Commission to: (b) generally to review the condition of the maritime area, the effectiveness of the measures being adopted, the priorities and the need for any additional or different measures; [and] (c) to draw up [...] programmes and measures for the prevention and elimination of pollution and for the control of activities which […] adversely affect the maritime area".
[187] OSPAR, art. 13.
[188] OSPAR Commission (2021) Technical report on current understanding of deep seabed mining resources, p. 37.

be considered as an international construction of its own kind"[189]. Resembling OSPAR's cooperation nature, the EU intents to provide a unique forum composed by states to discuss and further regulate shared concerns and objectives as a region, such as the green transformation.

Through its main institutions such as the European Council, the European Parliament as well as the European Commission, the EU has remained in the conversation and design of many policies related to green transformation, particularly regarding the supply of critical raw materials. According to the EU Commission's "Study on the Critical Raw Materials for the EU" final report, these resources are crucial "to meet [EU's] political goals: [from] the European Green Deal[190], the REPowerEU[191] [...], and Digital Strategy[192] [...] to achieve green [...] transition and [...] strategic autonomy"[193]. Given this particular interest, highly link with climate change goals that are part of the EU commitment under the Paris Agreement, the dynamic between the EU and the Artic seems to be further strengthen, through a wide set of resolutions and joint communications[194]. These documents highly reflect the complexity of this relationship, where two Arctic states, Finland and Sweden, are members of the EU, while other two, Iceland and Norway, are part of the EEA regime, which will be address shortly. In light of this scenario, it should be recognized that "EU policies and legislation co-shape environmental protection frameworks, affecting the network in terms of infrastructure, facilitate investments and determine regional development policy-making"[195].

As the object of this study will focus on the specific case of Norwegian law, it is relevant to briefly mentioned the EEA agreement as an important piece of legislation that could hold a direct impact in Norway's DSM interest, as well as the so-called European Free Trade Association ('EFTA'). EFTA reflects the intention of "closer economic cooperation between the European States, but they were not prepared to go as far as European community members,

[189] Langlet and Mahmoudi 2016, p. 6.
[190] COM (2019) 640 final, p. 2.
[191] COM (2022) 108 final, p. 5.
[192] COM (2020) 102 final, p. 4.
[193] EU Commission (2023) Study on the Critical Raw Materials for the EU, p. 1.
[194] Some of the most relevant documents include: the EU Parliament Resolution on «*Arctic governance* Commission Communication on *the European Union and the Arctic region» (2008),* the EU Parliament Resolution on «*A sustainable EU policy for the High North» (2011),* the EU Parliament Resolution on the «*EU strategy for the Arctic* Council Conclusions on *Developing a European Union Policy towards the Arctic region» (2014),* the EU Commission and High Representative Joint Communication on «*an integrated European Union Policy for the Arctic* Council Conclusions on *the Arctic» (2016),* and the Commission and High Representative Joint Communication on «*A stronger EU engagement for a peaceful, sustainable and prosperous Arctic» (2021)* [Gricius and Raspotnik 2023, p. 7]
[195] Ibid, p. 6.

namely towards a federal structure"[196]. On the other hand, The EEA agreement is a "hybrid between a traditional intergovernmental agreement and the supranationality of [EU], [where] decisions are made by consensus, which means that a State cannot be formally bound against its will"[197]. It must be added that, the EEA agreement targets the four freedoms of the EU structure: "free movement of goods (with the exception of fish and agricultural goods), services, persons, and capital, and cooperation on, inter alia, environmental protection, consumer protection, and research"[198], which at first glance may not seem to affect any national interest regarding the DSM future endeavour.

Taking into consideration the focus of the present study, it is important to acknowledge the consensual determination of the members of the EEA agreement to "preserve, protect and improve the quality of the environment [ensuring] rational utilization of natural resources on the basis […] of […] sustainable development, as well [as] precautionary and preventive action"[199]. Moreover, similar as the OSPAR structure, the EEA agreement incorporates both protocols and annexes[200], which further elaborate on other rules that could potentially impact any new anthropogenic impactful activities development, such as DSM. Therefore, from technical regulations, standards, testing and certifications, which will be further discuss in chapter 5 of this study, alongside the current policies and regulations towards a biodiversity strategy, the EEA agreement seems to hold then a potential grip on the future of DSM within the national territories of its members, including the case study within this research: the Norwegian domestic regulation regarding DSM.

[196] Langlet and Mahmoudi 2016, p. 14.
[197] Ibid
[198] Ibid, p. 15.
[199] EEA agreement, preamble and art. 73.
[200] Ibid, Protocol 12 and Annex II.

4 National jurisdiction in light of the Norwegian Law

4.1 Setting the importance of Norway for this study

Thus far, the description, analysis the main features, strengths and weaknesses of several international frameworks and key regional structures that partake within the development of DSM have been addressed. Now, the focus will shift towards a specific domestic scenario to further analyze the several reciprocate dynamics between both spheres with regards to DSM activities. For this purpose, the Norwegian legal framework on management of seabed mineral resources will be dissected, as a conducive paradigm of the concrete application and strive for balance between sustainable use of resources and the protection of the environment. Indeed, the interest of allowing DSM activities in AWNJ has only grown since the discovery of "42 percent of areas with massive sulphidesand, 54 percent of areas with cobalt-rich crusts, and 19 percent of known polymetallic nodules, all of these located within [different] EEZ [globally]"[201]. Contrary to the early stage in which Norway finds itself, several licenses for DSM exploitation activities in AWNJ have already been granted in countries with great mineral potential, such as "Papua New Guinea and Sudan/Saudi Arabia, [as well as] exploration activities planned […] in the Cook Islands [and] cobalt crusts and polymetallic nodules in Brazil"[202].

4.2 Actors and stakeholders of relevance within the Nordic Arctic

The 2008 Ilulissat Declaration[203] marked the collective recognition of the application of the international legal framework over the Arctic Ocean. Indeed, the Five Arctic States, "dismissed the perception of the Arctic as an international law vacuum governed by a 'first-come, first-serve' attitude [including a] 'boom-and-bust' resource exploitation with other forms of impacts on the environment and its biodiversity"[204]. This acknowledgement collocated UNCLOS at the centre while reaffirming how intertwined the international law and the national legislation within each of the Arctic States continues to be, as there was "no need to develop a new comprehensive international legal regime to govern the Arctic Ocean"[205]. However, this region is highly fragmented and complex, with several governance structures regarding marine issues; nevertheless, only two that are key to understand DSM activities within Norway: the Arctic Council and the High-Level Panel for a Sustainable Ocean Economy.

[201] Hight Level Panel for a Sustainable Ocean Economy (2020) Ocean-based Renewable Energy, p. 6.
[202] Levin et al. 2020, p. 3.
[203] Arctic Ocean Conference 2008 announced The Ilulissat Declaration (adopted on 28 May 2008).
[204] Molenaar 2017, p. 25.
[205] Ibid, p. 60.

4.2.1 The Arctic Council: cooperation and relevant concepts

This high-level intergovernmental forum has been "widely acknowledged [as] the main intergovernmental forum for regional cooperation in the Arctic […] since its establishment in 1996" [206], as a non-legally binding instrument[207] although it has been able to auspice three legally binding agreements[208]. As the main forum of all-related arctic issues, the Arctic Council has a cooperation function at its core, and it is now not only exclusive to the eight Arctic States but also an active involvement of the Arctic indigenous people – such as the Sami Council – as Permanent Participants, as well as third-States as Observers. However, "while the substantive mandate of the Council thus relates in particular to sustainable development and environmental protection, it is otherwise only subject to the restriction of 'common Arctic issues'" [209]; condition that could imply a sort of isolated approach towards global issues.

Despite the aforementioned, the continuous and arduous job of the six permanent working groups of the Arctic Council – Arctic Contaminants Action Program ('ACAP'), Arctic monitoring and Assessment Program ('AMAP'), Conservation of Arctic Flora and Fauna ('CAFF'), Emergency Prevention, Preparedness and Response ('EPR'), Protection of the Arctic Marine Environment ('PAME'), and the Sustainable Development Program ('SDWG') – clearly show that there is a need for an international outlook on the Arctic, including transversal and intersectoral concepts to tackle the increase overlapping of anthropogenic activities targeted at the Arctic region, especially when addressing the question of DSM. In addition, it should be noted that the "emergence of the Area in the Arctic Ocean governed by ISA directly depends on accomplishing the process of establishing coastal States' extended continental shelf"[210], which has an unknown timeline on sight. While there continue to be many challenges regarding the position of the Arctic Council towards new activities within the region, such as DSM, several guidelines and recommendations have been emitted related to different topics, such as the "Good practices For Environmental Impact Assessment and Meaningful Engagement in the Arctic".[211]

[206] Todorov 2023, p. 321.
[207] Molenaar 2017, p. 45.
[208] Some examples include: "Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, entered into force 25 March, 2016; [and] Agreement on Enhancing International Arctic Scientific Cooperation, entered into force 23 May 2018". [Todorov 2023, p. 314]
[209] Molenaar 2017, p. 45.
[210] Todorov 2023, p. 322.
[211] Arctic Council (2019). Good practices For Environmental Impact Assessment and Meaningful Engagement in the Arctic. Official archive of the Arctic Council (SWDG group).

As the first country to hold the Arctic Council's chairmanship back in 2007[212], Norway has now once again the task to continue the Arctic Council's work. Considering that "[Norway's] national priorities are based on the first *Arctic Council Strategic Plan* (2021)"[213], four priority topics have now been taking into consideration as the blueprint of Norway's forthcoming chairmanship within the Arctic Council: "the oceans; climate and environment; sustainable economic development; and people in the north [such as the Sami in the case of Norway]; […] founded on knowledge and responsible and sustainable management"[214]. The next three years are then crucial to realign the Arctic Council view and purpose, and will be particularly interesting for ocean space issues within the Arctic, such as the development of tools for ocean management, the organization of an international conference on ecosystem-based ocean management, as well as the development of Arctic observation systems to strengthen the cooperation and exchange of knowledge between Arctic States[215].

4.2.2 The High-Level Panel for Sustainable Ocean Economy

Also known as the Ocean Panel, the High-Level Panel is a "unique initiative by 17 world leaders who are building momentum for a sustainable ocean economy [with] effective protection, sustainable production and equitable prosperity"[216]. Indeed, back in "September 2018, 17 nations, [co-chaired] by Norway and Palau, commissioned a major science-based review of ocean threats and opportunities as a baseline for resetting policies[217], to fight against the individual management of States sector by sector, disregarding cumulative impacts. Moreover, the Ocean Panel "comprises [several] members from Australia, Canada, Chile, [etc.] and is supported by the UN Secretary-General's Special Envoy for the Ocean"[218]. The Ocean Panel portrays a holistic approach to the ocean, asking about both the wealth and health of this important ecosystem and working with different stakeholders[219], such as financial entities, governments, academic institutions, in order to design solutions in the context of the green transformation with the concept of *sustainable ocean economy* in its centre. The idea of the ocean as a new economic frontier was adverted back in 2016 by the OECD, which consider the "new ocean economy [as] a combination of population growth, rising incomes, dwindling

[212] Arctic Council. "Arctic States: Norway" (up to date) <https://arctic-council.org/about/states/norway/> (last accessed 27 May 2023).
[213] Norwegian Ministry of Foreign Affairs (2023) Norway's Chairship Arctic Council 2023-2025, p.4.
[214] Ibid, p. 7, 14.
[215] Ibid, p. 15.
[216] Hight Level Panel for a Sustainable Ocean Economy (2020) Ocean-based Renewable Energy, preface.
[217] Lubchenko et al. 2020, p. 30.
[218] Hight Level Panel for a Sustainable Ocean Economy (2020) Ocean-based Renewable Energy, preface.
[219] Ibid.

natural resources, responses to climate change and pioneering technologies" [220], including in its long list of new industries: offshore wind and aquaculture, tidal energy, and the controversial "production in ultra-deep water and exceptionally harsh environments [where] the long-term potential for innovation, […] economic growth offered by these sectors is impressive" [221]. Nevertheless, the early optimism of the OECD seemed to have overlooked a much complex dynamic between new industries such as DSM activities and their environmental impacts.

The Ocean Panel strives to manage the ocean holistically, introducing a sustainable approach as condition to continue exploring an ocean economy scenario. Specific examples, such as the already mentioned ecosystem-based management tools as well as the special evaluation and consideration of "current or anticipated activities [and] how they might coexist successfully and what combination can operate without serious harm [where] success requires clear goals, funding and an inclusive process" [222]. Therefore, since the ultimate goal of the members within the Ocean Panel is the fulfilment of a full sustainable ocean management of waters within national jurisdiction by 2025, the so-called new contract between the humans and the oceans "will require […] seeking greater efficiencies, using leapfrogging technologies and seeking scientific guidance [and] requiring heeding lessons from other transitions [and] acting with precaution (for example, with DSM activities)" [223], to assess the ocean's true value. Norway as co-chair of the Ocean Panel, which represents 44 percent of global EEZ and 50 percent of global coastal lines,[224] maintains a clear leadership for ocean management.

4.3 Norwegian governance, transformation and deep seabed mining

Regarding its particular geographical location, and true mineral richness within their maritime jurisdiction, "the areas beyond 200nm [of the Norwegian coast] in the Nansen Basin and in the Banana Hole [hold] no potential for oil and gas [but] have potential for […] polymetallic sulphides and manganese crusts" [225], where the Norwegian deep ocean spaces presumably contain such minerals. Indeed, back in 2020 there was already solid evidence of samples that "show REEs exist in higher concentrations in the Norwegian Sea than in other oceanic regions, such as the Pacific"[226]; curiously, the Pacific region remains the main focus of

[220] OECD (2016) The Ocean Economy in 2030, p. 3.
[221] Ibid.
[222] Lubchenko et al. 2020, p. 32.
[223] Ibid.
[224] High Level Panel for a Sustainable Ocean Economy "The Ocean Panel". <https://oceanpanel.org/> (last accessed 27 May 2023).
[225] Brekke 2020, p. 102.
[226] Norwegian Petroleum Directorate 2020, p. 20.

current DSM exploratory activities within the Area. The aforementioned samples disclosed high concentrations of cooper, zinc and cobalt in sulphides and manganese crusts – two of the three type of DSM activities described within Section 2.1.1. Although the research of new minerals throughout the continental shelf and EEZ has been targeted to "areas with inactive smokers – where water is no longer emerging and the chimneys have collapsed"[227] in an attempt to reduce additional environmental impacts, the Norwegian Petroleum Directorate ('NPD'), authority within the oil and gas sector, has been striving to keep researching about DSM, after "the Norwegian University of Science and Technology produced a best-case scenario of NOK1000 billion value of minerals on the Norwegian continental shelf ('NCS') [with the] methodology to predict Norway's undiscovered petroleum resources"[228].

The connection between Norway and the oil and gas sector, once an "extremely energy-intensive and versatile liquid […] since the 1850s, […] now, 170 years later, [is planned to be phased out]"[229], as consequence of the global net zero goals. Norway has remained cautious about the speed and scale of the face-out of fossil fuel-based economies since, despite their confidence in a quick national adaptation to a high renewable's economy, "numerous other things […] might have to be foregone"[230]. So, the Norwegian government have continued to investigate about alternatives to fossil fuels, such as biofuels and biomass[231] as well as DSM. The NPD, as an independent agency under the Ministry of Petroleum and Energy ('MPE'), constitutes the "expert body for offshore geology and geophysics [holding] an extensive marine programme for acquiring [specific mineral] data"[232], such as location of the minerals. The result of its work is shared with other "national agencies and institutions, including the Norwegian Mapping Agency, the Universities of Bergen, Oslo and Tromsø, the Norwegian Polar Institute [and] neighbouring coastal states"[233], as a sign of cooperation, especially with states which hold overlapping continental shelf areas beyond 200 nm, e.g., Russia, Iceland and Denmark"[234].

The special interest in Norway lies within its consideration as the foremost "petroleum exporter combined with strong climate policy ambitions [where] the term green transformation, was establish as a key goal [becoming] the word of the year in Norway [back] in 2015" [235]. In

[227] Ibid, p. 18.
[228] Ibid, p. 19.
[229] Ibid, p. 2.
[230] Ibid, p. 10.
[231] Ibid, p. 12-13.
[232] Brekke 2020, p. 90.
[233] Ibid.
[234] Ibid, p. 91.
[235] Amundsen and Hermansen 2020, p. 2.

this line, the conscious shift towards building a sustainable society "by restructuring the Norwegian economy, promoting growth and creating jobs, […] supporting the transition to a green economy and ensuring diversification"[236] must be adverted. As the green transformation continues to push governments into action, the mechanisms and practical means to achieve the shift form fossil fuels differs between stakeholders and policy actors within Norway, where DSM activities are particularly highlighted as a silver bullet aligned with several SDGs. The particular resource endowment of Norway can directly affect the crystallization of policy documents into domestic regulation and political path, as stated back in 2020 by Ingrid Sølvberg, the former director of the NPD: "Norway is a different country [..], our ability to exploit natural resources has put us in a unique position"[237].

Certainly, Norway's ocean resources are part of its uniqueness and mineral richness, which has been the main reason for strong ocean policy developments even before the establishment of the Ocean Panel, such as the ocean strategy "New growth*"* in 2017, accompanied by the white papers "The place of the oceans in Norway's foreign and development policy" (2016 – 2017) and "Update of the integrated management plan for the Norwegian Sea (2016 – 2017)[238]. The latter was updated in 2019 introducing five key elements: the promotion and development of the Law of the Sea, the marine ecosystems conservation, enhance of the knowledge-based management, the support of international ocean-related instruments implementation, and the campaign for an integrated approach to marine management[239], which echo the sustainable ocean economy goal.

4.4 Exploring the Norwegian framework for deep seabed mining

It is time to describe and analyze the content, structure and interpretation of the main domestic provisions in both the minerals framework and the environmental regulations currently in place, considering both the relevance of Article 112 of the Norwegian Constitution[240], while at the same time balancing the importance of the mineral activities against other activities and their importance, such as fisheries and oil, in the same area.

[236] Ibid, p. 2.
[237] Norwegian Petroleum Directorate 2020, p. 3.
[238] Norwegian Ministry of Climate and Environment (2020) Norway's integrated ocean management plans, p. 8.
[239] Ibid.
[240] Constitution of Norway, adopted on 17 May 1814 (henceforth refer to as the Norwegian Constitution), art. 112: "Every person has the right to an environment that is conducive to health and to a natural environment whose productivity and diversity are maintained. Natural resources shall be managed on the basis of comprehensive long-term considerations which will safeguard this right for future generations as well […]"

4.4.1 Minerals, economy and technology: the Seabed Minerals Act

The administration of mineral resources on the NCS was assigned to the MPE back in 2017, who successfully contributed to adopt the Seabed Mineral Act ('SBM') in 2019 which replaced the earlier 1963 Continental Shelf Act[241]. Contrary to its predecessor, the SBM builds on the traditional regime for oil and gas, including the mapping of open areas and impact assessments procedures for particular projects within a license system. This particular regulation holds three main pillars. Firstly, the role of technology its highlighted in both the process of mapping mineral locations and as a factor within impact assessments procedures; moreover, as part of the NPD's job, mapping the resources consists on the administration of all "NCS data acquired over more than 50 years of Norwegian petroleum activity [which] gives the NPD's geologists a starting point in deciding the best places to explore for minerals"[242].

The second pillar of the regulation reflects on the current Norwegian claim over the outer limits of its CS, which is transcendental in order to ascertain the government property over the minerals within the seabed. Norway duly signed and ratified UNCLOS, which entered into force in 1996, and "in the same year, the Norwegian Foreign Ministry initiated the work related to the establishment […] of the continental shelf of Norway beyond 200nm" [243]. This international claim has not been settled yet; nevertheless, clearly shows the position of the Norwegian government regarding the final pillar of this triad: to secure the future of the Norwegian ocean economy, while maintaining its commitment to "sustainably manage 100 per cent of ocean area under their national jurisdiction by 2025, guided by Sustainable Ocean Plans ('SOP') […] to advance long-term sustainable economic, social and environmental development"[244]. Having acknowledge these three considerations, the main features of the SBM will be now addressed to help uncover the national perspective towards the DSM.

4.4.1.1 Objective and structure: a nod to the oil and gas regime

The main objective of the SBM is the facilitation of exploration and extraction of mineral deposits on the NCS [245] "in accordance with societal objectives, in such manner that safeguards considerations such as value creation, environment, safety, as well as other interests"[246]. Indeed,

[241] Norwegian Petroleum Directorate 2020, p. 20.
[242] Ibid.
[243] Brekke 2020, p. 89–90.
[244] Norwegian Agency for development cooperation (2021) Making Waves Norway's support for a sustainable ocean, p. 8.
[245] This is later amended by Norwegian Act 18 June 2021 No. 89 that expands the geographical scope of the SBM to all Norwegian territory, with the exception of Svalbard.
[246] Seabed Mineral Act, section 1-1.

all DSM activities will be decided bearing in mind the collective value added to the Norwegian society as rightful owners of the mineral deposits, even though the Norwegian State holds legal property rights over them[247]. As a regulation that looks to provide a general legal basis for a complete resource management, the SBM mirrors the licensing system of the oil and gas sector, covering from exploration and mapping for mineral deposits for commercial purposes including geological, geophysical, geochemical and geotechnical activities to the extraction activities from the seabed or the subsurface for commercial purposes[248]. It must be noted that, any scientific research activity does not apply under this framework, having its own regulation[249]. The review the structure of the license system and the main stages of activities for DSM is now further reviewed.

According to the SBM, "none other than the State can conduct mineral activities on the Continental Shelf without a licence, approval or consent pursuant to this Act"[250], which conditions any DSM activity to an obligatory requirement of the correspondent license, also supported by Section 2-3 of the SBM. Within the Norwegian framework, there are three specific moments crucial for DSM activities: a) the opening areas for mineral activities, b) the allocation of survey activities, and c) extraction stage within a work program framework. Regarding the first stage, the Norwegian government holds the responsibility to defined specific areas on the NCS which shall be opened for mineral activities[251], procedure that "will make possible […] to start mapping the resource base and environmental conditions in the area […] to strengthen the knowledge base"[252]. This opening process could lead to a still uncertain activity, reason for which it is conditioned to a stringent process of public consultation regarding the obligatory impact assessment that shall be conducted prior to any decision[253].

The opening process was initiated back in 2020 by the MPE, consisting of two stages: "an impact assessment and a resource assessment, [where the] MPE prepares the resource assessment [assisting] with the impact assessment process, [comprised by] two phases: program

[247] Ibid, section 1-4.
[248] Ibid, section 1-5 ('survey' and 'extraction' activities).
[249] Scientific research activity under Norwegian Act of 21 June 1963 No. 12 "relating to scientific research and exploration for and exploitation of subsea natural resources other than petroleum resources".
[250] Seabed Mineral Act, section 1-6.
[251] Ibid section 1-2.
[252] Reggeringen (Norwegian Government) "Hearing: Impact assessment for mineral activities on the Norwegian continental shelf" (27 October 2022) <https://www.regjeringen.no/no/aktuelt/sender-kons/id2937834/#mce_temp_url#> (last accessed 27 May 2023).
[253] Seabed Mineral Act, section 2-1.

phase and an investigation phase"[254]. The proposal for a study program for the impact assessment was submitted for public consultation, considering comments for "the area where the NPD has the most data and knowledge and […] considers to be strategic for […] first phase"[255]. After this first consultation, the final program for the specific impact assessment was send for public consultation with a deadline of 27 January 2023, to which the MPE will submit comments and recommendations in the spring of 2023"[256]. This opening process is crucial, as it will mark the beginning of the next stage: the application for survey licenses, that can be granted to a physical person or body corporation, for all or only parts of the area initially applied for, for a period up to five years[257]. Although this license may condition its owner to specific measures relating to technology, safety and report of activities, the SBM does not mention specific environmental settings, which it could be assume to pertain to the content of the specific project impact assessment considered within the license process. After being granted the license, the licensee must submit specific reports to several authorities; some of these authorities include "MPD, the Norwegian Maritime Authority, the Directorate of Fisheries, the Institute of Marine Research, the Norwegian Coastal Administration and the Ministry of Defence"[258] with data on methods, transports used, and how will the results will be available.

The obtention of the license prepares the terrain for the next stage: the extraction activities. The "extraction licences [are granted] pursuant to specific conditions [giving] the licensee the exclusive right to conduct surveys for and extraction of all mineral deposits in the area covered by the licence"[259], which signifies that it is not necessary to hold a survey license in order to apply for an extraction license. This type of license only is granted to corporation bodies, which must be registered in the Register of Business Enterprises, and can be granted to up to ten years with a possible extension of twenty years[260]. Extraction activities are therefore highly competitive, and can only be chased after it is "publicly announce the area which is open for extraction licence applications [with specific] criteria that form the basis for licence granting, as well as the applicable time limits and terms"[261]. As similar to the survey licenses, Section 4-2 of the SBM states that this permit could be conditioned to technology requirements

[254] Reggeringen (Norwegian Government) "Hearing: Impact assessment for mineral activities on the Norwegian continental shelf" (27 October 2022) <https://www.regjeringen.no/no/aktuelt/sender-kons/id2937834/#mce_temp_url#> (last accessed 27 May 2023).
[255] Ibid.
[256] Ibid.
[257] Seabed Mineral Act, section 3-1.
[258] Ibid, section 3-3.
[259] Ibid, section 4-1.
[260] Ibid, section 4-5.
[261] Ibid, section 4-1.

and financial guarantees, as well as known resource potential and proposed development solutions. Differently from the previous stage, to obtain an extraction license several documents must be submitted previously: a) a work obligation and work program[262], b) a plan for extraction of mineral deposits, which also includes c) the correspondent impact assessment, which "shall include commercial and environmental factors, such as preventive and remedial measures, and information about how a facility can be decommissioned upon cessation of the mineral activity"[263]. It is interesting here to note that the commercial or corporate factor is included within the impact assessment, which evidently shows the aim for a balance between economic motivations and interests and environmental costs within the extractive activities. As an additional stage, it is under the so-called production license that the licensee becomes the "owner of the minerals effectively produced when they are brought up from the seabed to the sea surface"[264]. This stage its complemented by any other specific license to install and operate facilities[265] when those are not included within the approved plan of extraction.

4.4.1.2 Reasonable, prudent and necessary actions within the Seabed Mineral Act

Although most obligations incorporated by the SBM regarding safety, finance insurance for investments, and environmental responsibilities, are somewhat included in various provisions, Section 9-3 of the SBM mainly focuses on the obligation to comply, in a full and systematic manner, with the financial obligations that follow from any of the DSM activities. Certainly, there are both compulsory fines[266] as well as specific fines for violations of this Act[267]; nevertheless, the compliance to the SBM, especially regarding environmental considerations, can be considered challenging mainly due to the vagueness of its parameters and legal phrasing of their provisions. As an example, the obligation of any licensee to "pursue any mineral activities under this Act […] in a prudent manner and in due consideration of safety of personnel, the environment and the financial values represented by facilities and vessels"[268]. This obligation is also complemented by the concept of reasonable precautions that shall be taken "to avoid damage to the diversity of nature in the sea […] and to avoid pollution"[269]. Indeed, the terms *prudent manner* and *reasonable precautions* do not necessarily convey an identical content. The concept of *prudent extraction* is defined as the extraction with "prudent

[262] Ibid, section 4-3.
[263] Ibid, section 4-4.
[264] Ibid, section 4-10.
[265] Ibid, section 4-7.
[266] Ibid, section 9-6.
[267] Ibid, section 9-7.
[268] Ibid, section 1-7.
[269] Ibid.

technical, environmental and healthy economic principles, and in such manner as to avoid unnecessary loss of minerals [incorporating an iterative] assessment of the strategy […] implementing *necessary measures*" [270] ; undoubtedly, these necessary measures will be determined under the aforementioned reasonable precautions that can be incorporated within the strategy of the specific DSM project. In consequence, these two concepts seem to reflect a vague and broad reference to environmental considerations.

A second interesting feature is the dynamic between DSM activities and other activities outside the mineral sector. In the case of the survey licenses, Section 3-2 of the SBM states that neither of those licenses give exclusive in the areas comprised by the license nor does it give preferential rights in the case of survey licenses towards the extraction stage; therefore, activities such as scientific research and exploration and exploitation of subsea natural resources other than petroleum and mineral deposits, activities within the Marine Resources Act[271] as well as activities under the Ocean Energy Act[272] are permitted within the same area. The dynamic is a different in the case of exploration activities under the SBM, since "an extraction licence under this Act does not prevent other parties than the licensee from being granted the right to conduct surveys for and production of petroleum pursuant to the Petroleum Act, when this does not entail an *unreasonable disadvantage* to the mineral activity"[273].

Although the exploratory activities under the SBM can coexist with other activities, the particular consideration of a reasonability exercise before granting permit to third activities must not compromise any extraction license already in place. It would seem, that petroleum still holds a special consideration when evaluated against extractive DSM activities, having priority over DSM activities depending on "the type of discovery made, investments undertaken, the stage the activity has reached, the activity's duration and scope and its economic and societal significance" [274] . Arguably, this particular scenario could be a consequence of the authority undertaken the regulation of DSM activities, the MPE, which appears to favour petroleum as it is still a resource promoted under its competence.

[270] Ibid, section 4-11.
[271] Act on the management of wild marine resources ('Marine Resources Act') ACT-2008-06-06-37 (entry in force 1 January 2099).
[272] Act on renewable energy production at sea ('Ocean Energy Act'). ACT-2010-06-04-21 (entry in force 7 January 2010). Nevertheless, the Offshore Energy Regulations were finalised on June 12, 2020 and (entry in force 1 January 2021).
[273] Seabed Mineral Act, section 4-9.
[274] Ibid.

Finally, a particular compensation scheme developed under Chapter 8 of the SBM, which considers "the fact that the [DSM] activity occupies fishing grounds, or entails pollution or waste, or that a facility or measures in connection with placement of a facility cause harm"[275], results curious. Within this particular chapter, Section 8-2 of the SBM duly acknowledges the real impact on Norwegian fisheries if the mineral activity in an area wholly or partly occupies fishing ground; moreover, it correctly references the concept of pollution and waste under the Pollution Act, which provides a complete legal landscape when addressing overlaps between DSM activities and fisheries, duly incorporating an environmental consideration.

After reviewing these provisions, and although there is a clear competence of the coastal state to design its own laws regarding seabed mineral activities within its national jurisdiction, it must be acknowledged that this discretion "is limited by the international obligation to protect and preserve the marine environment"[276], which is translated in further domestic regulations.

4.4.2 Analysis of the relevant Norwegian environmental framework

Within the previous section, some environmental frameworks have been identified as complementary regulations that may constrain further explain several provisions within the SBM. The connection between the SBM and transversal Norwegian regulations gives then due account to how DSM environmental and impact assessments "must take account of other activities […] and measure the cumulative impacts [where] environmental performance is […] connected to the economic feasibility [requiring] high environmental standards"[277]. Therefore, three major environmental regulations will be now described and analyse.

4.4.2.1 Natural Diversity act

Within the Natural Diversity Act ('NDA'), there are three main topics: regulation on protected areas and priority of species, the identification of selected habitat types and areas with specific ecological functions, as well as general provisions and principles. Therefore, the objective of the NDA is to "protect biological, geological and landscape diversity and ecological processes through conservation and sustainable use"[278], and although it does not directly apply to the NCS or its EEZ, several of its provisions apply to the extent were they are appropriate[279]. It must be noted that, this particular regulation adopts concepts which seemly

[275] Ibid, section 8-1.
[276] Willaert 2021, p. 424.
[277] Van Dam et al. 2016, p. 171.
[278] Natural Diversity Act, section 1.
[279] Ibid, section 2.

resonate with the CBD framework, concurring with several definitions: "c) biological diversity […], i) biological, geological and landscape diversity, j) habitat type […], [and] t) ecosystem"[280]; however, their content is not identical since certain limitations and conditions to the traditional CBD concepts have been added to favor the continuity of use of resources within national frontiers. In this sense, there are three main factors to advert with regards to their possible impact towards the development of DSM activities: the concept of sustainable use, main environmental principles, and the well-known protected areas.

Although primarily an environmental regulation, the NDA quickly shows its main interest – sustainable use of resources – within its first main chapter. It is curious how the management of habitat and ecosystems, where the "objective is to maintain the diversity of habitat types [and] also to maintain ecosystem structure, functioning and productivity to the extent this is considered to be reasonable"[281], sets the tone for both environmental principles and approaches, to act as limitations or conditions in order to accept the exploitation of resources, depending on the habitat, type of ecosystem and knowledge available[282]. The term *sustainable use* is not defined or even referred to other frameworks; however, it appears to be interpreted through the negation of the following environmental provisions within Chapter II.

The correspondent Section 6 of the NDA intends to elaborate on the general duty of care, which commands any person, or licensee in the case of DSM activities, to act with care and take reasonable steps to prevent harm or damage to the environment. According to the NDA, and nodding to the previous SBM, this duty is crystallized and considered achieved mainly when the activity in question is carried out with a permit such as a survey or exploitation license under the SBM. In this context, the three most important concepts within the NDA are consistently: the precautionary principle[283], the ecosystem approach and cumulative environmental effects[284], and the user-pays principle[285]. The former, as mentioned within frameworks such as the CBD and OSPAR, is highly tight with the absence of adequate information on the impacts of the environment, holding as its main goal the avoidance of any possible significant damage to the environment. Two important effects can be drawn from this concept of precaution under the NDA: first, it is clearly considered a principle and not an

[280] Ibid, section 3.
[281] Ibid, section 4.
[282] Ibid.
[283] Ibid, section 9.
[284] Ibid, section 10.
[285] Ibid, section 11.

approach within the Norwegian framework; and second, the harmful impact or damage must be considered significant in order to take action. The other two concepts reveal a specific conduct a behavior when assessing environmental effects, mainly referring to the ecosystem approach, and the consequence of failing to prevent them, through the user-pays principle.

Despite the legal weight and importance of the aforementioned environmental provisions, these principles and approaches may collide with other important interests and their developments. In case of conflict of interests, this shall lead to specific measures in the NDA, mainly environmental ones, to be weighed against other important public interests[286]. As consequence, measures related to species management[287], the establishment of protection areas to guard specific ecological functions for species[288], as well as the consolidation of protected areas to secure the full range of variation of habitats and ecosystems types[289], may be relaxed in order to secure other national interests, in accordance to the societal objectives. It must be noted that, regarding the protection of marine areas, the NDA clearly demands that those regulations state whether the purpose of protection applies to the seabed, water column, water surface or a combination of these, making sure to connect its main objective to its marine conservation value, in order to "safeguard valuable marine areas that are ecologically necessary for terrestrial species"[290]. With regard to DSM activities, which may occur in areas outside a protected area, the NDA states that if said activity requires a specific permit or license and there is potential "impact on the conservation value of a protected area, importance shall be attached to this value when deciding whether a permit should be granted, and when setting conditions"[291]; therefore, the evaluation of licenses for DSM may be well put on hold or denied if the environmental impact is accredited, in light of the duty of care.

The NDA provides several environmental provisions, environmental supervisions[292], an extensive chapter of enforcement and sanctions[293] that are congruent with the duty to take preventive measures but also remedial or restorative actions, as well as including a specific obligation to compensate the State in case of contravention to this framework[294] considering the particular environmental assets concerned and level of impact; nevertheless, as adverted in

[286] Ibid, section 14.
[287] Ibid, section 15.
[288] Ibid, section 24.
[289] Ibid, section 33.
[290] Ibid, section 34.
[291] Ibid, section 49.
[292] Ibid, section 63.
[293] Ibid, section 69.
[294] Ibid, section 74.

the previous chapter of this study, it is the specific content and meaning of transversal concepts that will be crucial to determine when to activate these provisions in favor of the environment.

4.4.2.2 Pollution Act

The Pollution Act constitutes the main framework which hold important features such as a general duty to avoid pollution, the prohibition of littering, and the possibility of businesses to apply for greenhouse gases emissions permits. Therefore, this framework tackles then two specific environmental issues; however, for the purpose of this study the focus will remain on the pollution aspect, as the main indicator connected to the ideal of a "sound environmental quality, [without being a] cause damage to health, interfere with well-being or damage nature's ability to produce and self-renew"[295]. It must be noted that, the Pollution Act incorporates a full section of guidelines, which act as interpretation aids to further implement it. Two of these guidelines resemble on two specific concepts and principles, previously mentioned by the NDA: the indisputable role of technology as a starting point based on specific assessments of the future use of resources to secure better results[296], and the principle of polluter-pays reflected by the collocation of the preventing or limiting pollution costs under the person responsible.[297]

Regarding its scope of application, the Pollution Act elaborates on the general rules of the scope including the EEZ[298], it also targets the undertaking of operations on the NCS[299]. Indeed, Section 4 of the Pollution Act delineates a clear reference between its provisions and the limitations or considerations provided by the international law, where the latter acts as limitation of the content of the Pollution Act; however, the application of the Pollution Act towards activities within the NCS, nevertheless, will be also evaluated alongside the investigations for the exploration and extraction. A second limitation on the application of the Pollution Act for DSM comes regarding the application of the correspondent permits, mainly since the SBM already establishes a specific license system which covers impact assessments that should include pollution matters. Therefore, the general duty to avoid pollution[300] will only apply to those aspects of the business – in this case the DSM activities – that regularly lead to pollution. This last statement reveals a rather vague content of what "regularly" means, as well as to what "aspects of business" truly comprises. Indeed, the difference made under this legal

[295] Pollution Act, section 1.
[296] Ibid, section 2(3).
[297] Ibid.
[298] Ibid, section 3.
[299] Ibid, section 4.
[300] Ibid, section 7.

framework, could lead to believe that: 1) within DSM activities there are different aspects, and 2) some of those specific stages or aspects can regularly cause pollution. Nevertheless, neither the establishment of the different aspects can be related to the different legal stages of DSM, nor the condition of regularity of those specific aspects to be well-known as usual triggers for pollution, because of the lack of proper baseline and information regarding this particular and new activity. Despite the observation aforementioned, the application of PA with regard to DSM activities within the NCS remains useful with regards of the content of specific terms such as the concept of pollution. Certainly, the concept of pollution can hold quite an extensive content: supply of solid, liquid or gas to air, water or the ground, noise and vibrations, light and other radiations, influence of temperature which may be harmful to the environment, as well as "something that can lead to previous pollution becoming an increased damaged"[301], the latter being consequence of a cumulative effect perspective.

Finally, throughout the Pollution Act, several environmental provisions are established: from specific faculties of the authority to regulate on limit values and quality requirements[302], the obligation to report new activities which could cause pollution, and therefore are subject to correspondent impact assessments and the condition of a public meeting about potential impactful activities[303], which would condition the granting of permits to pollute, to the obligation to hold emergency responses and emergency plans[304] in case of an acute pollution scenario. Nevertheless, one of the particular provisions within Pollution Act that could impact DSM activities corresponds to Chapter 8, that refers to the compensation for pollution damage. According to Section 54 of the PA "the provisions in the chapter apply to pollution damage that: a) occurs in Norway or the EEZ of Norway, or b) occurs outside the areas mentioned previously, provided that the damage is caused by an incident or activity on Norwegian maritime or land territory". Although DSM activities may fall within the second option of this provision, damages following a DSM scenario could be solved under Norwegian tort law.

4.4.2.3 Regulations on Impact Assessment framework

As DSM activities are currently promoted in several parts of the globe, "a number of existing EIA templates for DSM […] currently include social impact assessment as well as consideration of cultural and economic factors, although these are less developed and extensive

[301] Ibid, section 6.
[302] Ibid, section 9.
[303] Ibid, section 13.
[304] Ibid, sections 40, 41.

than environmental impacts"[305]. Indeed, the objective of the elaboration of impacts assessments within national jurisdiction is connected to the specific requirements of individual projects "where the technology, its operations and the general expected environmental impacts are broadly known to the national regulator, but an in-depth study is needed to better understand the specific impacts that are expected to occur if the planned project is allowed to take place"[306]. The concept of impact assessments has been constantly enhanced, almost in parallel with the improvement of national legal systems and the role of public authorities within the decision-making process of new activities within their jurisdiction.

As consequence of the EEA agreement, Norway has effectively incorporated the EU directives of 2014 on EIA and Strategical Eenvironmental Assessments ('SEA')[307] into its legal system through its Regulations on Impact Assessments ('RIA')[308]. The purpose of this framework is to guarantee the consideration for the environment and society is taken into account during the preparation of plans and initiatives, and when and what considerations may be needed[309]; moreover, this system lies under three separate procedures, land-based projects, maritime projects, and a special regard for activities in Svalbard[310]. It must be acknowledged that, the notion of impact assessments is not strange to the Norwegian framework, having "more than 30 years of experience with environmental assessments […] as vital tool for integrating environmental concerns [and] strengthened public engagement in Norway" [311].

Regarding the scope of this regulation, the relationship to other regulations "shall meet the assessment requirements and evaluations which under other laws are necessary for the decision on which the impact assessment shall be made"[312]; therefore, regarding particular DSM activities under the SBM, it would also need to be assessed under the RIA as a general provision. It is important to advert that, "the Norwegian system applies an integrated approach involving competent authorities, either the relevant municipality or a sectoral authority" [313], where DSM activities would still need to include primarily the MPE and subsequently the NPD to take decisions on major projects within the NCS. The RIA develops several chapters which

[305] Clark 2019, p. 454.
[306] Guilhon et al. 2022, p. 2.
[307] OECD 2022, Ch. 1.
[308] Established according to Royal Decree of 21 June 2017 pursuant to Act of 27 June 2008 no. 71 relating to the Planning and the Processing of Building Applications.
[309] Regulations on Impact Assessment, section 1.
[310] OECD 2022, Ch. 1.
[311] Ibid.
[312] Regulations on Impact Assessment, section 3.
[313] OECD 2022, Ch. 1.

account for the management of the different stages of completion of an impact assessment. Chapter 4 of the RIA begins to address the obligations and special considerations that the proponent of a project must consider in the early stages. Both the preparation and consultation procedure are highlighted; however, in the case of initiatives with other legislation, the RIA establishes that the "proposer shall prepare a notification with a proposed assessment programme, if the matter concerns an initiative pursuant to Section 6(1)(c)"[314]; which could include major DSM activities[315].

Certainly, a proper approach to impact assessments within the context of DSM activities would require a "systematic approach for environmental assessment, multidisciplinary baseline data collection […] as well as applying mitigation hierarchy to avoid and minimise the impacts"[316]. All the factors previously mentioned can be inferred from both the application of the RIA and the SBM, as they cannot attest of all the impacts and detail requirements needed for the particular activity which entails DSM. Here, the RIA elaborates on the specific requirements for the planning program with a proposed assessment program[317], while also developing the specific provisions on the consultation process targeted in benefit of the affected authorities and interested groups for their comments[318]. At this point, the proposal for a study program for the impact assessment mentioned in the previous Section 3.3.1.2 must be recalled, which complies with performing a crucial consultation process[319]. As a result of this process, several comments and environmental concerns came forward: 1) the need for more knowledge and mapping prior to any DSM activity to be performed, 2) the lack of application of the guidelines offered by the NDA and the application of the precautionary principle, 3) the incomplete regulatory development of a suitable administrative system that include environmental authorities in a direct manner, 4) the contradiction with the Ocean Panel objective and the SDGs, and 5) the social impacts that DSM activities could impact as a whole[320], all which are founded in very real doubts, already recognised in the international fora.

[314] Regulations on Impact Assessment, section 13.
[315] Ibid, Annex I.A.19. Plans and initiatives: "Extraction of ores, minerals, stone, gravel, sand, clay or other mass if at least 200 decares of the total surface is affected or the total extraction involves more than 2 million m3 mass, or extraction of peat in an area greater than 200 decares".
[316] Sharma 2022, p. 38.
[317] Regulations on Impact Assessment, section 14.
[318] Ibid, section 15.
[319] Ibid, section 15.
[320] Reggeringen (Norwegian Government). "Hearing - proposal for an impact assessment program for mineral activities on the Norwegian continental shelf" (12 April 2021) <https://www.regjeringen.no/no/dokumenter/horing-forslag-til-konsekvensutredningsprogram-for-mineralvirksomhet-pa-norsk-kontinentalsokkel/id2828123/> (last accessed 28 May 2023).

The RIA carries on elaborating the specific contents of the impact assessment, declaring that all impact assessments "shall be based on relevant and available information"[321], which coincides with the approach of the SBM regarding the available knowledge required. This particular provision, alongside Section 21 of the RIA which refers to the identification of factors that may contribute to a significant impact on the environment and society, are highly relevant for DSM activities. Certainly, the description within any impact assessment is intended to be transparent and complete; nevertheless, the obligation imposed by the RIA does not compels for the proponent to discover new relevant information, but to compile, analyse and discuss the available knowledge in order to determine the possibility of a project within the parameters and be able to avoid, limit and remedy any significant adverse effects plausible to happen[322].

Indeed, detailed and transparent impact assessment could be instrumental and a major contributor to further develop "strategies for management of impacts [since] one of the concerns is [the lack of knowledge] given the vastness of the oceans [which jeopardizes the data] required before mining begins"[323]. It must be noted that, Chapter 8 of the RIA also elaborates on the possible transboundary effects of plans or projects, where the Norwegian Environment Agency ('NEA') as a national point of contact[324], is to be notified[325] in case of transnational impacts.

4.5 Norwegian framework within the global context

Since the international commitments accepted by the Norwegian government, both from the Kyoto Protocol[326] and the Paris Agreement, have been incorporated through the Climate Change Act[327], the role of international law has never been more present. Therefore, the next and final chapter within this study, will aim to collocate the Norwegian regulatory framework within the international regulatory landscape, analysed in both the previous third and fourth chapter, with the objective to evaluate their dynamic, whether it involves compatibility, complementarity or total assimilation within the legal debate of pursuing DSM activities, according to the general environmental principles, sustainable development global context and the pursue of green transformation.

[321] Regulations on Impact Assessment, section 17.
[322] Ibid, section 23.
[323] Sharma 2022, p. 38.
[324] Regulations on Impact Assessment, section 33.
[325] Ibid, section 34.
[326] Kyoto Protocol to the United Nations Framework Convention on Climate Change, (adopted 10 December 1997, in force 16 February 2005) (1998) 37 I.L.M. 22 (henceforth refer to as Kyoto Protocol).
[327] Act relating to Norway's climate targets ('Climate Change Act') LOV-2017-06-16-60 (entry in force 1 January 2018) (henceforth refer to as Climate Change Act).

5 Assessing the dynamic between the international framework and Norwegian regulation regarding deep seabed mining

5.1 Sustainable development between the international and national spheres of law

Following the descriptive and analytic exercise applied throughout the previous chapters: why should the international law be considered within the development of domestic regulations in the context of DSM? and, how does the Norwegian framework approach the international landscape of regulations? Both of these questions aim to determine the dynamic of the legal relationship between international law and national or domestic law, within the specific scenario of DSM activities and the protection of the marine environment. The complexity of this exercise is reflected through two main aspects: 1) the main set of regulations within the sphere of international law that are applicable, both directly or indirectly, when discussing the legal development of DSM as a new anthropogenic activity, and 2) the equal value between international regulations, including regional structures and agreements, and national legal frameworks, which suggests the absence of any priority between them.

With regards to the first aspect, this study has been structured in adherence to the notion of an "international legal regime [which] falls within the intersection of two sub-areas […], namely the international law of the sea on the one hand and international environmental law on the other"[328]; the latter being slightly contentious and difficult to isolate since the "conclusion of numerous multilateral environmental agreements, the second sub-area has developed in a highly fragmented manner over time" [329]. The second aspect contextualizes the response to the research questions of this study, recognizing both spheres to hold a significant legal value within the legal controversy imposed by the DSM activity, as well as further focusing on how these "separate environmental legal regimes […] interact in one way or the other with marine environmental law" [330]. In this particular study, this second aspect involves different specific legal regimes such as climate change law and energy law as legal background, as well as the transversal input of impact assessments regulations and biodiversity management conservation.

Considered as a highly impactful and still virtually in process to be exploited and commercially developed in the Arctic, the condition of DSM opens the legal debate regarding

[328] Proelss 2023, p. 57.
[329] Ibid.
[330] Ibid.

its acceptance in the context of green transformation and sustainable development. As "mankind depends on nature, a [legal framework] aiming at achieving a sustainable fundament for generations of humans […] will [be] similar to [another] aiming at preserving the quality and biodiversity"[331]; therefore, the connection between a green transformation of energy resources and the protection of the environment, especially marine ecosystems, is highly intertwined as "the world in its physical and ecological senses reacts to what humans do physically"[332]. Manifestation of this can be clearly adverted from the transversal concepts and legal objectives of the different regulations reviewed within this thesis. Given this evident connection, DSM development could signify a new attempt to question "mankind's possibilities to live in a limited biosphere"[333]. As consequence of this discussion, questions regarding the role and of law, particularly within the international scenario, seem to increase at the same rate of the environmental concerns regarding DSM impact.

In search of the essence of the role of law for this particular scenario, Westerlund's idea of the scope of the law seems appropriate: "law in the meaning of the entire system of principles, written laws and binding or guiding court practice, but [also] about 'laws' in the meaning of pieces of legislation or acts"[334]. Certainly, in order to understand the role of the international law within the DSM debate, principles, treaties and pieces of legislation have been described and assessed; as consequence of this exercise, it can be adverted that these reflect an "active law [nature], [where the law] states something, [where the regulations analysed] allocate rights, […] impose obligations, […] prescribe restrictions […] and does this more or less explicitly"[335] in the context of DSM activities. It is important now to delve into the two sub-areas of the international framework to examine how both of these constitute complementary pieces of the same puzzle that is the protection of the marine environment.

5.1.1 International marine environmental law: role within deep seabed mining

Although this study physically separates the field of law of the sea and the field of environmental protection, this exercise should not be misread for a legal separation of both their scopes, if anything this study constitutes a clear manifest of their natural correlation. Churchill affirms that the current "corpus of international marine environmental law comprises at least 100 global and regional treaties, as well as countless legally binding measures adopted by an

[331] Westerlund 2007, p. 17.
[332] Ibid, p. 19.
[333] Ibid, p. 94.
[334] Ibid, p. 25.
[335] Ibid, p. 29.

array of global and regional bodies"[336], which would definitely include UNCLOS as one of its main treaties. As representative of the law of the sea consolidation, UNCLOS contributes immensely with the crucial task of defining the extent and definition of jurisdiction and the maritime areas, which provide the first step towards the legal analysis of this study. The transversal natural of the environmental component can be identified particularly within Part XII, were concepts such as the sustainable use of resources and the conservation of marine environment, play a key role within the interpretation of obligations regarding the development of new activities, such as DSM. However, the question of whether this important treaty is still relevant to the protection of the marine environment[337] looms within the DSM debate, both within and beyond national jurisdiction. In these circumstances, is the support offered by the regulations and principles analysed within Chapter 3 of this study, that complement the vision of UNCLOS, and conform the so-called environmental law field.

The environmental filed builds on two crucial pillars: a) the "legal development [...] traced back to earlier legal rules and policies in different countries, [and] b) the [results from the acknowledgement] of the [human] limitations [within] the biosphere"[338]. Regarding the first, it is noticeable how the growth of the environmental field and its objectives its deeply embedded within the sustainable development concept and the "notion of (global) finitude [recognizing] such problems as limits to growth" [339]. Although not explicitly mentioned, the concept of economic growth fuels the so-called "ecological dilemma [that] lies behind the world community's [decision] aiming at sustainable development"[340]: is sustainable development compatible with DSM? While this study does not intent to answer said question, it is crucial to highlight it as context for the narratives that will be analyze in the following sections.

Delving into the object of this study, the *equilibrium* between the conservation and protection of the marine environment and the right of exploitation of resources was acknowledge and analysed, which clearly portraits the current debate of DSM within national jurisdiction. This particular dynamic can be extrapolated to an even more practical scenario such as the difference between environmental planning and exploitation planning, as manifestations of a certain role of the law in a particular scenario. Here, Westerlund adverts that when a "plan [allows] for exploitation, [it] functions as [a] licensing [system] resulting in

[336] Churchill 2023, p. 34.
[337] Rayfuse et al. 2023, p. 32.
[338] Westerlund 2007, p. 39.
[339] Ibid, p. 16–17.
[340] Ibid.

environmental changes, [but] when [it] also […] restricts land [use], it functions […] as [environmental] reserves" [341] or areas for protection or conservation of the environment. I believe this distinction lies within the core of the balance exercise previously mentioned, to which the MEL needs to respond as a global responsibility in favour of sustainability. If performed successfully it can have huge potential to positively impact across different domestic regulations, which will aim to incorporate the MEL into their own legal framework, not only as consequence of its obligatory condition but because there is a conscious belief in its value to ensure a sustainable development. The Norwegian legislation was then evaluated precisely to verify the degree and level of correlation between the role of MEL within the Norwegian national jurisdiction in the particular DSM scenario, duly acknowledging that the DSM legal framework resembles an identical approach of the Norwegian licensing system for oil and gas.

5.1.2 A manifestation of dualism: Norway's approach on international law

As adverted in the previous chapters, Norway comprises a unique example of both consolidated integration within the international scenario as well as a deep and strong national jurisdiction, with a particular view on its resource endowment and how it can be best what is the best way to take advantage of them; however, this study aims to expose how both of this aspects impact and influence each other. For this purpose, it is appropriate to analyse the Norwegian approach towards the international law outlook, focusing on one of the two main doctrines regarding the interrelation between national law and international law: the doctrine of dualism, and its origin in the "self-determination and sovereignty of States"[342].

The dualism doctrine entails a particular approach on the meaning of what rule of law, which asserts that "national law should not automatically be subject to changes in events on the international level over which the national legislature has no control, [effectively]viewing national law and international law as distinct legal orders" [343]. This doctrine emphasizes then the rightful power of any sovereign state to adopt and demand compliance of any law within their jurisdiction, as a natural consequence of the exercise of its sovereignty, concept which is highly relevant regarding the determination of maritime zones and the effective control over resources and activities that would be performed within the national jurisdiction. Despite other political intentions or motivations that could lie beneath a dualist doctrine, the Norwegian view towards the international law may not only rely on dualism approach, but also include a monist

[341] Ibid, p. 251.
[342] Björgvinsson 2015, p. 34.
[343] Ibid.

approach to a certain extent, which understands national and international spheres as a unit[344], mainly since in Norway "some fields of law, […] whereby international treaties […] are to some extent automatically incorporated, [exposing] that the [dualist approach is] inconsistent with furthering of international relations and the involvement of Norway"[345]. Whether this argument contradicts the traditional dualist approach of the Nordic region, there are specific constitutional norms which address the next step to be considered within a dualist scheme, mainly found within "articles 76–79 of the Norwegian constitution[which] lay down rules on adoption of legislation [as well as] article 26 of the constitution [which] provides that the law must be changed if [any international] provisions run counter to Norwegian law"[346].

Indeed, the Norwegian constitution clearly states that "treaties on matters of special importance, and […] treaties whose implementation […] necessitates a new law […], are not binding until the Storting has given its consent thereto"[347], were again the Norwegian dualist approach "leads us to [believe in the application of] the principle or doctrine of transformation, just as in the case of Denmark"[348]. The doctrine of transformation, as well as the doctrine of automatic incorporation, derive from a practical application of the international law within the national sphere; where the latter "is done by [a direct] referring to international treaties, either specific provisions contained in the treaties or to them as a whole […] thereby incorporating them in national law"[349], while the former aims to "transform [the international provisions] into a legal text which is then adopted [within the national law]"[350]. While the majority of authors claim that Norway portraits a clear dualist approach, some concrete examples may expose a rather case-by-case scenario when evaluating the incorporation or transformation of international laws into the Norwegian framework, one of them being the incorporation of the European Convention of the Human Rights[351], which remains "fully consistent with the dualistic approach and the doctrine of transformation [as] it was enacted as statutory law in Norway by the Human Rights Act (Menneskerettsloven)"[352].

[344] Ibid, p. 20.
[345] Ibid, p. 37.
[346] Ibid.
[347] Norwegian Constitution, art. 26 para 3.
[348] Björgvinsson 2015, p. 50.
[349] Björgvinsson 2015, p. 63.
[350] Ibid.
[351] Ibid, p. 94.
[352] Ibid.

5.2 Impact of the international framework into Norwegian Law

Although the relationship between MEL and the Norwegian domestic regulation has proven to be true and relevant for the DSM debate, the sovereignty and right to exploit the natural resources in favour of the Norwegian domestic regulation, as established in the chapter 2, may questioned a total precedent and priority of the complexity of MEL provisions to be implemented within the national sphere. As consequence, we recall the initial legal questions within this study: how does the Norwegian legal framework include MEL provisions regarding DSM? and, to what degree is aligned with its principles and main pillars beforementioned? This analysis is based on two main premises: a) Norway is member of all the MEAs and governance structures here acknowledge, including the EEA community, and, b) since MEL involves a vast set of agreements, principles and recommendations, the concept of rules of reference ('RoR') constitutes an important factor to incorporate within this evaluation.

Throughout this study, the relevant Norwegian regulations regarding DSM activities have been identified, described and analysed, offering a glimpse of the answers to the questions aforementioned. Furthermore, the existence of protocols, mechanism and practical tools within the MEL landscape have been carefully highlighted and associated to specific Norwegian provisions in all four regulations assessed: the SBM and the NDA to the Pollution Act and the RIA. Despite the association between both international and national provisions, one particular condition was evident: there is currently an over-regulation, including policies and legislations, of the marine environmental subject regarding both its conservation and use. Indeed, the idea of "UNCLOS as a comprehensive marine environmental treaty is [truly mistaken], […] that was never the intention of its drafters [since] there were already important [MEL] treaties in existence" [353]. Whether to avoid unnecessary duplications or due to the recognition of MEL as a "cross-sectoral and multi-layered area [which] entails the risk of […] norm conflicts"[354], the impression of a fragmented condition is undeniable. Given this circumstance, the implementation of MEL provisions regarding DSM is highly supported by several competent institutions in accordance to Article 197 of UNCLOS, which establishes the well-known legal duty to "cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations". Some of the main examples relevant for the object of this study are those founded in the "context of the Regional Seas Programme of the United Nations Environment Programme ('UNEP'), [as well as] the OSPAR Convention [which

[353] Churchill 2023, p. 34.
[354] Proelss 2023, p. 57.

constitutes] a competent international organisation in terms of Articles 207(4), 208(5) and 210(4) [of UNCLOS]"[355].

5.2.1 The introduction of MEL provisions within the Norwegian legal framework

In this study, the current balance between economic and environmental interests within the scope of DSM activities in Norway has been openly exposed, mainly in light of three main elements within MEL framework: "threat of environmental harm, scientific uncertainty and action despite uncertainty"[356]. Since DSM constitutes, first and foremost, a human activity which is huge developed within the marine environment, UNCLOS remains the main international framework responsible to shine a light regarding its future path and legal considerations. However, since DSM is a new activity not acknowledge within the origin of UNCLOS, "many of the substantive environmental provisions of UNCLOS [could now be considered] inadequate […] either because the standard that they set for environmental protection is too low or because they are too broadly formulated and open-textured to be serviceable"[357], which suggest a first challenge towards a clear legal regulation on impactful marine activities. Against this background, and recognizing the unlikly possibility of a formal amendment of UNCLOS, other alternatives are currently contemplated, mainly: "(1) implementation agreements; (2) rules of reference; (3) measures adopted by the ISA; (4) resolutions of the UN General Assembly; and (5) interpretation by international courts"[358]. The first three first alternatives will be now highlight and briefly discuss, as the most useful and effective combined legal choices when discussing the DSM future within national jurisdiction.

5.2.1.1 Implementation agreements

This first alternative derives from a second challenge posed by an apparent conflict of frameworks between UNCLOS, as the main treaty of the law of the sea, and other agreements that aim to protect the marine environment, where the CBD plays a central role. Both UNCLOS and CBD include a specific provision regarding this issue, where "Article 22(2) of the CBD [demands its] implementation with respect to the marine environment consistently with the rights and obligations of States under [UNCLOS"[359], which "seems to establish superiority of UNCLOS over the CBD in relation to the protection of the marine environment; [however,] it

[355] Ibid, p. 67.
[356] Wollensak 2023, p. 139.
[357] Churchill 2023, p. 39.
[358] Ibid.
[359] Proelss 2023, p. 71.

[…] neglects a broader category of legal elements – namely approaches and principles –"[360] that could be argued in favour of the protection of the marine environment. As a direct effect of this reasoning, the so-called rules of reference make an appearance as a natural consequence of "the nature of UNCLOS as […] constitution for the oceans, recognising that its provisions – those of Part XII – need to be further developed through other multilateral agreements"[361] including "the adoption of more specific instruments on the levels of international, regional and national law" [362]. Within the DSM scenario, although this alternative seems coherent with the general and vague content of UNCLOS, it usually calls not only to be in alignment with UNCLOS, but also strive to be no less effective than the so-called international rules, standards and recommended, as congruent with Article 208 of UNCLOS previously addressed within Section 2.2.1.2 of this study, condition which is linked with the following second alternative. Regarding the CBD, as second main treaty within MEL, "in terms of its jurisdictional scope, […] covers marine biodiversity within the limits of national jurisdiction as well as processes and activities carried out under the jurisdiction or control of the member States"[363]. Therefore, the direct influence and obligation of implementation within the Norwegian framework is undeniable. One of the most important concepts targeted to be implemented is the well-known ecosystem approach, although "anything but straightforward, […] legal and administrative systems governing them make [its] effective implementation […] both complex and highly challenging" [364]. Aware of the high interconnectivity of the oceans, and the lack of physic boundaries between national jurisdiction and the Area, this important mechanism it is even more challenging to address, since it "has added 'a new dimension to marine environmental protection [promoting a] more efficient and sustainable use" [365].

It must be noted that, the selection of specific marine areas to be conservated is now a common practice, with somewhat different terminology. From *regional environmental management plan* ('REMP') as a tool within the ISA framework, to the non-legally binding concept of *ecologically or biologically significant marine areas* ('EBSA') [366] within the CBD framework. It is in light of this transversal agreement, the CBD, that the "importance of implementing area-based management capable of addressing multiple management objectives,

[360] Ibid.
[361] Ibid.
[362] Ibid, p. 58.
[363] Rayfuse 2023, p. 313.
[364] Ibid, p. 316.
[365] Ibid.
[366] Ibid, p. 329.

[including] tools and approaches, such as Integrated Coastal Zone Management ('ICZM'), [as well as] Marine spatial planning ('MSP')"[367] has been highlighted and encouraged to use for decision-making processes such as the one involving DSM exploitation possibility. In this context, Norway's implementation of these tools and concepts has been optimal, unlike other "[national] jurisdictional competence […] has largely been characterised by high levels of sector-specific and uncoordinated institutional […] fragmentation"[368]. Indeed, "the progress made in the region's MPA network via Norway and the United Kingdom's nomination of thirty-one new MPAs [has increased] the total in the OSPAR network to 496 MPAs".[369]

5.2.1.2 Rules of reference

To discuss properly the RoR, we need to advert that they can be used in different ways, holding different legal effects. Certainly, some RoR directly incorporate international rules and standards establishing an international minimum standard to comply with; however, others merely require that international rules or standards[370] be taken into account, indicating a significant degree of discretion when deciding upon an appropriate regulation regarding a specific subject. In the case of UNCLOS, RoR have been usually encountered in relation to different categories of environmental pollution, aiming to "concretise broadly drawn obligations in the UNCLOS"[371] and hopefully contribute to limit the myriad of alternatives each State would favour to implement within their jurisdiction[372] in the particular case of DSM. Indeed, "many rules of reference concern protection of the marine environment [where] they vary in their nature and their degree of normativity"[373]. Part XII UNCLOS supports itself with these particular set of RoR, "that have been accepted within the framework of other international agreement"[374], which can be found even with different terminology[375]. In the particular case of this study, DSM within national jurisdiction remains a highly discretional state decision, where we observed the use of a RoR that aims to hold any state interested in

[367] Becker-Weinberg 2023, p. 454.
[368] Rayfuse 2023, p. 331.
[369] Manoj 2019, p. 299.
[370] "The phrase 'generally accepted international rules and standards' is not defined in UNCLOS. In the past, considerable ink has been spilt over its meaning and in attempting to determine which international rules and standards relating to pollution from ships could be regarded as 'generally accepted'. Today those questions are largely academic" [Churchill 2023, p. 45.]
[371] Ibid, p. 44.
[372] Cormier and Minkiewicz 2022, p. 608.
[373] Churchill 2023, p. 44.
[374] Proelss 2023, p. 61 – 62.
[375] "Notions such as 'applicable international rules and standards' (Arts 213, 214, 216(1) 217(1), etc.), internationally agreed rules, standards, and recommended practices and procedures' (Arts 207(1) and 212(1), 'generally accepted international rules and standards' (UNCLOS, Arts 211(2) and (5), 211(6)(c) and 226(1)(a)), and 'global rules and standards' (UNCLOS, Art. 210(6)), to mention a few examples". [Ibid]

DSM, responsible as long as it complies with the general international rules and standards for said particular activity. Since "depending on how the reference clauses codified in the UNCLOS […] are framed, the external rules [could] indirectly become binding under the LOSC" [376], the particular case of DSM within national jurisdiction suggests a rather soft impact from UNCLOS, mainly due to: the nature of UNCLOS and the historical approach of DSM activities, the presence and continuation of ISA's work within the Area, and the consolidated right of exploitation of resource, to name a few legal conditions re-discovered within this study. Moreover, "the sovereignty of the contracting parties is safeguarded by the requirement that these measures must be 'generally accepted"[377], which poses a question in itself regarding the general, and therefore internationally, acceptance of specific legal rules; however, since DSM is currently a centre of attention and economic pressure, the regulations and guidance from the current DSM exploratory activities within the Area can legal impact DSM within national jurisdiction as "rules and standards [that] have been incorporated in international agreements [where it is] sufficient that the measures in question have received widespread acceptance – by whatever form of international consent" [378] which could include the ISA standards on DSM.

5.2.1.3 Relevance of measures adopted by the ISA

Indeed, the sovereignty principle and the right of each State to design its own environmental policies remains untouchable, suggesting a complementary dynamic between the international standards and national legal frameworks, since "discussions taking place at the ISA can certainly play an important role in informing the development of regulatory regimes within national jurisdictions"[379]. There is no doubt about the direct input and effect of the ISA when addressing DSM within national jurisdiction, reflected in several rules and standards: from the introduction of" conservation targets [which] the ISA would need to ensure for DSM to effectively protect the marine environment and does not endanger the natural systems"[380], to the recompilation of the BAT knowledge to determine "what type and level of impact from DSM would pose risks of serious harm […] life-support systems [duly applying] the precautionary […] to determine acceptable risks" [381]. As consequence, many transversal environmental concepts have been incorporated through national legislation, "[such as the inclusion of] the ecosystem approach [as] guiding principle for environmental management

[376] Ibid.
[377] Ibid, p. 69.
[378] Ibid.
[379] Guilhon et al. 2022, p. 3.
[380] Jaeckel et al. 2017, p. 154.
[381] Ibid.

[with direct connection to the] EIA"[382]. Notwithstanding the numerous Recommendations made by the ISA[383], there is currently still an ongoing process of consolidating a Mining Code to "govern the entire life-span of deep seabed mining operations"[384]. These guidelines, although aimed for the Areal, will add on the current standards to be considered in Norway.

As the result of the analysis of the three major aspects of UNCLOS regarding DSM, it can be asserted that this legal framework demands States to incorporate into domestic legislation the precautionary principle, environmental impact assessments ('EIA'), prevention of transboundary harm, and community cooperation as some of the key requirements to develop DSM activities. However, although the Council of the ISA has recently reconvened to discuss the draft regulations on the exploitation of mineral resources in the Area[385] last March 2023, until the full legal process is complete it could be suggested that an international constraint to proceed only with domestic legislation remains in place. Activities such as fisheries and shipping, which are contain in different regimes and regulatory frameworks, often impact and have opposite interests to DSM, that may influence the decision-making process regarding the possibility of developing DSM. This controversy within the Area can inform and educate the policies and legal frameworks such as the Norwegian regulation, offering a closer look to the "coordination at the overarching level, [with] common tools and standardised practices"[386].

5.2.2 Impact of the EEA agreement towards deep seabed mining in Norway

As hinted within Section 3.2.2 of this study, the EU fulfils an important role in the green transformation process, and more so with its relationship with Norway, as a member of the EEA Agreement. Due to its dualist approach and coherent with the principle of consistent interpretation[387], Norway approved the *EEA Act*[388], which aims to operationalize the EEA Agreement, to fully incorporate the EU "rules on the four freedoms, competition and state aid

[382] Clark et a. 2020, p. 3.

[383] Some of the Recommendations regarding DSM: Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (adopted 13 July 2000) ISBA/6/A/18, (updated 25 July 2013) ISBA/19/C/17 (Nodules Regulations); Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area (adopted 7 May 2010) ISBA/16/A/12/Rev.1 (Sulphides Regulations); Regulations on Prospecting and Exploration for Cobalt-Rich Ferromanganese Crusts in the Area (adopted 27 July 2012) ISBA/18/A/11 (Cobalt Regulations) [Sharma 2022, p. 36-37.]

[384] Dingwall 2020, p. 147.

[385] IISD. "Summary report, 16–31 March 2023" <https://enb.iisd.org/international-seabed-authority-isa-council-28-summary> (last accessed 29 May 2023).

[386] Banet 2020, p. 7.

[387] "International law in a certain field may dictate that contracting states are under the obligation to interpret national law as consistent with the state's obligations. This is well known, for example, in EU law as well as EEA law [as mentioned in the] EFTA Court judgment in the Karlsson case" [Björgvinsson 2015, p. 106]

[388] Act on the implementation in Norwegian law of the main part of the agreement on the European Economic Area (EEA) Act No. 2/1993 (henceforth refer to as EEA Act).

direct effect in the domestic system"[389]. Truly, the unique relationship between the EU and Norway holds a deep legal nature, since it "separate principles apply to the relationship between EEA law and national law which are set out in the EEA Agreement itself"[390]. Moreover, the concretion of the dualism approach is reflected in several of the features of the EEA agreement: a) the direct effect or direct applicability of the EU secondary legislation will not become part of the national legal corpus, until specific measures are taken to implement them, in accordance to its national standards and constitutional frameworks[391] suggesting the primacy of national laws over unimplemented EEA laws, b) the primacy of EEA law resembles the idea of uniformity within EU law[392] and it is states within Section 2 of the EEA Act, which provides that "provisions in law that serve to meet Norway's obligations under the EEA Agreement shall, in case of conflict, take primacy over other provisions that regulate the same conditions" [393]. Although Norway has effectively implemented the EEA agreement, certain terminology may be used to exhort the impact of the EEA framework regarding Norwegian decisions regarding DSM within its continental shelf, mainly since according to Article 126, the EEA agreement "is applicable to territories of the EFTA States; [nonetheless] Norway [claims] that [it] does not apply to [its] continental shelf, as these do not take place on Norwegian territory"[394].

The strength in the relationship between EU and Norway does not restrict itself to the legal framework that consolidates it but more so to a huge sense of political need and cooperation that has been acknowledge more recently. The demonstration of "Norway's commitment to cooperate with the EU […] in relation to environmental, energy, resource management, [mainly through] grants [supporting] renewable energy, energy efficiency, and energy security; and climate change" [395] issues, truly reflect the interest of Norway in multilateral cooperation "to address common challenges experienced on a global scale and to safeguard Norway's security, economy, and prosperity"[396]. As consequence of this several EU particular policies, may only have a specific impact into Norwegian law, if they are effectively introduced within the EEA framework, and cooperation is set to remain.

[389] Björgvinsson 2015, p. 69.
[390] Ibid, p. 70.
[391] Ibid.
[392] Ibid.
[393] Ibid.
[394] Arnesen et al. 2020, p. 318.
[395] Das Neves 2021, p. 361.
[396] Ibid, p. 363.

5.3 Beyond Marine Environmental Law: the role of governance

5.3.1 Current global narratives of deep seabed mining

The regulations analysed within this study convey different legal aspects of DSM activities, highlighting the main concerns and factors to be included in the current debate of pursuing an exploitation phase. While it is appropriate to mention that the relationship between international law – more concretely MEL – and Norwegian legislation – as our main case in this study – is legally a strong as the number of voluntary introduction of agreements and effective participation with specific regional institutions as part of the Norwegian framework, it seems that DSM activities may yet to be fully address in both spheres. As a matter of fact, the current scenario leans towards a yet under developed legal framework mainly due to the lack of determination of what sustainable development means and hence the role of both international and national laws to address it progressively. Nonetheless, "the emergence of the legal regime for deep seabed mining [and] the mere expectation of future technological development can also provide the impetus for the development of the law" [397], and therefore, external and non-legal factors may shape the future international legal frameworks, alongside the impact on national jurisdictions such as Norway. Indeed, since the ultimate legal challenge appears to be between the development of new regulation and competent structures of governance – such as OSPAR, Artic Council and the Ocean Panel – and the effective assessment of tolerable limits and mitigation of impacts towards threats to the marine environment[398], non-legal concepts and specific narratives may interplay within the debate.

Although most recently, there have been new environmental pledges and international summits regarding new scenarios and discourses of DSM, there are four main conflicting narratives identified within the DSM legal debate, as a result of the "economic growth, green technology, and the production of electronic goods are driving the mining industry into new frontiers" [399]. The first narrative called resembles the previous notion of a possible Blue Economy, as a consequence of the previously established need for minerals to achieve the green transformation, "DSM is not only portrayed [...] as means to secure economic growth, but also as the potential start of an alternate economy — a blue one— that could [also] pave a way out of poverty"[400]. A second narrative derives from the CHM concept, where the idea of DSM is

[397] Rayfuse et al. 2023, p. 29–30.
[398] Ibid, p. 30.
[399] Hallgren and Hansson 2021, p. 1.
[400] Ibid, p. 6.

possible to entertain only if "DSM profits [are] shared equitably amongst all nations [utilizing the work of] ISA [by] setting up a payment mechanism [...] controlled and organised around a notion of transparency and fairness"[401]. A third narrative – named *depths of the unknow* – is highly intertwined with the lack of sufficient knowledge about the deep seabed, where the pursuance of DSM projects would need to be a result of an extensively analysed between the environmental risks and societal benefits. Finally, the last narrative calls for a conscious and voluntary will to *let the minerals be,* as consequence of the "fears of environmental disaster [and] lack of trust in the current seabed regime and the risk that the regulatory system will rely [only] on the currently available [and] incomplete data"[402]. This last narrative does not consider viable a justice approach into sharing the benefits mentioned in the second narrative because the lack of data would make it impossible to trust the data publicly available. As consequence of this scenario, how do these narratives impact in the development of DSM within national jurisdiction? And more so, how does the legal framework in both international and national legislation tend to said narratives?

The narratives previously described are a reflection of ideas within certain groups of society all around the world, and some of them do concur in the same national jurisdiction. After examining and analysing the main Norwegian legislation regarding DSM, the first narrative appears to be manifested through both its regulatory documents as well as the progressive policies and guidelines emitted; however, I do not consider the four narratives previously mentioned are totally incompatible with each other, and the possibility of a mix of them as main motivation behind certain legislations is conceivable. Therefore, the consideration of a Blue Economy narrative[403] does not exclude the pursuance of a benefit sharing narrative, while it is possible to consider that the third and fourth narrative could be combined to try call a moratorium on DSM until enough information and knowledge has been gather. Certainly, this study has proven that the Norwegian legislation background would be fuelled by the first two narratives, and crystallized the concept of sustainable use to be well-matched to the consideration of a DSM exploitation situation, which could be shared with the majority of Arctic states if the international framework remains neutral to consider any of these narratives.

[401] Ibid, p. 8.
[402] Ibid, p. 11.
[403] It must be noted here that, the blue economy path seems particularly similar to "the focus of the Decade for Ocean Science [as it may] not [look out for] the protection of the marine environment but rather on providing 'solution-oriented research needed for a well-functioning ocean. [The focus] is on science for sustainable development and promotion of the 'Blue Economy', rather than on science for the protection of the marine environment per se" [Rayfuse et al. 2023, p. 3.]

Given this scenario, two important factors interplay as connectors between the exposed narratives and legal development regarding DSM: international cooperation and governance.

5.3.2 Cooperation as both legal principle and decision-making factor

As previously stated in this study, the principle of cooperation forms part of MEL core and centre; nevertheless, it can also promote certain narratives in a particular international debate, such as the development of DSM exploitation and commercial activities, as condition to continue and consolidate certain international relationships between states globally. The dynamic between Norway and the EU serves as a concrete example of how, depending of a particular narrative regarding DSM as well as the particular interests within the national sphere and regional sphere of the EEA community, the cooperation and relationship between them may decrease. Moreover, the cooperation factor within marine environmental issues can be highly delineated by the current "multilateral frameworks [that continue] supporting and coordinating the Decade [of the Oceans], that is, UNESCO and, […] the UN system, [that aim to] delivering *the science we need for the ocean we want*" [404]. Another manifestation of a platform that aims for international cooperation to manage our oceans and coastal areas is the so-called "UN Oceans, an 'interagency mechanism that seeks to enhance the coordination, coherence and effectiveness of competent organizations of the United Nations system and the ISA" [405]. It should be noted that this forum "embodies the insight that interinstitutional cooperation is necessary because coherence of the marine environmental protection regime cannot be ensured by means of formal rules and principles alone" [406], establishing a necessity beyond MEL to achieve the effective realization of MEL main provisions and goals.

A final example of high-level cooperation from the biodiversity perspective derives from Article 14 of the CBD, where cooperation is translated on the exchange of information and consultation activities between the members, regarding activities under their jurisdiction or control that could hold significant and adverse effects on the biological diversity of other States. Additionally, Article 18 of CBD further elaborates on the content of technical and scientific cooperation, considering an international approach where different stakeholders are actively engaged within both the field of conservation and sustainable use, where the implementation of national policies is encouraged. As consequence of this, the cooperation promoted by the CBD can help delineate and form a particular national regulation regarding transversal topics,

[404] Polejack 2023, p. 3.
[405] Ibid, p. 73.
[406] Ibid.

such as the future of DSM. The concepts of cooperation and shared knowledge are not strange to the Arctic region, for example in the relationship between the Arctic Council's CAFF and the CBD which has successfully consolidated several agreements with the purpose of providing a platform to inform the CBD on the status of Arctic biodiversity and the possible impacts of new anthropogenic activities sat large scale such as DSM.

5.3.3 Governance and the future of deep seabed mining

The idea of a "comprehensive governance of the oceans that brings together and relates the numerous multilateral agreements, soft law instruments and actors relevant to marine environmental protection in a coordinated manner"[407] seems transcendent within the debate of DSM exploitation phase. Undeniably, the legal frameworks examine within this study only show a part of what marine governance constitutes, and they can be rather limiting if not paired up with scientific new concepts and tools, as well as technological improvements, moreover when trying to predict the future of an activity with impacts yet to be fully understood. Thus, it is expected for new non-legal concepts and tools to lead the path towards a green transformation.

Following this perspective, this study has identified a glimpse of several concepts with a potential to be engaged or promoted within particular policies and legislations, within the DSM scenario. In addition to the tools already highlighted, the concept of Integrated Ecosystem-Based Marine Management ('IEBMM') has been promoted as the next level of application of the previously identified concept of Ecosystem Approach within both the CBD and OSPAR, which considers the combination of three different tools: Marine Spatial Planning ('MSP'), Marine Protected Areas ('MPAs') and Ocean Zoning ('OZ')"[408]. The advantage of this concept comes from its cross-sectoral nature which highlights the numerous activities within the ocean space, including DSM within national jurisdiction, as well as the understanding of how "the boundaries of ecosystems do not, as a rule, overlap with the boundaries of national jurisdiction of coastal States [where] relevant policies […] in various sea areas with different legal status and regime should be coordinated" [409]. Although the Arctic Council could be the main platform of cooperation to implement ideas such as IEBMM, "most of the efforts to develop [them have been] within areas of national jurisdiction"[410].

[407] Ibid.
[408] Todorov 2023, p. 315.
[409] Ibid.
[410] Ibid.

6 Conclusions

6.1 Summary of academic study

This thesis has provided an opportunity to explore a particular domestic legislation, such as the Norwegian framework, which is insert in such a unique region such as the Arctic and its particular governance structures, in a context where there is yet to be any development of DSM exploitation activities in its national jurisdiction. Therefore, the normative description and analysis of the international context, specifically regarding the MEL field, has not only help delve deeper into legal concepts and important principles but also effectively measure in parallel how these concepts interconnected within the international sphere and the national sphere with the green transformation necessity as major background. Therefore, this thesis has opted for an evaluation of a cascade of selected international, regional and national obligations, that were described and legally analysed to provide an overview of how those spheres contribute or deter the protection of the marine environment, taking DSM as main case study.

As an introduction, this study lay the field of legal controversy acknowledging two important concepts: the green transformation and the pursue of sustainable development. The former, although not entirely a legal concept, conveys a major net-zero goal commitment as a result of the Paris Agreement, as well as a deep connection with several SDGs, including the guarantee of affordable, reliable and sustainable energy, through mainly renewable sources. As the global demand of energy will only increase forwards, DSM has now dusted off as an alternative to both land-based mining and conflict minerals circumstances. In this light, all types of DSM – SMS, CFC and PNM – and their recovery technologies, are now being explored, proving the historical interest of the development of this activity. Nevertheless, the Arctic – as general geographic area of this study – has remained untouched, mainly due to the current sovereign claims regarding the extension of the continental shelf of several states.

Once the historical and scientific details regarding DSM were highlighted, the international law of the sea field was identified and duly assessed. Indeed, following the jurisdiction claims submitted to the CLCS, the possibility of DSM not only in ABNJ but also in AWNJ was effectively considered. Here, the legal analysis of the maritime jurisdiction of the EEZ, continental shelf and the Area was found relevant to continue evaluating the scope and legal concerns of DSM under the UNCLOS framework. Furthermore, the concept of sovereign rights within the continental shelf and EEZ were crucial to detailed to confirm their resource-oriented functional competence. Nevertheless, the main takeaway from this chapter

lies in the recognition of a delicate balance between the right to exploit natural resources, including the seabed minerals, and the duty to protect the marine environment in both AWNJ and ABNJ. The achievement of an equilibrium between both UNCLOS provisions remains challenging, mostly because there are no standardized environmental concepts with high impacts for DSM, such as the idea of serious harm. Indeed, the lack of uniformity of GAIRS impact the well-known legally binding obligation under Article 208 of UNCLOS, since the effectiveness of the domestic legislation regarding DSM is not able to be measured. However, relevant case law, such as the 2011 ITLOS Advisory Opinion[411], which can fill this provision with meaning and strive to categorise and promote the conceptualization of crucial terms. It must be noted that, within the law of the sea framework, both the due diligence concept and BAT knowledge have truly validated the EIA mechanism as the practical reflection of the balance aforementioned.

Following the overview and analysis of UNCLOS and its main principles, it was opportune to address the environmental law regulations applicable to a DSM scenario. Starting from the no harm rule and sovereign right to exploit natural resources in the Stockholm Declaration, to the development of the sustainable development principle as well as the precautionary principle, highlighting their complex path towards an effective implementation. Within this chapter it was important to analyse the main agreement regarding biological diversity and protection of the marine environment: the CBD and the recent GBF. Here, the main debate between DSM and biodiversity was sinthesize as the overlapping richness of both minerals and unique biodiversity samples in the same areas. Although the CBD promotes one the conservation of resources, it also demands a sustainable use of them utilizing the EIA mechanism, perspective that mirrors the sovereign right to exploit resources provision established in UNCLOS, incorporating the condition to ensure sufficient environmental policies as well as the responsibility to not cause damage to the environment of other States. As complement to CBD, two main key entities with a specific mandate for the sustainable development of deep-oceans areas where assessed: OSPAR and the EU, stressing the establishment of MPA and the ecosystem approach regarding the former, as well as highlighting the cooperative nature of the EU and its particular interest in critical minerals.

By the end of the third chapter of this study, the introduction of Norway as main object of this study, and paradigm of the concrete application and strive for balance between

[411] C 17 *ITLOS Advisory Opinion* (2011)

sustainable use of resources and the protection of the environment, was established and collocated within the Arctic background. As consequence, both the Arctic Council and Ocean Panel were explored. Although both regional governance structures were constructed as forums of cooperation, they hold a particular strength when it comes to the elaboration of recommendations and guidelines, which mimic the utility of GAIRS within the DSM debate. Perhaps the most relevant information regarding both structure lies within the role of Norway, both as chairmanship within the Arctic Council since 2023, and co-chair of the Ocean Panel which intends to establish a holistic approach to the ocean in the context of the green transformation and sustainable ocean economy in its centre. In this scenario, the ocean is view as the new frontier in terms of exploitation of resources, opposing the Arctic's connotation as last frontier. Subsequent to this analysis, the legal evaluation of the Norwegian framework was performed. From highlighting the cross-sectoral authorities relevant for DSM – NPD, MPE, MPD, etc. – to the specific analysis of the four main national regulations – the SBM, the NDA, the Pollution Act and the RIA – the position of Norway regarding DSM has shown a clear coherence with a sustainable ocean economy, where the economic growth holds a considerable priority over environmental concepts, as demonstrated within the use of vague terms such as *prudent manner, reasonable precautions and prudent extraction*, although considered to be congruent with the MEL obligations and principles. Therefore, the approach of DSM activities in Norway derives from a license system resembling the oil and gas sector, with an imperative to secure the future of the Norwegian economy. This new activity conveys a huge economic return for Norway, and therefore, the plans for opening the corresponding areas within the NCS are well underway after the last consultation process in January 2023.

6.2 Response to the research questions

To answer the main research question in this study, the complexity of the international legal framework was effectively identified and analysed in parallel to the Norwegian applicable regulations, in order to assess the degree of constraint or freedom posed by the MEL field towards the development of DSM in AWNJ such as the NCS. After a long research and application of the legal dogmatic method, it is my assessment that there are currently no direct conditions or limitations from the main treaties, UNCLOS nor the CBD, or regional governance bodies and conventions, such as OSPAR, the Arctic Council nor the EEA agreement, regarding the possibility for the Norwegian government to continue exploring the possibility of DSM activities within its jurisdiction, more than the voluntary commitments and individual goals set by the Norwegian government and its own national environmental regulation.

The transformation of the applicable international law provisions has been duly considered within the Norwegian legislation in accordance to its dualistic approach, verifying an alignment of both principles and specific environmental strategies – such as the *ecosystem approach* – and in some cases an improvement from the international frameworks regarding specific environmental concepts and its application within the DSM scenario. This specific question has been solved utilizing not only the legal examination of the contents of their provisions, but also acknowledging that it is within specific narratives, such as a Blue Economy, and non-legal concepts, such as MSP, ICZM, OZ and IEBMM, that the development and pursuance of DSM in AWNJ may be shaped, confronted or stopped. It is important to note that key entities, such as the EU and the Arctic Council may hold an even greater impact to Norwegian legislation, as consequence of the consideration of regional cooperation, effective bilateral or multilateral negotiation and perception of Arctic governance.

Regardless of the different international legal regulations and the vast possibilities of states to regulate within its jurisdiction, the application of both international and national spheres as well as the determination of a specific narrative towards green transformation, will determine the future of DSM, and therefore, the way the role of law, as well as the dynamics between sovereignty and conservation of marine resources, are perceived.

6.3 Recommendations on future solutions or areas of research

This thesis has showed the challenge of looking for how to protect the oceans, not only how to use them[412]; therefore, it aims to point to a new role of national legislation in a new governance time. The endless creativity within the realm of domestic legislation should be further examined in relation to specific societal needs and resource endowments. However, the central take away of this study points to the need of a deeper evaluation of specific narratives regarding sustainable development, and how can the national law address them crystallizing effective legislations to promote or stop activities that may be incompatible, rethinking about the Blue Economy and its requirement of economic growth. The future legal solutions to the DSM debate, or any controversial activity, should be pointed towards the uniformization of critical concepts, such as serious harm, and the prioritization of mechanisms with consolidated membership and proven effectiveness, such as the Arctic Council. The future focus is therefore beyond implementation but a complementarity of both spheres in favour of the environment.

[412] Meyer 2022, p. 257.

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