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An analysis of EIA as a tool to implement the LOSC obligations for marine environmental protection and preservation when conducting CCS and Ocean Fertilization activities.

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Abbreviations

IPCC	Intergovernmental Panel on Climate Change
SROCC	Special Report on the Ocean and Cryosphere in a Changing Climate
GHG	Greenhouse gas
CO2	Carbon dioxide
CCS	Carbon dioxide capture and storage
LOSC	United Nations Convention on the Law of the Sea
EIA	Environmental Impact Assessment
UNEP	United Nations Environmental Programme
ICJ	International Court of Justice
VCLT	Vienna Convention on the law of treaties
ITLOS	International Tribunal for the Law of the Sea
UNFCCC	United Nations Framework Convention on Climate Change
CBD	Convention on Biological Diversity
COP	Conference of the Parties
ILC	International Law Commission
AWNJ	Areas within national jurisdiction
ABNJ	Areas beyond national jurisdiction
BBNJ	Intergovernmental Conference on an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction
ILBI	International legally binding instrument under the United Nations Convention on the Law of Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, with a view to developing the instrument as soon as possible.
RAMF	Risk Assessment and Management Framework for CO2 sequestration in sub-seabed geological structures

1 Introduction

1.1 Topic and research question

The Intergovernmental Panel on Climate Change's (IPCC) Special Reports for its Sixth Assessment Cycle confirm that the world is now seeing the consequences of global warming.[1] According to the Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), examples of such consequences are warmer oceans, increased ocean acidification, sea level rise and loss of marine biodiversity and ecosystem functionality.[2] Moreover, science do no longer question that humans causes this climate change challenge.[3]

To limit global warming, Parties to the Paris Agreement have agreed to hold the increase in the global average temperature "to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C…recognizing that this would significantly reduce the risks and impacts of climate change".[4] The primary measure to meet this temperature goal is by reduction of greenhouse gas (GHG) emissions among State Parties.[5] Despite this, however, 15 of the G20 nations report a rise of GHG emissions in 2017.[6] As per 2018, none of the G20 nation's emission reduction targets for the year of 2030 seems to be in line with the Paris Agreement.[7] According to the Climate Transparency's Brown to Green Report 2018, the current emission reduction targets would lead to a global temperature increase of around 3.2°C.[8] One can therefore ask if there are political willingness among States to stabilize their release of greenhouse gases.

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[1] Intergovernmental Panel on Climate Change (IPCC). (2018). *Global warming of 1.5°C* and IPCC. (2019). *The IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*.

[2] IPCC. (2019).

[3] IPCC. (2013). Summary of Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*.

[4] The Paris Agreement, entered into force 4 November 2016, UN Doc. FCCC/CP/2015/10/Add.1, Annex, p. 21, available at (accessed 30.11.19):

http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf. Article 2 (1) (a).

[5] The primary instrument for GHG emission reductions are Nationally Determined Contributions (NDCs). According to the Paris Agreement, Article 3, Parties are to undertake and communicate ambitious efforts of reducing their GHG emissions that is supposed to represent a progression over time.

[6] Climate Transparency. (2018). *Brown to Green Report – The G20 Transition to a Low-Carbon Economy*. Available at (accessed 30.11.19):

https://www.climate-transparency.org/g20-climate-performance/g20report2018.

[7] *Ibid.*

[8] *Ibid.*

Experts doubt whether the conventional forms of mitigation and adaptation alone are sufficient to prevent serious climate change risks.[9] IPCC say a return of global temperature to 1.5°C require carbon dioxide (CO2) removal activities to compensate for residual emissions and, in most cases, achieve net negative emissions.[10] Such removal activities are referred to as geoengineering, or climate engineering.[11] These are activities reducing atmospheric concentration of GHG independent of emission reductions.[12] Geoengineering activities seem hence to be a necessity for humans to limit global warming. Argued by *Anna-Maria Hubert* however, geoengineering should not be a "substitute for measures that anticipate, prevent or minimise the causes of climate change", such as GHG emission reductions.[13]

The Royal Society defines geoengineering as "deliberate large-scale intervention in the Earth's climate system, in order to moderate global warming".[14] Underlined by *Elise Johansen* "it is the intent and scale of the manipulation of the climate that sets geoengineering apart from other intervention attempts".[15] As clarified by *Hubert*, "geoengineering is an umbrella term that covers a diverse set of proposed techniques".[16] Usually these divides in two broad categories, namely GHG removal and solar radiation management.[17] Carbon dioxide capture and storage (CCS) and Ocean Fertilization are examples of GHG removal techniques.[18]

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[9] See Hubert, A.M. (2017). *Code of Conduct for the Responsible Geoengineering Research*. 4. Available at (accessed 30.11.19):

https://www.ucalgary.ca/grgproject/files/grgproject/revised-code-of-conduct-for-geoengineering-research-2017-hubert.pdf

[10] IPCC. (2018). *Ibid 1*. C.3, 17.

[11] For a historic introduction of the use of the term geoengineering, see Scott, K.N. (2013) *International Law in the Anthropocene: Responding to the Geoengineering Challenge.* Michigan Journal of International Law, 34, 309-358. See also Scott, K.N. (2015) *Engineering the Mis-Anthropocene: International Law, Ethics, and Geoengineering.* Ocean Yearbook, 29, 61-84.

[12] Scott, K.N. (2015). *Ibid.* 63.

[13] Hubert, A.M. (2017). *Ibid 9.* Art. 4 (3).

[14] The Royal Society (2009). *Geoengineering the climate: Science, governance and uncertainty*. RS Policy document 10/09. Available at (accessed 30.11.19):

https://royalsociety.org/~/media/Royal_Society_Content/policy/publications/2009/8693.pdf

Other similar definitions can be found, see e.g. IPCC. (2011). *Expert Meeting on Geoengineering*. Meeting Report available at (accessed 30.11.19):

https://archive.ipcc.ch/pdf/supporting-material/EM_GeoE_Meeting_Report_final.pdf

[15] Johansen, E. (2020). *Ocean Fertilization.* In Johansen, E., Busch, S.V. and Jakobsen, I.U. (eds). (2020) *The Law of the Sea and Climate Change – Part of the Solution or Representing constraints*. Forthcoming in Cambridge University Press. 1-21.

[16] Hubert, A.M. (2017). *Ibid 9.* 4.

[17] *Ibid.*

[18] See e.g. IPCC. (2005). *Special Report on Carbon Dioxide Capture and Storage.*

The Royal Society (2009). *Ibid 14.*

The United Nations Convention on the Law of the Sea (LOSC) imposes both rights and obligations upon its State Parties. States have within its maritime zones the right to explore and exploit its marine resources.[19] The use of ocean space for geoengineering activities could be viewed as a resource protected by the LOSC. At the same time, one of the main obligations for Parties to the LOSC is to protect and preserve the marine environment.[20] Engaging in geoengineering activities such as CCS and Ocean Fertilization could impose risks to the marine environment.[21] This raises several questions e.g. what are the environmental risks of these activities and will those risks represent a breach of the LOSC Part XII obligations to protect and preserve the marine environment. An important tool in assessing environmental risks is the use of Environmental Impact Assessment (EIA).[22] The United Nations Environmental Programme (UNEP) define EIA as "an examination, analysis and assessment of planned activities with a view to ensuring environmentally sound and sustainable development".[23] EIA may hence be of particular relevance when conducting CCS and Ocean Fertilization activities.

The LOSC contains rules on monitoring and environmental assessment in Section 4 of Part XII. This thesis examines the applicability of the LOSC rules on EIA when engaging in CCS and Ocean Fertilization activities. The analysis explores how LOSC facilitates EIA as a legal tool to implement its obligations to protect and preserve the marine environment when conducting CCS and Ocean Fertilization activities.

1.2 Defining the EIA term

In the words of the UNEP, "Environmental Impact Assessments (EIAs) are the most commonly known, used, and globally widespread, environmental planning and management tools".[24] *Neil Craik* describes EIAs as processes "to predict the environmental effects of proposed initiatives

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[19] 1982 United Nations Convention for the Law of the Sea (LOSC). Parts II, V and VI.

[20] *Ibid.* Part XII in particular impose the rules on marine environmental protection and preservation.

[21] See e.g. IPCC (2005*) Ibid 18.*12.

The Royal Society (2009) *Ibid 14.* 17.

[22] See e.g. Sands, P., Peel, J., Fabra, A. MacKenzie, R. (2018) *Principles of international environmental law, Cambridge university press*, fourth edition, Chapter 14. Warner, R. (2018). *Oceans in transition: Incorporating climate-change impacts into environmental impact assessment for marine areas beyond national jurisdiction.* Ecology Law Quarterly, Vol. 45:1, 31-52. 40.

[23] Formulation by United Nations Environmental Programme (UNEP). (1987) *UNEP Goals and Principles of Environmental Impact Assessment.* Available at (accessed 30.11.19):

https://elaw.org/system/files/unep.EIA_.guidelines.and_.principles.pdf

[24] UNEP. (2018). *Assessing Environmental Impacts- A Global Review of Legislation*, Nairobi, Kenya. 1.4. Available at (accessed 30.11.19):

http://wedocs.unep.org/bitstream/handle/20.500.11822/22691/Environmental_Impacts_Legislation.pdf?sequence=1&isAllowed=y

before they are carried out".[25] EIA is however not the only term used for such assessment processes.[26] The most commonly alternative is Strategic Environmental Assessment (SEA). Usually, SEA applies at an earlier level of decision-making processes than EIA, e.g. when governments adopt plans and policies.[27] Nevertheless, the use of this terminology is not consistent as EIA sometimes also apply to plans and policies.[28]

This thesis uses the term EIA in a broad sense in order to cover also other assessment terms than the phrase "Environmental Impact Assessment". The use of EIA as a broad category encompassing other environmental assessment terms is a common approach.[29]

1.3 Legal sources

The Statute of the International Court of Justice (ICJ) Article 38 is "generally regarded as a complete statement of the sources of international law".[30] Article 38 (1) refer to "international conventions…, international custom, as evidence of a general practice accepted as law, the general principles of law recognized by civilized nations, [and] judicial decisions and the teachings of the most highly qualified publicists".[31] This thesis considers all these sources. It contemplates soft law where appropriate, yet accepting the non-legally binding status of such norms.

1.4 Legal methodology

Treaties, or conventions, agreements and protocols, "are the primary source of international legal rights and obligations for environmental protection".[32] This thesis apply the legal methodology of treaty interpretation guided by the rules established in Section 3 of the Vienna

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[25] Craik, N. (2015). *International EIA Law and Geoengineering: Do Emerging Technologies Require Special Rules.* Climate Law, Spring-Fall, Vol.5:2-4, 1. cf. Canadian Environmental Assessment Agency. (2011). *Canadian Environmental Assessment Act: An Overview*. 1.1. Available at (accessed 02.11.19): https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=0DF82AA5-1&printfullpage=true

[26] See e.g. Therivel, R. and Wood, G. (eds), (2017). *Methods of Environmental and Social Impact Assessment.* Routledge, New York. 4th ed. Classon, J., Therivel R., and Chadwick A. (eds), (2005). *Introduction to Environmental Impact Assessment*. Routledge, New York. 3rd ed.

[27] UNEP. (2018). *Ibid 24*. 1.4.

[28] *Ibid.*

[29] UNEP (1987) *Ibid 23.* 1991 Convention on Environmental Impact Assessment in a Transboundary Context. Espoo, Finland, (the Espoo (EIA) Convention). See also e.g. Doelle, M. and Sander, G. (2019) *Next Generation EA in the BBNJ Regime? An Assessment of the State of the Negotiations.* Available at SSRN (accessed 30.11.19):

https://ssrn.com/abstract=3479657 or http://dx.doi.org/10.2139/ssrn.3479657

[30] See e.g. Brownlie, I. (2008) *Principles of Public International Law*. OUP Great Britain. 5.

[31] 1945 Statute of the International Court of Justice (ICJ), Art. 38 (1).

[32] See e.g. Sands, P., et.al. (2018). *Ibid 22*. 4. Fitzmaurice, M., Elias, O. and Merkouris, P. (2010). *Treaty interpretation and the Vienna convention on the law of treaties: 30 years on.* Leiden: Brill.

Convention on the Law of Treaties (VCLT). Treaty interpretation is of importance for the practical result. As emphasised by *Philippe Sands* and *Jacqueline Peel*, "[a] restrictive approach to interpretation will limit the scope and effect of a rule, whereas a broad approach may identify an obligation where none was thought to exist".[33] According to VCLT Article 31, interpretation of a treaty shall be "in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose".[34] Taken into account together with the context, shall "[a]ny relevant rules of international law applicable in the relations between the parties".[35] To confirm or determine the meaning as in accordance with Article 31, "[r]ecourse may be had to supplementary means of interpretation, including the preparatory work of the treaty".[36] *Sands* and *Peel* highlight "[t]he principal supplementary means are the *travaux préparatories* of a treaty, including the minutes of formal negotiations, reports of sessions, and prior drafts of a text".[37]

The approach of this thesis is principally descriptive, with a view to examine how LOSC rules on EIA applies when engaging in CCS and Ocean Fertilization activities. To a certain extent, the thesis look at how international law regulates geoengineering. In addition, it seeks to comment on the adequacy of the LOSC rules on EIA when conducting CCS and Ocean Fertilization activities. Thus, there is a normative element to the analysis.

1.5 Further structure

Chapter 2 describes CCS and Ocean Fertilization and identifies potential consequences for the marine environment in such cases. It also introduces the legal tool EIA.

Chapter 3 identifies the relevant set of rules for discussing how EIA obligations under LOSC apply to CCS and Ocean Fertilization activities. The chapter starts with looking at general EIA instruments in international law. Next, it presents relevant regulations for CCS and Ocean Fertilization activities. The last section of the chapter introduces some general Principles of International Environmental Law.

Chapter 4 analyses EIA as a legal tool in implementing the LOSC obligations to protect and preserve the marine environment when conducting CCS and Ocean Fertilization activities. First, the debate relates to if EIA is required under LOSC in such cases. Second, the question is if procedural elements of those EIA obligations are fit to ensure that the substantive obligation

[33] Sands, P., et.al. (2018). *Ibid 22*. 108.

[34] 1969 Vienna Convention on the law of treaties (VCLT) Art. 31 (1).

[35] VCLT Art. 31 (3) (c).

[36] *Ibid.* Art. 32.

[37] Sands, P., et.al. (2018). *Ibid 22.* 109.

to prevent harm is met, when engaging in CCS and Ocean Fertilization activities. Third, the chapter briefly explore some more detailed EIA regulation referred to by the LOSC. Finally, the chapter look at EIA obligations considered in the ongoing negotiations (BBNJ negotiations) for a legally binding instrument (ILBI) for the conservation of biological diversity in areas beyond national jurisdiction (ABNJ).

Chapter 5 holds the conclusions.

2 The factual context

2.1 Introduction of CCS

This section describes the geoengineering activity of CCS. As defined by the IPCC, CCS is a process consisting of the separation of CO2 from industrial and energy related sources, transport to a storage location and finally long-term isolation from the atmosphere.[38] The compression and transport of the separated CO2 takes place by a pipeline or tanker to its final storage destination.[39] The storing part of the process involves namely two different methods. Geological sequestration of CO2 beneath the seabed and the proposal to dispose CO2 in the water column or on the seabed.[40] *Nigel Bankes* emphasise that, "many countries identify a role for CCS projects…in their [NDCs] under the Paris Agreement".[41] As an example, the EU continues to reference CCS as part of its 2030 climate and energy policy framework.[42]

The main method of oceanic CO2 sequestration seems to be the injection of CO2 into deep saline aquifers or depleted oil and gas reserves.[43] Notably, when combined with other mitigation strategies, scientists have argued that sufficient geological capacity may exist to sequester all future anthropogenic CO2 emissions.[44]

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[38] IPCC. (2005). *Ibid 18.* 1,3.

[39] Haszeldine, R.S. et al, (2018). *Negative emission technologies and carbon capture and storage to achieve the Paris Agreement commitments.* Phil. Trans. R. Soc. A 376: 20160447. Available at (accessed 30.11.19):
http://dx.doi.org/10.1098/rsta.2016.0447

[40] Bankes, N. (2020) *Carbon Capture and Storage and the Law of the Sea* in Johansen, et.al. (eds), (2020). *Ibid n.15*. 1-25. Scott, K.N. (2005). *The Day After Tomorrow: Ocean CO_2 Sequestration and the Future of Climate Change*. Georgetown International Environmental Law Review. 18 Geo. 1. II and III.

[41] Bankes, N. (2020) *Ibid 40.* 3.

[42] A policy framework for climate and energy in the period from 2020 to 2030, COM (2014) 15 final, January 22, 2014 (15, section 4.3 of the policy).

[43] Bankes, N. (2020) *Ibid 40*.1. Scott, K.N. (2005) *Ibid 40*.63.

[44] Gale, J. (2002). *Overview of CO2 Emission Sources, Potential, Transport, and Geographical Distribution of Storage Possibilities*. in IPCC Workshop on Carbon Dioxide Capture and Storage. Proceedings. available at (accessed 30.11.19):
https://inis.iaea.org/search/search.aspx?orig_q=RN:34028836 and IPCC. (2005). *Ibid 18.*

The second CCS method of oceanic CO2 sequestration is the proposed direct injection of CO2 in the water column or on the seabed. Unlike geological disposal, this is not a permanent form of sequestration; yet, some have argued that the removal of large amounts of carbon from the atmosphere for lengthy periods might provide the biosphere time to adjust to higher global temperatures.[45] However, there are uncertainties over the speed with which CO2 will return to the atmosphere.[46]

Both of these methods involve possible consequences to the marine environment. At its most extreme, the injection of CO2 beneath the seabed has the potential to induce seismic activity, such as earthquakes, which in turn may lead to landslides, tidal waves and loss of containment of the injected CO2.[47] However, scholars claim the possibility of minimizing such risks by careful site selection and ongoing monitoring procedures.[48] Further, there are concerns for possible leakages from the storage facilities and its impact to the marine environment.[49]

For the method of direct ocean injections, the consequences on the marine environment might be of greater significance.[50] Scientists have discovered that the immediate affect likely to result is a decrease in the waters pH value, particularly around the release point.[51] That deep-sea ecosystems seem to be particularly vulnerable even to small changes in water pH makes the decrease in waters pH value problematic.[52] Moreover, scientists consider that species in the deep-sea environment potentially are not equipped to survive rapid changes in their

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[45] Brewer, P. G. et al., (1999). *Direct Experiments on the Ocean Disposal of Fossil Fuel CO2*, 284 Sci. 943, 944.

[46] Herzog, H. et al., (2001) *Carbon Sequestration via Direct Injection*. In Steele J. H. (2001) Encyclopaedia of Ocean Sciences. 408.

[47] Sminchak, J. et al., (2002). *Issues Related to Seismic Activity Induced by the Injection of CO2 in Deep Saline Aquifers*. Energy and Envtl. Res. 32.

[48] Benson, S. M. and Myer, L. (2002) *Monitoring to Ensure Safe and Effective Geologic Sequestration of Carbon Dioxide.* in IPCC Workshop on Carbon Dioxide Capture and Storage. Available at (accessed 30.11.19): https://inis.iaea.org/search/search.aspx?orig_q=RN:34028843

[49] Bankes, N. (2020). *Ibid 40*. 4. Scott, K.N. (2005). *Ibid n.40*.64.

[50] Scott, K.N. (2005). *Ibid 40*. 86.

[51] Haugan, P. M. and Drange, H (1996). *Effects of CO2 on the Ocean Environment.* Energy Conversion and MGMT. Vol 37. Herzog, H. J. et al., (1996). *Environmental Impacts of Ocean Disposal of CO2*, Energy Conversion and MGMT. Vol 37.

[52] Shirayama, Y. (1997*) Biodiversity and Biological Impact of Ocean Disposal of Carbon Dioxide*. Waste MGMT. Vol. 17.

environmental conditions.[53] The direct injection of CO2 into the deep-sea could hence possibly have consequences for "the ecology of the entire deep-sea".[54]

2.2 Introduction of Ocean Fertilization

The other marine geoengineering activity discussed in this thesis is Ocean Fertilization. To begin with, the combined effect of photosynthesis in the surface followed by respiration deeper in the water column, known as the oceans biological pump, remove CO2 from the surface and re-release it at the ocean depth.[55] Due to low availability of nutrients such as iron, nitrogen or phosphate, parts of the oceans are less productive in biological terms.[56] As pointed out by *Elise Johansen*, Ocean Fertilization is a technique developed "for accelerating the…oceans' biological pump…[to] increase the uptake of atmospheric carbon by the ocean…[and] remove it from the atmosphere for long enough to provide global climatic benefit".[57]

To stimulate the biological production in the ocean, in addition to light, a range of essential elements is required, such as e.g. iron.[58] Research confirms that plankton biomass responds to artificially added iron leading to the reduction of surface levels of CO2.[59] By 2018, at least 13 official Ocean Fertilization experiments have been conducted,[60] however results are mixed regarding how much and for how long CO2 is sequestered,[61] and for how large an area needs to be fertilized for the technique to have a meaningful impact on climate change.[62] Scholars

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[53] E.g. Seibel, B. A. and Walsh, P. J. (2003) *Biological Impacts of Deep-Sea Carbon Dioxide Injection Inferred from Indices of Physiological Performance*. Experimental Biology. Vol. 206, p. 641,642. Shirayama, Y. (1997). *Ibid*. 381.

[54] Seibel, B. A. and Walsh, P. J. (2003). *Ibid.* 642.

[55] The Royal Society (2009). *Ibid 14.* 2.3.1.

[56] Baar, H.J.W. de., Boyd, P.W. (2000). *The Role of Iron in Plankton Ecology and Carbon Dioxide Transfer of the Global Oceans*. In Hansen, R. B. et al (eds), in *The Changing Ocean Carbon Cycle: A Midterm Synthesis of the Joint Global Ocean Flux Study*. Cambridge University Press. Vol 61. 107.

[57] E. Johansen (2020). *Ibid 15*. 3.

[58] The Royal Society (2009). *Ibid 14.*

[59] Williamson, P. et al (2012). *Ocean Fertilization for Geoengineering: A Review of Effectiveness, Environmental Impacts and Emerging Governance*. Process Safety and Environmental Protection. Vol. 90. 475, 477.

[60] Geoengineering Monitor, *Ocean Fertilization (technology Factsheet)* (2018). Available at (accessed 30.11.19): http://www.geoengineeringmonitor.org/2018/05/ocean-fertilization/

[61] Williamson, P. et al, (2012). *Ibid 59*. 475, 477. Blain, S. (2007*). Effect of Natural Iron Fertilization on Carbon Sequestration in the Southern Ocean*. Nature. Vol. 446. 1070.

[62] Buesseler, K. et al (2004). *The Effects of Iron Fertilization on Carbon Sequestration in the Southern Ocean.* Science Vol. 304. 417. K.N Scott, (2018). *Mind the Gap: Marine Geoengineering and the Law of the Sea.* High Seas Governance: Gaps and Challenges. Publications on Ocean Development. Vol. 86. Koninklijke Brill NV, Leiden. 34-56. p. 40. K.N. Scott (2013) *Regulating Ocean Fertilization under International Law: The Risks.* Carbon and Climate Law Review. Vol. 2. 108-X. 110. Williamson, P. (2016). *Emissions reduction: Scrutinize CO2 removal methods.* Nature-internationally weekly journal of science. Available at (accessed 30.11.19):

argue that science has not been able to provide a clear evidence to the role of the added iron or other nutrients compared to other factors such as e.g. light, seasonality, and oxygen production, or to the "export and fate" of the extra carbon.[63]

A matter of debate is also the possible risks of the Ocean Fertilization activity. Some say the adding of iron to the seawater have caused fundamental modification of the local ecology of the Southern Ocean.[64] Moreover, research indicates that consequences of Ocean Fertilization may include ocean acidification.[65] The iron-induced algal blooms may also induce the growth of toxic algae, which could suffocate entire ecosystems via the removal of oxygen from the sea.[66]

2.3 Introduction of EIA

This section present EIA as a legal tool and identifies its relevance to CCS and Ocean Fertilization activities.

EIA can be described as "a national procedure for evaluating the likely impact of a proposed activity on the environment".[67] According to *Craik*, "requiring decisions to be made in an informed, open and participatory setting will result in better environmental benign outcomes".[68] A typical EIA process might include (1) screening of what activities are subject to EIA, (2) contents of the EIA report, (3) public notification, (4) final decisions, and (5) post-project monitoring processes.[69]

The use of EIA as a legal tool have evolved through both international and domestic environmental law, in legally binding and non-legally binding instruments. The United States

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https://www.nature.com/news/emissions-reduction-scrutinize-co2-removal-methods-1.19318

[63] G Jeffries (2017). *Time for a New International Legal Regime for Ocean Fertilization in the High Seas?* Master Thesis LLM in Law of the Sea, UiT The Arctic University of Norway. 10. Available at (accessed 31.11.19): https://munin.uit.no/bitstream/handle/10037/12501/thesis.pdf?sequence=2&isAllowed=y>. K.N. Scott (2013) *Ibid.62.* 108, 110.

[64] Cullen, J. J. (1991) *Hypotheses to Explain High-Nutrient Conditions in the Open Sea*. Liminology and Oceanography. Vol 36. 1578, 1596. Jaffe, S. (2004). *Iron Seeding Just Doesn't Pay.* Scientist. 26.

[65] Williamson, P. et al, (2012). *Ibid 59*. 475.

[66] Schiermeier, Q. (2003) The Oresmen. Nature. Vol. 421. 109, 110.

[67] The Espoo (EIA) Convention. *Ibid 29.* Art. 1 (vi).

[68] Craik, N. (2018). *Environmental Assessment: A Comparative Legal Analysis*. In Vinuales and Lees (eds.) Oxford Handbook of Comparative Environmental Law. Forthcoming in Oxford University Press. 1.

[69] Craik, N. (2018). *Ibid*. 5. Warner, R. (2018). *Ibid 22*. 38-39. Craik, N. (2015). *Ibid n.25*.12-22. Kong, L. (2011) *Environmental Impact Assessment under the United Nations Convention on the Law of the Sea*. Chinese Journal of International Law. Oxford University Press. 651-669. 663-669. Craik, N. (2008). *The International Law of Environmental Impact Assessment: Process, Substance and Integration*. Cambridge University Press, 2008). 133-172.

National Environmental Policy Act of 1969 first established the use of EIA.[70] At international level, EIA processes have particularly developed through the United Nations Conferences on Human Environment, Development, and Sustainable Development.[71] In the Stockholm Declaration on the Human Environment (Stockholm Declaration), EIA were supposed to be included in draft principle 20 obliging States to supply information in situations where their actions threaten the environment of others.[72] However, given concerns for a potential conflict between the EIA obligation and States right to development, delegations could not agree and hence an explicit reference to EIA was not included in the Declaration.[73] Even so, Principle 14 of the Declaration do highlight the importance of rational planning as "an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment".[74] After the 1972 Stockholm Conference, EIA have evolved within international law. One example is LOSC Article 206 requiring States Parties to assess potential effects of planned activities to the marine environment.[75] Another example is the non-binding UNEP Goals and Principles of EIA that provides guidance for EIA processes at national, regional and international level.[76] Principle 17 of the Rio Declaration on Environment and Development (Rio Declaration), although not legally binding, acknowledge that as a national instrument EIA "shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority".[77] Since Principle 17 were adopted, several international legal instruments including international case law "confirm the circumstances in which international law requires the preparation of a prior environmental impact assessment before a State engages in, or permits, an activity which may have serious adverse impact on the environment".[78] Affirmed by the Seabed Dispute Chamber of the International Tribunal for the Law of the Sea (ITLOS), "the

[70] 1969 The United States National Environmental Policy Act. Available at (accessed 02.11.19): https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/Req-NEPA.pdf Craik, N. (2018). *Ibid 5*. 2-3. Sands, P., et.al. (2018). *Ibid 22*. 657. Craik, N. (2008). *Ibid 69*. 98.

[71] The United Nations Conference on the Human Environment, Stockholm 1972, The United Nations Conference on the Environment and Development, Rio de Janeiro 1992 and the United Nations Conference on Sustainable development, Johannesburg 2002 and Rio de Janeiro 2012, often referred to as Rio+20.

[72] Declaration of the United Nations Conference on the Human Environment, Stockholm 1972. (Stockholm Declaration). UNEP (2018). *Ibid 24*. 35. Craik, N. (2008). *Ibid 69*. 90-91.

[73] Sands, P., et.al (2018). *Ibid 22*. 659. Craik, N. (2018). *Ibid.* 3-4.

[74] Stockholm Declaration, Principle 14.

[75] LOSC. *Ibid 19*. Article 206.

[76] UNEP (1987). *Ibid 23.*

[77] Declaration of the United Nations Conference on Environment and Development (Rio Declaration), Principle 17.

[78] Sands, P., et.al. (2018). *Ibid 22*. 658.

obligation to conduct an environmental impact assessment is a direct obligation under the Convention [LOSC] and a general obligation under customary international law".[79]

Nevertheless, emphasised by *Craik*, "the [EIA] rules themselves are often inchoate, leaving critical questions regarding the application, scope and nature of EIA unanswered".[80] Moreover, *Craik* points out that "little attention has been paid in the legal or policy literatures to the adequacy of the international EIA rules to address geoengineering research proposals".[81] Analysing how EIA obligations under LOSC apply when conducting CCS and Ocean Fertilization activities is therefore highly relevant.

3 The international legal context

3.1 Regulating EIA, CCS and Ocean Fertilization

When conducting CCS and Ocean Fertilization activities, the question of substantive and procedural EIA obligations represent a matter of legal interaction. In addition to LOSC, general EIA instruments in international law as well as the fields of International Climate Change Law, and International Environmental Law are of relevance.[82] This chapter will therefore briefly explore all of these instruments. The chapter start by looking at general EIA instruments in international law. Next, the chapter presents set of rules relevant for CCS and Ocean Fertilization in the Law of the Sea regime, the International Climate Change regime and in International Environmental Law. The last section contains information on General Principles of International Environmental Law.

3.2 EIA regulations

This section briefly present the two instruments in international law containing detailed information about the substantive and procedural elements of EIA. These are the UNEP Goals and Principles of EIA and the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo (EIA) Convention). The UNEP Goas and Principles of EIA represents the first international instrument that describes EIA, though with the status as soft

[79] ITLOS (2011). Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area (Request for Advisory Opinion submitted to the Seabed Disputes Chamber). Reports 10, 145.

[80] Craik, N. (2015). *Ibid 25.* 2. Craik, N. (2018). *Ibid 68*. Craik, N. (2008). *Ibid 69*. 87-131.

[81] Craik, N. (2015). *Ibid.* 2.

[82] These set of rules are explained in later sections.

law.[83] The Espoo (EIA) Convention is the only global treaty regulating EIA and is of binding status for its 45 Contracting Parties.[84]

3.2.1 The UNEP Goals and Principles of EIA

The UNEP Goals and Principles seeks to establish that before competent authorities decides to "undertake or to authorize activities that are likely to significantly affect the environment, the environmental effects of those activities should be taken fully into account".[85] Moreover, by adopting these Goals and Principles, UNEP intends to encourage the development of implementing EIA obligations in national laws as for promoting exchange, notification and consultation processes.[86]

The Virginia Commentary look to the UNEP Goals and Principles of EIA when discussing the applicability of LOSC Article 206 about assessing potential effects of activities.[87] Moreover, in the view of *Meinhard Doelle* and *Gunnar Sander*, the UNEP goals and principles "has been highly influential in shaping the understanding of what EIA is, even though it is not legally binding" and "forms well-established process steps…as well as requirements for the content of the EIA report".[88]

3.2.2 The Espoo (EIA) Convention

The Espoo (EIA) Convention require Contracting Parties to assess environmental impacts of listed activities at an early stage of planning, and set out detailed rules in so regard.[89] According to Article 2, the Parties shall "take all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impacts from proposed activities".[90] Furthermore, it lays down general obligations on States to notify and consult with other States.[91] In the view of *Craik*, the obligations under the Espoo (EIA) Convention "are limited in the treaty to significant environmental impacts in one State that arise from activities undertaken under the jurisdiction of another state, but which excludes impacts to areas beyond national jurisdiction".[92] Moreover, *Doelle* and *Sander* emphasise that "few marine activities are listed"

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[83] UNEP (1987). *Ibid 23.*

[84] Espoo (EIA) Convention. *Ibid 29.*

[85] UNEP (1987) *Ibid 23*. Goals, nr. 1.

[86] *Ibid.* Goals, nr. 2 and 3.

[87] Nordquist, M.H. Rosenne, S. Yancov, A. and Grandy, N. (eds.). (1990). *United Nations Convention on the Law of the Sea 1982: A commentary.* Leiden: Brill/Nijhoff. Vol. IV. 124.

[88] Doelle, M., Sander, G. (2019). *Ibid 29.* 6.

[89] The Espoo (EIA) Convention. *Ibid 29.* Preamble, Recital 7.

[90] *Ibid.* Art. 2.

[91] *Ibid.* Art 3 cf. Art 5.

[92] Craik, N. (2015). *Ibid 25.* 11.

as requiring EIA under the Convention.[93] Yet, these established transboundary rules might provide support when discussing the elements of EIA under LOSC with a view to CCS and Ocean Fertilization activities.

3.3 CCS and Ocean Fertilization regulation

This section presents international regulations relevant when engaging in CCS and Ocean Fertilization activities. It starts with presenting the Law of the Sea regime, yet in particular LOSC Part XII on protection and preservation of the marine environment. It also introduces the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) and the Protocol to the London Convention (London Protocol), as the Contracting Parties to these instruments have adopted regulations for marine geoengineering.[94] The next section presents the International Climate Change Regime consisting of the United Nations Framework Convention for Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement.[95] The final rules commented upon in this section is the International Environmental rules, including particularly the Convention on Biological Diversity (CBD).[96]

3.3.1 The Law of the Sea regime

The LOSC consist of 320 Articles divided in 17 parts and complemented by nine annexes. In their territorial seas, exclusive economic zones (EEZ) and continental shelfs, coastal States have exclusive sovereign rights "for the purpose of exploring and exploiting, conserving and managing the natural resources" as well as "exclusive rights to regulate, authorize and conduct marine scientific research".[97] Although the LOSC confirms the primacy of the jurisdiction of the coastal State in these zones, it also recognise that use of ocean space, and hence its jurisdictional framework, builds on the notion of balancing interests. Activities carried out by coastal States "shall have due regard to the rights and duties of other States" in order to be compatible with the LOSC obligations for marine environmental protection and preservation.[98]

In light of its Preamble and references made throughout the convention, a fundamental objective of the LOSC is the protection and preservation of the marine environment. Part XII of the

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[93] M. Doelle., G. Sander (2019). *Ibid 29.* 6-7.

[94] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, entered into force 30 August 1975 (London Convention). Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, entered into force 24 March 2006 (London Protocol).

[95] 1992 United Nation Framework Convention on Climate Change (UNFCCC). Kyoto Protocol to the United Nations Framework Convention on Climate Change (The Kyoto Protocol), in force 16 February 2005, Paris Agreement. *Ibid 4.*

[96] 1992 United Nations Convention on Biological Diversity (CBD).

[97] LOSC *Ibid 19.* II Art 56, V Arts 245, 246, VI Art. 87.

[98] *Ibid.* Art. 56 (2) cf. XII.

convention contain the primary set of rules on this matter, including requirements for environmental assessment. Part XII start with general provisions setting broad principles for the protection and preservation of the marine environment. The remaining provisions offers content and context to the general provisions, mainly considering marine pollution. According to these, States Parties are required to develop international norms and standards "to prevent, reduce and control pollution of the marine environment" from all sources, and to create and enforce national legislation that is "no less strict than such norms and standards".[99] Examples of such global "norms and standards" are the London Convention and the London Protocol, adopted in accordance with LOSC Article 210.[100] Due to the concerns for potential consequences to the marine environment caused by geoengineering activities, the States Parties to the London Convention and London Protocol have adopted specific assessment rules.[101]

3.3.2 The International Climate Change regime

The International Climate Change regime consists of the UNFCCC, the Kyoto Protocol and the Paris Agreement.[102]

The ultimate objective of the International Climate Change regime, as specified in Article 2 of the UNFCCC, is "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".[103] In order to enhance the implementation of the UNFCCC objective, the Paris Agreement "aims to strengthen the global response to the threat of climate change…[by] holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels".[104] Argued by *Ying Chen* and *Yuan Xin*, "both scientists and politicians generally hold a census that the 1.5°C target, compared with the 2°C target, presents a much more difficult challenge in such a short amount of time".[105] As such, "the discussion on geoengineering for the 1.5°C target is gaining prominence worldwide".[106]

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[99] *Ibid*. XII Sections 5, 6.

[100] London Convention and London Protocol. *Ibid 94.*

[101] M. Doelle, G. Sander (2019). *Ibid 29.* 6. International Maritime Organization (IMO). Information about the frameworks adopted under the London Protocol. Available at (accessed 30.11.19):
http://www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Pages/default.aspx
http://www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/geoengineering/Pages/default.aspx

[102] UNFCCC, Kyoto Protocol. *Ibid 95.* Paris Agreement. *Ibid 4.*

[103] UNFCCC. *Ibid.* Art 2.

[104] Paris Agreement. *Ibid 4.* Art 2(1)(a).

[105] Ying, C. Xin, Y. (2017) *Implications of geoengineering under the 1.5 °C target: Analysis and policy suggestions*. Advances in Climate Change Research. Vol. 8. 123-129.124.

[106] *Ibid.* 124. Horton, J.B., Keith, D.W. and Honegger, M. (2016). *Implications of the Paris Agreement for Carbon Dioxide Removal and Solar Geoengineering.* Policy Brief, Harvard Project on Climate Agreements, Belfer

Carbon dioxide removal techniques, including CCS and Ocean Fertilization, are however not specifically included in either the UNFCCC, the Kyoto Protocol or the Paris Agreement. As pointed out by *Johansen*, to achieve the temperature goal "the international community has accepted that the use and implementation of a range of mitigation and adaptation measures is necessary".[107] The UNFCCC refer to mitigation as States' adoption of policies and measures "by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs".[108] Moreover, the Kyoto Protocol calls for "research on, and promotion, development and increased use…of advanced and innovative environmentally sound technologies".[109] According to the Paris Agreement, Parties should "take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases".[110]

It is not clear whether CCS and Ocean Fertilization activities qualify as mitigation or other terms referred to by the UNFCCC, Kyoto Protocol or the Paris Agreement.[111] According to *Catherine Redgwell*, the general obligation of UNFCCC Article 4 (1) (f) to "employ appropriate methods [e.g.] impact assessments…with a view to minimizing adverse effects…on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change" are indirectly relevant to geoengineering.[112] Moreover, *Johansen* emphasise that the Paris Agreement approach possibly "factor geoengineering techniques into the Paris commitment[s]" as the parties are left with "a very wide margin of discretion…on how to contribute [to identify measures in their NDCs]".[113]

Center. Lewis, S. (2015). *The Dirty Secret of the Paris Climate Deal.* Foreign Policy. Available at (accessed 23.11.19):

https://foreignpolicy.com/2015/12/17/the-dirty-secret-of-the-paris-climate-deal-carbon-capture-negative-emissions-global-warming/

[107] E. Johansen (2019). *Ibid 15*. 5. Freestone, D. and Rayfuse, R. (2008). *Ocean iron fertilization in international law. Marine Ecology Progress Series.* Vol. 364.227.

[108] UNFCCC. *Ibid 95*. Art. 4 (2) (a).

[109] Kyoto Protocol. *Ibid 95*. Art. 2 (1) (a) (iv).

[110] Paris Agreement. *Ibid 4*. Art. 5 (1).

[111] See discussion in e.g. Redgwell, C. (2011). *Geoengineering the climate: Technological solutions to mitigation failure or continuing carbon addiction*. Carbon Climate Law Review. Vol. 2. 178-189. 183-184., K.N. Scott (2018). *Ibid 62*. 52., K.N. Scott (2013) *Ibid 11*. 309. E. Johansen (2019). *Ibid 15*. 4-7.

[112] Redgwell, C. (2011) *Ibid.* 184.

[113] E. Johansen (2019). *Ibid 15*. 6. Savaresi, A. (2016). *The Paris Agreement: a new beginning?*. Journal of Energy & Natural Resource Law. Vol. 34:1.16, 20-21.

3.3.3 International Environmental Law

The body of International Environmental Law consists of a wide range of principles and rules, yet the key treaty of international environmental law is the CBD.[114] The objectives for the CBD are "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".[115] Moreover, placed in Article 3 is the CBD guiding principle, namely States "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 or of areas beyond the limits of national jurisdiction".[116]

The convention gives no explicit reference to geoengineering. However, several decisions made by the Conference of the Parties (COP) to CBD relates to geoengineering avtivities. In 2008, the COP prohibited Ocean Fertilization activities "until there is an adequate scientific basis on which to justify such activities, including assessing associated risks, and a global, transparent and effective control and regulatory mechanism is in place for these activities".[117] The only exception is "small scale scientific research studies within coastal waters".[118] In 2010, the COP addressed and banned all geoengineering activities "that may affect biodiversity" as a starting point.[119] Yet, such activities may occur where "there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts".[120] The exception was still "small scale scientific research studies", but notably, only when "that would be conducted in a controlled setting in accordance with Article 3 of the Convention and only if they are justified by the need to gather specific scientific data and are subject to a thorough prior assessment of the potential impacts on the environment".[121] Moreover, the COP acknowledged the work of the London Convention and Protocol.[122] The COP saw this decision as in accordance with the precautionary approach and Article 14 of the Convention, saying Contracting Parties are to introduce environmental impact assessment procedures of proposed projects.[123]

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[114] CBD *Ibid 96.*

[115] *Ibid.* Art. 1.

[116] *Ibid.* Art. 3.

[117] UNEP/CBD/COP/DEC/IX/16 9 October 2008, letter C nr. 4.

[118] *Ibid.*

[119] UNEP/CBD/COP/DEC/X/33 29 October 2010, nr. 8 (v) (w).

[120] *Ibid.*

[121] *Ibid.*

[122] *Ibid.*

[123] *Ibid.*

In the view of *Redgwell*, this debate within CBD "encapsulates the diverse public perceptions of this geoengineering technology, with concerns expressed about potential environmental impact, premature commercialisation of the activity in the face of so many scientific uncertainties, and that it offers a "false solution" to climate change".[124] Moreover, for the conservation of biological diversity and prevention of environmental damage from geoengineering activities, the COP embrace EIA as an important tool.

3.4 General Principles of International Environmental Law

This section introduce some general principles of International Environmental Law that are of relevance when engaging in CCS and Ocean Fertilization activities. These are the precautionary principle, the no harm principle and the principle of cooperation.

To begin with, a diverse set of general principles exist and apply as part of the body of International Environmental Law. The Arbitral Tribunal in the Iron Rhine arbitration first confirmed the applicability of environmental law principles.[125] Argued by *Philippe Sands* and *Jacqueline Peel*, general legal principles "are potentially applicable to all members of the international community across the range of activities that they carry out or authorize and in respect of the protection of all aspects of the environment".[126] If so, general principles does not provide clear and specific rules. Yet, they still have a valuable function when considering environmental obligations. As in the words of *David M. Dzidzornu*, "[p]rinciples encompass or aggregate interests and goals, and thus indicate directions for individual and collective conduct consistent with realizing the interests and goals in issue".[127] General principles of International Environmental Law may hence apply when discussing the applicability of EIA obligations when conducting CCS and Ocean Fertilization activities. In that sense, the next sections look into the relevance of the precautionary principle, the no harm principle and the principle of cooperation in so regard. In the words of *Tanaka* all of these three principles can be considered as "pillars of the international law of marine environmental protection".[128]

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[124] Redgwell, C. (2011). *Ibid 111*. 188.

[125] Award in the Arbitration regarding the Iron Rhine ("Ijzeren Rijn") Railway between the Kingdom of Belgium and the Kingdom of the Netherlands, decision of 24 May 2005, 223.

[126] Sands, P.,et.al.(2018). *Ibid 22.* 198.

[127] Dzidzornu, D. M. (1998) *Four principles in marine environment protection: A comparative analysis*. Ocean Development & International Law. Vol. 29:2. 91-123.

[128] Tanaka, Y. (2015). *Principles of international marine environmental law*. In R. Rayfuse (2015) *Research Handbook on International Marine Environmental Law*. Elgar Online. 31-56. 34.

3.4.1 The Precautionary Principle

The precautionary principle was first recognised internationally through the 1982 World Charter for Nature.[129] The first explicit reference came with the 1987 Second International Conference on the Protection of the North Sea.[130] To date, the principle is widely adopted in international frameworks, such as e.g. the UNFCCC,[131] the CBD,[132] and the London Protocol.[133] As defined in Principle 15 of the Rio Declaration, "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".[134] Though the legal status of the precautionary principle is a matter of debate, and is not included explicitly in the LOSC, the ITLOS Seabed Dispute Chamber observes that through International Environmental Law it is "initiated a trend towards making this approach [the precautionary approach] part of customary international law".[135]

As we will see, EIA may function as a tool to implement the precautionary principle approach. However, when applied to CCS and ocean fertilization, the principle of precaution have a two-sided function. In the words of *Elizabeth Tedsen* and *Gesa Homan*, "while climate engineering could potentially help to combat certain climate change impacts, these approaches present their own risks [to the environment]".[136]

3.4.2 The No Harm Principle

As argued by *Tanaka*, "it is beyond serious argument that the…[no harm principle] reflects customary international law".[137] According to *Tanaka*, the no harm principle is well established, meaning, "no State has the right to use or permit the use of its territory in such a manner as to cause injury in or to the territory of another State".[138] The International Law Commission (ILC) have adopted a set of Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities (ILC Draft Articles).[139] Followed by Article 3, the State of

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[129] 1982 World Charter for Nature. UN Doc. A/37/51.

[130] See Tedsen, E., Homann, G. (2013). *Implementing the precautionary principle for climate engineering.* Carbon Climate Law Review. Vol. 2. 90-100. 91.

[131] UNFCCC. *Ibid 95.* Art. 3 (3).

[132] CBD. *Ibid 96.* Preamble, Recital 9.

[133] London Protocol. *Ibid 94.* Art. 3 (1).

[134] Rio Declaration. *Ibid 77.* Principle 15.

[135] ITLOS (2011) *Ibid 79*. 135.

[136] Tedsen, E.; Homann, G. (2013) *Ibid 130*. 90-91.

[137] Tanaka, Y. (2015). *Ibid 128.* 33. Birnie, P., Boyle, A. and Redgwell, C. (2008). *International Law and the Environment.* OUP. 3rd ed.137.

[138] Tanaka, Y. (2015). *Ibid* 128. 37.

[139] 2001 The International Law Commission (ILC) Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities.

origin "shall take all appropriate measures to prevent significant transboundary harm or at any event to minimize the risk thereof".[140] According to the ILC, Article 3 is based on the no harm principle.[141]

The LOSC express the no harm principle in Article 194 (2), requiring States to ensure not to cause damage to other States.[142] The ICJ made the first pronouncement of the no harm principle in the Trail Smelter arbitration as a duty not to cause transboundary harm to other States.[143] Tanaka argues however, "the obligation not to cause environmental damage is no longer solely bilateral in nature but relates to the protection of the high seas or the global atmosphere".[144] This is in accordance with the broader formulation in Article 2 of the Rio Declaration. Followed by Article 2, states have "the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction".[145] The ICJ have confirmed this formulation of the principle stating that "the existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment".[146] As such, the no harm principle reflect that States may not conduct or permit CCS and ocean fertilization activities without regard to the global environment or environment of other States.

Moreover, in the word of *Doelle* and *Sander*, "[a] due diligence implication of the principle is that states must undertake some sort of screening of national initiatives to make sure that transboundary harm can be avoided".[147] If so, the no harm principle supports the use of EIA as a legal tool in assessing if an activity involve a type of transboundary harm not allowed, before engaging in the activity. Emphasised by *Tanaka* however, the due diligence obligation "will only be at issue after environmental damage has arisen".[148] Though, in the South China Sea

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[140] ILC (2001) *Ibid 139.* Art. 3.

[141] *Ibid.* Art. 3. Comment 1.

[142] LOSC. *Ibid 19.* Art. 194 (2).

[143] ICJ (1941) The Trail Smelter Case (Canada v. USA), 3 Reports of International Arbitral Awards p.1965 the Tribunal rule that "no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence".

[144] Tanaka, Y. (2015). *Ibid 128.* 37. Birnie, P., et.al. (2008). *Ibid 137.* 145.

[145] Rio Declaration. *Ibid 77.* Principle 2.

[146] ICJ (1996) Advisory Opinion, Legality of the Threat or Use of Nuclear Weapons. ICJ Reports 241–2. 29.

[147] M. Doelle, G. Sander (2019). *Ibid 29.* 4. For a discussion on the «due diligence» obligation and the no harm principle, see Tanaka, Y. (2015). *Ibid 128.* 38-39.

[148] Tanaka, Y. (2015). *Ibid 128.* 40.

arbitration, ITLOS describe due diligence as a duty to adopt rules and measures to prevent harmful acts as well as a duty to maintain a level of vigilance in enforcing those rules and measures.[149] It is understood by ITLOS that the standard of due diligence "may vary over time and depends on the level of risk and on the activities involved".[150] The ILC Draft Articles Article 7 rule that any decision authorising activities that involve the risk of significant transboundary harm shall "be based on an assessment of the possible transboundary harm caused by that activity".[151] According to the ILC, this assessment enables the State to determine the extent and the nature of the risk involved in an activity and consequently the type of preventive measures it should take.[152] As such, it is reasonable to think that the no harm principle support legal measures seeking to attain marine environmental protection, regardless if such measures apply before or after engaging in an activity that may cause the type of harm not allowed. In other words, the principle seem to support EIA as a preventive measure.

3.4.3 Principle of Cooperation

As for the no harm principle, *Tanaka* argues that the principle of cooperation reflects customary international law.[153] A numerous of treaties and other international legal instruments embody the principle of cooperation.[154] An example is Principle 24 of the Stockholm Declaration that say "[c]ooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States".[155] Furthermore, Principle 27 of the Rio Declaration states that "States and people shall co-operate in good faith and in a spirit of partnership…in the further development of international law…".[156] In the words of *Tanaka*, "[d]amage to the marine environment is not necessarily constrained by man-made delimitation lines…[and hence]…the protection of the marine environment…can hardly be achieved by a single State…[t]hus international cooperation is a prerequisite to marine environmental protection".[157]

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[149] ITLOS (2016) The South China Sea Arbitration (The Republic of Philippines v. The People's Republic of China). 961.

[150] ITLOS (2011). *Ibid 79*. 242 (3).

[151] ILC (2001). *Ibid 139*. Art. 7.

[152] See *Ibid.* Comment 1.

[153] Tanaka, Y. (2015). *Ibid 128*. 33. Birnie, P., et.al (2008). *Ibid 137*. 137.

[154] Sands, P., et.al (2018). *Ibid 22.* 214-215.

[155] Stockholm Declaration. *Ibid 22.* Principle 24.

[156] Rio Declaration. *Ibid 77.* Principle 27.

[157] Tanka (2015). *Ibid 128.* 52.

ITLOS highlighted the importance of international cooperation in marine environmental protection in the MOX Plant case.[158] The Tribunal confirmed, "the duty to cooperate is a fundamental principle in the prevention of pollution of the marine environment under Part XII of the Convention and general international law".[159] Moreover, the ICJ, in the Pulp Mills on the River Uruguay case, observed that "it is by co-operating the States concerned can jointly manage the risks of damage to the environment that might be created by the plans initiated by one or other of them, so as to prevent the damage in question…".[160]

The LOSC contain several provisions that require cooperation with the purpose to prevent various forms of marine pollution. For the protection and preservation of the marine environment, Article 197 in LOSC Part XII places an obligation upon States to cooperate in formulating and elaborating international rules, standards and recommended practices and procedures consistent with the LOSC.[161] Article 206 contain the requirement to communicate the results of EIA.

4 EIA and CCS and Ocean Fertilization

4.1 EIA obligations in the LOSC

This chapter analyse EIA as a legal tool in implementing the LOSC obligations to protect and preserve the marine environment when conducting CCS and Ocean Fertilization activities. The first question is if EIA is required under LOSC in such cases. The second question is if the procedural elements of those EIA obligations are fit to ensure that the substantive obligation to prevent harm is met, when engaging in CCS and Ocean Fertilization activities. Third, the chapter briefly explore the more detailed EIA regulation in the London Protocol. Finally, the chapter discusses the EIA obligations considered in the ongoing BBNJ negotiations for ILBI with a view to CCS and Ocean Fertilization activities.

To begin with, as we have seen, the LOSC offer States sovereign rights to plan and carry out activities within their respective maritime zones.[162] At the same time, the States are subject to fundamental duties of ocean protection and conservation. In the negotiations leading to the LOSC, the establishment of "an agreed international legal framework for the protection and preservation of the marine environment was considered to be a major objective".[163] Therefore,

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[158] ITLOS (2002). The MOX Plant case (Ireland v. United Kingdom) (Provisional Measures) Case No. 10, 415.
[159] *Ibid.* 82.
[160] ICJ (2010). Pulp Mills on the River Uruguay (Argentina v. Uruguay). ICJ Reports 14. 49, 77.
[161] LOSC. *Ibid 19.* Art. 197.
[162] See LOSC *Ibid 19.* Arts. 2, 56 and 193.
[163] Nordquist, et.al (eds.). (1990). *Ibid 87.* 3.

it was with consensus that LOSC should include "a wide range of rules on this matter".[164] As we have seen, these set of rules are particularly concentrated in Part XII on protection and preservation of the marine environment. The Virginia Commentary understand that "measures of protection and preservation of the marine environment are conceived in the most comprehensive and all-embracing manner".[165]

Included in Part XII is Article 192 stating the primary obligation of all States "to protect and preserve the marine environment".[166] According to the Virginia Commentary, Article 192 "is an essential component of the comprehensive approach in Part XII".[167] The obligation "explicitly proclaiming in positive terms, as a general principle of law, that all States have the obligation to protect and preserve the marine environment, and implicitly (in negative terms) the obligation not to degrade it deliberately (or perhaps even carelessly)".[168] Furthermore, it "is not limited to the prevention of prospective damage…but extends to the "preservation of the marine environment" [that] would seem to require active measures to maintain, or improve the present condition of the marine environment".[169] As recognized by scholars, Article 192 is "unlimited in geographical scope"[170] and "applies to all States and activities".[171] Hence, with the aim to protect and improve marine environmental conditions a broad interpretation of rules under LOSC Part XII seem possible.

As part of the overall provisions of Part XII that expand upon the general rule in Article 192, are the Articles 204, 205 and 206 encompassing EIA obligations. Article 204 of the LOSC requires States to, "as far as practicable…observe, measure, evaluate and analyse, by recognized scientific methods, risks or effects of pollution of the marine environment".[172] Moreover, Article 205 places an obligation upon States "to publish reports of the results obtained pursuant to Article 204 or provide such reports at appropriate intervals to the competent international organizations, which should make them available to all States".[173] Related to the duty of monitoring specified in Article 204 is Article 206, saying:

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[164] *Ibid.*

[165] *Ibid.* 10.

[166] LOSC. *Ibid 19.* Art. 192.

[167] Nordquist, et.al (eds.). (1990). *Ibid 87.* 36.

[168] *Ibid.* 39-40.

[169] *Ibid.* 40.

[170] Warner, R. M. (2015*) Conserving Marine Biodiversity in Areas Beyond National Jurisdiction: Co-Evolution and Interaction with the Law of the Sea*. In Rothwell, D. R. G. Oude Elferink, A. Scott, K. N. Stephens, T. (eds.) (2015) *The Oxford Handbook of the Law of the Sea.* 752-776. 753.

[171] Sands, P., et.al (2018). *Ibid 22*. 458.

[172] LOSC. *Ibid 19.* Art. 204 (1).

[173] *Ibid.* Art. 205.

> "When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in Article 205". [174]

The Virginia Commentary highlight that Article 204 relates to ongoing activities.[175] By contrast, the obligation under Article 206 "is concerned with the assessment of planned activities *before* they are begun".[176] The Commentary emphasise prior assessment as "an essential part of a comprehensive environmental management system".[177] Although the provisions does not refer to the term "environmental impact assessment", scholars concludes that in light of the *travaux préparatories* of the LOSC and its objectives, it is reasonable to understand that Article 205 and 206 provide basic requirements on EIA.[178] Such an interpretation is in accordance with the evolving Law of the Sea presumed by ITLOS.

The Seabed Dispute Chamber of ITLOS accepted that "the obligation to conduct an environmental impact assessment is a direct obligation under the Convention [LOSC] and a general obligation under customary international law."[179] The Tribunal confirmed this statement in the 2016 South China Sea Arbitration.[180] As argued by *Craik* however, "international EIA obligations are not a set of unified rules of general application [and hence] it is necessary to look carefully at the specific characteristics of [the particular geoengineering activity]".[181] As we have seen, the "specific characteristics" of the CCS and Ocean Fertilization activities varies concerning e.g. location of activity and potential consequences, environmental elements potentially impacted and by the degree of risk. In light of these characteristics, the next sections analyse how the LOSC facilitate EIA as a legal tool to implement its obligations to protect and preserve the marine environment when conducting CCS and Ocean Fertilization activities.

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[174] *Ibid.* Art. 206.

[175] Nordquist, et.al (eds.). (1990). *Ibid 87.* 122.

[176] *Ibid.*

[177] *Ibid*.

[178] See e.g. *Ibid* 206.2, The Commentary notes that the first reference to EIA appeared in 1973 in a working thesis submitted by Norway. Craik, N. (2008). *Ibid 69*. 98, Kong, L. (2011). *Ibid 68.* 658.

[179] ITLOS (2011). *Ibid 79.* 145.

[180] ITLOS (2016). *Ibid* 149. 948. The Tribunal concluded that by performing occupation and construction activities in the South China Sea, China had breached several of the environmental obligations under the LOSC, including the obligation to conduct an environmental impact assessment.

[181] Craik, N. (2015). *Ibid 25.* 12.

4.2 The question if EIA is required

This section analyse if EIA is required when conducting CCS and Ocean Fertilization activities. According to Article 206, States shall, "as far as practicable" assess potential effects in situations where they "have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment".[182] As such, the question if EIA is required rely on if CCS and Ocean Fertilization activities may cause "substantial pollution of or significant and harmful changes to the marine environment". However, the inclusion of "as far as practicable" and "reasonable grounds" indicate that individual States may perform discretion for the question if EIA is required. In addition, the phrase "under their jurisdiction or control" point to that location of activity and its potential consequences might influence the question if EIA is required.

The next sections therefore clarifies whether States' discretion or the location of the activity and its potential consequences influences the question if EIA is required. Thereafter, it is analysed if LOSC require EIA when CCS and Ocean Fertilization activities are carried out.

4.2.1 The influence of States' discretion

The LOSC Article 206 contain the two terms "as far as practicable" and "reasonable grounds". This seems to leave States with some discretion for the decision if EIA is required when conducting CCS and Ocean Fertilization activities. The question is if that discretion influence if EIA obligations in LOSC apply.

The Virginia Commentary says the word reasonable "implies an element of [State] discretion" with reference to the act of assessing the potential effects of the activities in question, and "that this is echoed in the words as far as practicable".[183] *Alex G. Oude Elferink* agree with this interpretation.[184] Notably, *Craik* clarifies however, that it "would be a mistake to consider the obligation to conduct EIAs under LOSC as being non-binding".[185] According to *Craik*, the qualification "as far as practicable" only arises after the harm threshold has been met and hence "does not relieve a state from its obligation to carry out an EIA, but instead impacts the level of detail and depth to which an EIA must be carried out".[186]

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[182] LOSC. *Ibid 19.* Art. 206.

[183] Nordquist, et.al (eds.). (1990). *Ibid 87.* 124.

[184] Oude Elferink, A.G. (2012). *Environmental Impact Assessment in Areas beyond National Jurisdiction.* The International Journal of Marine and Coastal Law 27. 449-480. 456.

[185] Craik, N. (2008). *Ibid 69.* 99.

[186] *Ibid.*

For the phrase "reasonable grounds for believing", it may be helpful to have a look at what ICJ specified in the Costa Rica v Nicaragua case.[187] When discussing the question if EIA was required in that case, the ICJ affirmed that a State is required to ascertain "whether there is a risk of significant transboundary harm".[188] If so, it seem like States in any case must actively investigate if it should have reasonable grounds for believing if EIA is required when conducting an activity. In other words, *Yoshifumi Tanaka* understand that States are obliged to carry out a "preliminary assessment" for if they "believe" EIA is required.[189] Moreover, the ICJ specify that such an assessment should be conducted "on the basis of an objective evaluation of all the relevant circumstances".[190] With a view to the word "reasonable", *Craik* explain, "the reasonableness requirement maintains an objective standard for the determination of the threshold".[191] Thus, although States may perform discretion, the question if they believe EIA is required when conducting CCS and Ocean Fertilization activities should be determined in light of what is reasonable on objective grounds. Argued by *Tanaka* however, this does not guarantee that States causing the risk activate an EIA process under the LOSC, since "the evidential standard for determining significant transboundary harm remains less clear and is a matter of subjective appreciation".[192] The question of what harm that triggers the EIA obligations in LOSC is analysed in later parts of this thesis.

4.2.2 The influence of location

Article 206 refers to "planned activities under [the States] jurisdiction or control". The wording naturally cover activities within States' maritime zones. In addition, a literal interpretation of the term "or control", indicates that the provision possibly applies also for States activities beyond national jurisdiction. The Virginia Commentary support such a broad interpretation. According to the Commentary, Article 206 applies to "all planned activities…of the State concerned, regardless of the nationality of the individual or entity planning to undertake the activities in question, or the place in which those activities will be undertaken".[193] Furthermore, given the concept of "jurisdiction" in the LOSC, the Virginia Commentary acknowledge, "in the spatial sense…the geographical extent of this obligation [Article 206] may be wide".

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[187] ICJ (2015). Certain activities carried out by Nicaragua in the boarder area (Costa Rica v. Nicaragua) and Construction of a road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica).

[188] *Ibid.* 153.

[189] Tanaka, Y. (2017). *Case note Costa Rica v Nicaragua and Nicaragua v Costa Rica: Some reflections on the obligation to conduct an environmental impact assessment.* RECIEL. Vol. 26:1. 93-94 and Y. Tanaka (2018). *Case note the South China Sea arbitration: Environmental obligations under the Law of the Sea Convention*. RECIEL. Vol. 27. 90-96. 94.

[190] ICJ (2015). *Ibid 187.* 153.

[191] Craik, N. (2008). *Ibid 69.* 98.

[192] Tanaka, Y. (2018). *Ibid 189.* 94.

[193] Nordquist, et.al (eds.). (1990). *Ibid 87.* 124.

For the question if the location of the potential consequences influence if EIA is required, Article 206 refer to "the marine environment". With a view to the regulation of EIA in international legal instruments, usually it is the potential harm that take place in a transboundary or global context that require EIA.[194] If so, purely local consequences might not require EIA in accordance with LOSC Article 206. Throughout its Part XII, however, LOSC impose duties on States to protect and preserve the marine environment, regardless of geographical scope, maritime zones or jurisdictional rights of States. As we know, Article 206 is placed in Part XII, which indicate that it should account for potential impact on the marine environment as a whole. Moreover, EIA as prior assessment is acknowledged as an essential part of States' active duties for marine environmental protection under LOSC, which makes it reasonable that EIA obligations are not limited by where potential harm may occur. Thus, both *Craik* and *Lingjie Kong* argue that activities carried out in the maritime environment always are of global concern.[195] It is hence reasonable to think that also consequences of such activities should be of global concern.

Thus, it seems like the geographical location of activity and its potential impact does not influence the question if EIA is required when conducting CCS and Ocean Fertilization activities.

4.2.3 The harm threshold

This section analyse if EIA, according to the LOSC, is required when engaging in CCS and Ocean Fertilization activities. Article 206 establishes a harm threshold for EIA to be required. This is when States believe planned activities "may cause substantial pollution of or significant and harmful changes to the marine environment". One can ask if the wording applies to CCS and Ocean Fertilization activities, and hence makes EIA in accordance with Article 206 required in such cases. In other words, may CCS and Ocean Fertilization activities lead to the type and level of harmful impact that require EIA according to Article 206.

At first sight, the provision seems to cover two different sorts of impacts, including "substantial pollution" and "significant harmful changes to the marine environment". The term "or" indicates that they apply autonomous. Yet according to the Virginia Commentary, Article 206 relates to "the potential polluting effects of planned activities".[196] Despite the objective of comprehensiveness, most of the LOSC regulation for marine environmental protection and

[194] See e.g. Espoo (EIA) Convention *Ibid 29.* CBD *Ibid 96.* Art. 14. ICJ (2010) *Ibid 160.* 204. ICJ (2015) *Ibid 187.* 153.

[195] See e.g. Craik, N. (2015). *Ibid 25.* 13. Kong, L. (2011). *Ibid 68.* 665.

[196] Nordquist, et.al (eds.). (1990). *Ibid 87.* 122.

preservation relates to harm caused by, or potentially caused by pollution. A problem to clarify here is if CCS and Ocean Fertilization qualify as marine pollution, and if only impact caused by pollution will trigger the EIA requirement.

To begin with, it is debateable whether the definition of pollution under LOSC is applicable to CCS and Ocean Fertilization. The definition of marine pollution in Article 1 (4) of the LOSC covers:

> "[T]he introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities".[197]

As the definition does not specifically refer to marine geoengineering, scholars argue that not all such activities falls within the definition.[198] For instance, *Scott* argues that "technologies supporting the transport of nutrients through ocean pipes…are unlikely to be…classified" as pollution.[199] Furthermore, *Johansen* say it is possible that "the effects [of Ocean Fertilization] are not deleterious since [such effects]…are not any different from the natural biological ocean pump, and because stimulating the biological productivity by adding nutrients have a net positive effect".[200] For CCS activities, *Bankes* advocates the definition of pollution not covering the injection of CO2 into subsea geological formations since "it [the definition] is concerned with pollution of the water column or the surface of the seabed rather than the sub-soil itself".[201] Thus, if Article 206 only require EIA for activities that may cause harm by pollution, the EIA obligation may not apply to all CCS or Ocean Fertilization techniques. The next question is therefore if so is the case.

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[197] LOSC. *Ibid 19.* Art. 1 (4).

[198] For discussions on whether Ocean Fertilization falls within the definition of pollution in accordance with LOSC Art. 1 (4) see Johansen, E. (2020). *Ibid 15.* 9-10. K.N. Scott. (2015). *Geoengineering and the marine environment*. In Rayfuse, R (eds) (2015). *Research Handbook on International Marine Environmental Law*. Edward Elgar Cheltenham. 465. Scott, K.N. (2018) *Ibid 62*.45. For a discussion on whether CCS falls within the definition of pollution, see Bankes, N. (2020). *Ibid 40.* 13.

[199] Scott, K.N. (2018). *Ibid.* 45.

[200] Johansen, E. (2020). *Ibid 15.* 10. Abate, R. and Greenlee, A. (2010). *Sowing Seeds Uncertain: Ocean Iron Fertilization, Climate Change, and the International Environmental Law Framework*. Pace Environmental Law Review. Vol. 27. 573-574.

[201] Bankes, N. (2020). *Ibid 40.* 13.

Early references to EIA in the law of the sea context read "significant alteration of the marine environment"[202] and "significant marine pollution".[203] At the third session of the Third United Nations Conference on the Law of the Sea, a draft of the EIA obligation included the harm threshold "substantial pollution of the marine environment".[204] At the fourth session, further negotiations led to the revision "substantial pollution of, or significant and harmful changes to, the marine environment".[205] The inclusion of "marine environment" may indicate that the EIA obligation under LOSC apply in a broader sense than only in the context of marine pollution. *Oude Elferink* argues that so may be the case, giving Article 206 "a broader scope of application than would otherwise be the case".[206] The Virginia Commentary on the other hand, say the revision at the fourth session "extended the scope of the provision by placing greater emphasis on the effects of the pollution".[207] Hence, even though including "marine environment" apply to effects in a broader sense, the effect might still have to be "pollution". Given the history of the LOSC and that marine environmental protection primarily have been "concerned with the regulation of efforts to combat pollution", it is perhaps no wonder that so is also the case for Article 206.[208] If by so far the provision only cover harmful impacts from pollution, it is proper to discuss if it can be interpreted *de lege ferenda* so that it covers other effects than only from pollution. As *Alan Boyle* puts it "like any other constitution…if it [LOSC] cannot or does not evolve it is unlikely to last".[209] Notably, *Boyle* highlights the definition of "pollution of the marine environment" among some "examples of potentially evolutionary phraseology" under LOSC.[210] The general rules on treaty interpretation may support such an understanding.

Article 31(3) (c) of the VCLT says that when interpreting a treaty "any relevant rules of international law applicable in the relations between the parties" shall be taken into account.[211] Though the ICJ have placed emphasis on "the primary necessity of interpreting an instrument in accordance with the intentions of the parties at the time of its conclusion", it have also accepted that treaties are to be "interpreted and applied within the framework of the entire legal

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[202] A/AC.138/SC.III/L.43 (1973, mimeo.), Article XV

[203] A/CONF.62/C.3/L.14/Add.1 (1974) (CRP/MP/7), paragraph 2 and note 6, III Off. Rec. 255,256

[204] A/CONF.62/WP.8/Part III. I.V. Art. 15.

[205] A/CONF.62/WP.8/Rev.1/Part III, Chapter 1, Section 5, Article 16.

[206] Oude Elferink, A.G. (2012). *Ibid 184.* 455.

[207] Nordquist, et.al. (eds.). (1990). *Ibid 87.* 122, 124.

[208] For historic overview, see e.g. the debate Sands, P., et.al. (2018). *Ibid 22.* 459.

[209] Boyle, A. (2005) *Further Development of the 1982 Convention on the Law of the Sea: Mechanisms for Change* in Freestone, D., Barnes, R. and Ong, D. (2006). *The Law of the Sea: Progress and Prospects.* Oxford Scholarship Online. 43.

[210] *Ibid.* 46.

[211] VCLT *Ibid 34.* Art. 31 (3) (c).

system prevailing at the time of the interpretation".[212] As we have seen, CCS and Ocean Fertilization represents newly adopted contributions to achieve the temperature goal set by the International Climate Change regime. This may point towards that Article 206 should apply in such cases, even though it was not in the intention of the Parties to the LOSC at the time of its conclusion.

In accordance with VCLT, the outcome must nevertheless be "in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose".[213] As presented above, prior assessment is an essential part of the major objective under LOSC to protect and preserve the marine environment. In the South China Sea Arbitration, ITLOS affirm that Article 206 "ensures that planned activities with potentially damaging effects may be effectively controlled and that other States are kept informed of their potential risks".[214] The Virginia Commentary gives a similar description of the purpose of Article 206.[215] We have seen that all CCS and Ocean Fertilization activities involve risks to the marine environment, and that EIA function to implement the LOSC obligations for marine environmental protection and preservation. Notably, careful site selection and ongoing monitoring procedures is highlighted to reduce the risk of serious damage when e.g. injecting CO2 beneath the seabed. However, such activities may not be covered by the pollution definition. It is hence reasonable and likely in accordance with the purpose of the LOSC to interpret Article 206 in a broad sense so it applies to all CCS and Ocean Fertilization activities, despite if the provision originally was meant to encompass only the risk of marine pollution.

Nevertheless, if CCS and Ocean Fertilization activities may cause the type of impact covered by Article 206, not any level of such impact will trigger the EIA obligation. According to the provision, EIA is required for "substantial" pollution of or "significant" and harmful changes to the marine environment. The next question is therefore if potential impacts from CCS and Ocean Fertilization activities qualify as "substantial" and "significant".

The minimum level of harm determined in Article 206 distinguish from the threshold for conducting EIA under other international legal instruments. Usually it is the possibility for "significant" adverse environmental harm that require EIA.[216] An exception is the Antarctic

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[212] Highlighted by A. Boyle (2005) *Ibid 209*. 45. See ICJ (1971) Namibia Advisory Opinion. Rep 16, 31. ICJ (1978) Aegean Sea Continental Shelf Case. Rep 3, 32–33.

[213] VCLT, *Ibid 34.* Art. 31(1).

[214] ITLOS (2016) *Ibid 149.* 948.

[215] Nordquist, et.al (eds.). (1990). *Ibid 87.* 122.

[216] See Espoo (EIA) Convention *Ibid 29.* Art. 2. Rio Declaration *Ibid 77.* Principle 17. CBD *Ibid 96.* Art. 14, ICJ (2010) *Ibid 160*. 204. ICJ (2015) Costa Rica v Nicaragua *Ibid 187.* 153. UNEP (1987) *Ibid 23.* Uses only the

Protocol using a "more than a minor or transitory impact" threshold, probably justified by its fragile environment.[217] In the view of *Craik*, the two thresholds used in LOSC may lead to confusion.[218] The term "substantial" may suggest a higher threshold according to *Craik*.[219] Yet, he finds "given that the two standards are disjunctive, the lower standard of "significant and harmful change" will apply in any event".[220] If so, the harm threshold of Article 206 is likely in accordance with the international standards on that matter. Thus, it should be clarified what is meant by "significant" and if potential impact from CCS and Ocean Fertilization activities qualify in so regard.

In a transboundary setting, the term "significant" is by the ILC described as "something more than "detectable", but need to be at the level of "serious" or "substantial".[221] This indicates a high threshold for what level of harm that trigger the EIA obligation. Moreover, the ILC explains that the harm "must lead to a real detrimental effect on matters such as, for example, human health, industry, property, environment or agriculture".[222] This indicates that only physical harm meets the harm threshold, but as in the view of *Craik*, both direct and indirect impacts are covered.[223] As emphasised by Scott, geoengineering involves broader ethical and moral issues such as "…whether geoengineering of any sort is a desirable response to climate change, taking into consideration the interests of not only current but also future generations".[224] That "significant harm" may cover only physical harm mean that e.g. ethical or moral concerns with CCS or Ocean Fertilization do not trigger the EIA obligation. Under the Espoo (EIA) Convention however, the definition of impact focus on "physical structures" but include "effects on cultural heritage or socio-economic conditions".[225] Such a wording may open for other effects than only physical, possibly in favour for the broader issues concerned with CCS and Ocean Fertilization activities.

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term "significant". UNFCCC *Ibid 95.* Art. 4 (f) suggests the use of impact assessments with a view to minimizing "adverse" effects.

[217] 1998 Protocol on Environmental Protection to the Antarctic Treaty, Annex I, Article 3. For a discussion on the lower threshold, see Craik, N. (2015) *Ibid 25.* 12, 17.

[218] Craik, N. (2008). *Ibid 69.* 133.

[219] *Ibid.*

[220] *Ibid.*

[221] ILC (2001) *Ibid 139.* Art. 2, Commentary 4.

[222] *Ibid.*

[223] Craik, N. (2015). *Ibid 25.* 15.

[224] K.N. Scott (2018). *Ibid 62.* 51. For a discussion on ethical issues related to geoengineering and developing international law see e.g. Scott K. N. (2015). *Ibid 11.*

[225] Espoo (EIA) Convention *Ibid 29.* Art. 1.

Moreover, according to the ILC, a determination of harm has to be made in each specific case, measured by factual and objective standards.[226] *Craik* argues that the determination of harm "may require a risk assessment approach in which account is taken of both the degree of potential harm and the probability of its occurrence".[227] According to *Craik*, "activities that may result in a low probability of harm with more serious consequences may meet the threshold requirement".[228] If so, activities such as e.g. the injection of CO2 beneath the seabed with potentially serious impact such as seismic activity may meet the harm threshold even though the probability of its occurrence is low. *Scott* argues that when assessing environmental risks posed by marine geoengineering, States must apply a precautionary approach "and explicitly consider the myriad of uncertainties and knowledge gaps associated with the impact of manipulating the ocean carbon cycle".[229]

As we have seen, the LOSC do not explicitly embrace the precautionary approach, or the precautionary principle. When looking at the *travaux préparatories* of Aricle 206, however, the phrase "believing" that planned activities may cause harm did replace the first suggested term "expecting".[230] This may indicate that the Drafting Committee wanted it to be room for some uncertainty when deciding if the harm threshold of Article 206 is met.

In any case, as we have seen, there are legal support for the precautionary principle in the International Environmental Law context, and that several legally binding instruments have explicitly encompassed the principle. In the Pulp mills case, the ICJ found, based on Article 31 (3) (c) of the VCLT, that "a precautionary approach may be relevant in the interpretation and application of the provisions of the Statute [the relevant environmental bilateral treaty between the parties]".[231] In light of the ICJ statement, the Seabed Dispute Chamber of the ITLOS have observed "that the precautionary approach has been incorporated into a growing number of international treaties and other instruments, many of which reflect the formulation of Principle 15 of the Rio Declaration…this has initiated a trend towards making this approach part of customary international law".[232] The Principle 15 of the 1992 Rio Declaration say that:

> "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible

[226] ILC (2001) *Ibid 139.* Art. 2, Commentary 4.
[227] Craik, N. (2015). *Ibid 25.* 14-15.
[228] *Ibid.* 15.
[229] See e.g. Scott (2015) *Ibid 198.* 463.
[230] A/CONF.62/L.78 (Draft Convention, 1981), Article 206, XV Off. Rec. 172, 208.
[231] ICJ (2010) *Ibid 160.* 164.
[232] ITLOS (2011) *Ibid 79.* 135.

damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".[233]

By this, as highlighted by *Tedsen* and *Homann*, "the lack of scientific knowledge of risks cannot justify a failure to take appropriate action".[234] For geoengineering activities however, the application of the principle is not straightforward. As *Scott* puts it, "an assessment of such activities [geoengineering activities] cannot take place in isolation of the broader context of climate change and the environmental risks associated with inaction or action that is otherwise ineffective to the marine environment".[235] Yet, the application of the principle, in the view of *Tedsen* and *Homann* depend "on the specific formulation of the principle as well as the special climate engineering option at issue" in addition to if the activity take place in a "research" or "deployment" phase.[236]

Scholars come to different conclusions by doing so. *Daniel Bodansky* have previously suggested that based on precaution, the international community could decide to ban geoengineering due to its controversy as it is "generally easier to prohibit an activity than to regulate it".[237] *Rickels et al.* however, write that when applying the precautionary principle the risks "which first exist during research and later during the potential deployment of CE activities [geoengineering] and threaten specific areas of the environment depending on the…technology in question, can be weighted according to their relationship to the potentially climate-relevant advantages of climate engineering arising from the objectives of the [international climate change regime]".[238] In so regard, *Rickels et al.* acknowledge that "[i]t may ultimately prove necessary to accept a certain degree of environmental damage in this process in order to advance the comprehensive goal of climate protection".[239] The Royal Society state however, that the precautionary principle can only offer guidance and open the door to further questions, rather than to dictate a course of action in the case of geoengineering.[240] Against this background, applying a precautionary approach when

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[233] Rio Declaration *Ibid 77.* Principle 15.

[234] Tedsen, E.; Homann, G. (2013). *Ibid 130.* 92.

[235] K.N. Scott (2015) *Ibid 198.* 465. Elliot, K. (2010) *Geoengineering and the Precautionary Principle*. International Journal of Applied Philosophy Vol. 24. 237. Tedsen, E.; Homann, G. (2013). *Ibid 130.* 90.

[236] Tedsen, E.; Homann, G. (2013). *Ibid.* 95, 96. Elliot, K. (2010). *Ibid.* Davis, W. D. (2009) *What Does 'Green' Mean? Anthropogenic Climate Change, Geoengineering, and International Environmental Law*. Georgia Law Review. Vol. 43. 931.

[237] Bodansky, D. (1996). *May We Engineer the Climate?.* Climatic Change. Vol. 33. 309, 319.

[238] Rickels, W. et al., (2011). *Large-Scale Intentional Interventions into the Climate System? Assessing the Climate Engineering Debate.* Kiel: Kiel Earth Institute. 102.

[239] *Ibid.*

[240] The Royal Society (2009). *Ibid 14.* 38.

conducting CCS and Ocean Fertilization activities might make it possible to balance the considerations for mitigating global warming, and at the same time protect and preserve the marine environment. In this regard, *Scott* argues that the application of precaution to marine geoengineering activities, "likely, and arguably, must be demonstrated through [EIA]".[241] In this sense, EIA is of particular relevance to marine geoengineering activities.

4.2.4 Observations

With a view to the analysis above it can be asked if a lower harm threshold should apply to CCS and Ocean Fertilization activities for EIA to be required. In the case of Antarctica, the lower threshold, *Craik* argues, can be justified as its fragile environment "presents greater risks for environmental harm and therefore justifies a more precautionary approach".[242] There are some aspects of CCS and Ocean Fertilization activities possibly justifying a more precautionary approach. To begin with, is that the application of precaution in such cases might be crucial given the need to balance the considerations for climate change mitigation and marine environmental protection. Consequently, EIA process might be needed for all CCS and Ocean Fertilization activities, even if potential consequences qualify as "significant" or not. Furthermore, concerning CCS and Ocean Fertilization, there are some issues likely not to trigger the EIA obligations in the LOSC. Still, EIA might be needed to identify and evaluate these issues, such as e.g. ethical concerns. Another factor that can support a lower harm threshold in the case of CCS and Ocean Fertilization activities is that their potential consequences often involve a high level of scientific uncertainty. As such, it can be difficult to decide if the qualification of "significant" is apparent or not, which may result in that sometimes EIA do not apply even though so is needed. The final factor highlighted is that questions related to the engage in CCS and Ocean Fertilization activities represent a matter of legal interaction. EIA might hence be of particular relevance for these activities to implement the LOSC obligations for marine environmental protection and preservation.

4.3 Procedural elements of EIA

As we have seen, when asking if EIA is required under LOSC when conducting CCS and Ocean Fertilization activities, arguments can be made both ways. The next topic to discuss is the relationship between the procedural elements of EIA obligations and the substantive obligation to prevent harm. In other words, are the procedural elements of the EIA obligations in LOSC fit to ensure that CCS and Ocean Fertilization activities not to cause "substantial pollution of or significant and harmful changes to the marine environment" when carried out?

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[241] K.N. Scott (2018). *Ibid 62.* 44.

[242] See Craik, N. (2015). *Ibid 25.* 12, 17.

4.3.1 The obligation to communicate

Article 206 makes clear that States "shall communicate reports of the results" of the EIA assessment "in the manner provided in Article 205".[243] Article 205 places an obligation upon States to publish reports of the results obtained, or provide such reports at appropriate intervals, "to the competent international organizations, which should make them available to all States".[244] The requirement of communication as provided by Article 206 and 205 lead to some questions. One can simply ask, when and what to communicate, and next, how to communicate and to whom.

In the South China Sea arbitration, ITLOS highlights that Article 206 seeks to ensure that planned activities with potential damaging effects "may be effectively controlled and that other States are kept informed of their potential risks".[245] The Tribunal ruled that "China could not reasonably have held any belief other than that the construction "may cause significant and harmful changes to the marine environment"…[and] [a]ccordingly, China was required…to prepare an [EIA]…[and] to communicate the results of the assessment".[246] Moreover, the Tribunal affirms that the obligation to communicate reports of the results of the assessment is "absolute".[247] The Tribunal hence links the requirement to conduct EIA and that to communicate. However, at first sight that does not help clarifying when and what to communicate. In the Costa Rica v Nicaragua case, the ICJ did the same and interlinked the two requirements. Here, the Court ruled that when an EIA confirms there is a risk of significant transboundary harm "the State planning to undertake the activity is required, in conformity with its due diligence obligation, to notify and consult in good faith with the potentially affected State, where that is necessary to determine the appropriate measures to prevent or mitigate that risk".[248] As in the words of *Tanaka*, according to the ICJ statement it seem like that "only when an [EIA] confirms that there is a risk of significant transboundary harm, the State causing the risk must notify potentially affected State(s)".[249] As such, the requirement to communicate possibly only arises after an EIA is conducted, and only in the case of potential significant harmful impacts. In Article 206 situations, this will mean that the requirement to communicate only apply for activities that may cause "substantial pollution of or significant and harmful changes to the environment". As we have seen, the result of such an interpretation is that the requirement to communicate not necessarily apply for all CCS or Ocean Fertilization activities.

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[243] LOSC. *Ibid 19.* Art. 206.
[244] LOSC. *Ibid 19.* Art. 205.
[245] ITLOS (2016). *Ibid 149.* 948.
[246] *Ibid.* 988.
[247] *Ibid.* 948.
[248] ICJ (2015) *Ibid 187.* 104.
[249] Tanaka, Y. (2017). *Ibid 189.* 95

However, as understood by *Tanaka,* in the South China Sea arbitration, "a finding [of that China had prepared an EIA] was not necessary to find a breach of Article 206".[250] According to *Tanaka*, what was more important was the obligation to communicate.[251] Thus, *Tanaka* concludes that it appear "the obligation to communicate under Article 206 is not limited to the situation where a risk of significant transboundary harm was confirmed by the [EIA].[252] Such an understanding separates the obligation to conduct EIA and the obligation to communicate.

If we look at the words of the Tribunal, we see that its conclusion rely on that "China could reasonably have held any belief other than that the construction" possibly would cause "significant and harmful changes to the marine environment".[253] As we have seen in earlier parts of this thesis, States may have an active duty to perform a preliminary assessment to discover whether activities qualify for EIA according to Article 206. Considering the Tribunals findings in the South China Sea arbitration, it may seem like the obligation to communicate arise in the preliminary assessment phase, when deciding if EIA is required. In other words, prior to the EIA. *Craik* argues, "[g]iven the level of controversy around geoengineering experimentation, it is likely that States would be under pressure to justify any finding of no significant impact".[254] As such, it is likely to think that when conducting geoengineering activities one can reasonably not "have held any [other] belief" than that such activity may cause "significant and harmful changes to the marine environment". If so is the case, the obligation to communicate may arise already when considering if EIA is required when conducting CCS and Ocean Fertilization activities. In other words, possibly already when planning to conduct CCS and Ocean Fertilization activities. As not all CCS and Ocean Fertilization activities necessarily qualify for EIA, such a conclusion seems reasonable. This reasoning might also be in accordance with the general obligation of cooperation among States for environmental protection in cases involving a potential damage to the environment.

The next question is what to communicate. Article 206 gives no guidance to the content of what to communicate. It is likely to think that it will involve the information a State is supposed to have when it is required to communicate. As we have seen, arguments can be made both ways if this is required at the preliminary assessment stage or when the EIA is conducted. The particular contents of an EIA is generally defined by domestic legislation. As stated by ICJ in the Pulp Mills case, "it is for each State to determine…the specific content of the [EIA]".[255] In

[250] Tanaka, Y. (2018). *Ibid 198.* 93.
[251] *Ibid.*
[252] *Ibid.* 94.
[253] ITLOS (2016) *Ibid 149.* 988.
[254] Craik, N. (2015). *Ibid 25.* 16.
[255] ICJ (2010) *Ibid 160.* 205.

the South China Sea arbitration, the Tribunal reviewed the domestic legislative standards and ruled that the statements and reports published due to the requirement to communicate were "far less comprehensive" than they should be in accordance with international law.[256] In the view of *Makane Moïse Mbengue*, the Tribunal "seems to have singled out "comprehensiveness" as the most important characteristic of an EIA".[257] In the Costa Rica v Nicaragua case, the ICJ acknowledge that determining the particular contents of the EIA "should be made in light of the specific circumstances of each case".[258] The Court further ruled that, the assessment of the existence of a risk must be made "on the basis of an objective evaluation of all the relevant circumstances".[259] Even so, it can be concluded that the LOSC does not provide much guidance for what to communicate when conducting CCS and Ocean Fertilization activities.

As such, on this matter, general principles and rules of international environmental and EIA law might supplement the LOSC. For example, with a view to the Principle 4 of UNEP Goals and Principles of EIA, *Craik* acknowledge "[a]s the goal is identification and evaluation of impacts, as well as identification of mitigation measures, EIA studies will include, in addition to a description of the project and the baseline environmental conditions, a description of alternatives to the project (or aspect of the project) and a consideration of the impacts of the alternatives".[260] In so regard, *Craik* argues "[t]ere are good reasons for requiring those conducting geoengineering experiments to consider a range of alternatives, including the alternative of not proceeding".[261] It is reasonable to think that when conducting CCS or Ocean Fertilization activities, the general obligation in international law not to cause significant harm to the environment of other states or to areas beyond national jurisdiction, will justify the relevance of the "no action" alternative in such cases. Moreover, as we will see, the Contracting Parties to the London Convention and the London Protocol have adopted detailed EIA rules that are possibly applicable to CCS and Ocean Fertilization.

The next question is if the LOSC provide guidance for how to communicate and to whom. According to Article 205, States are required to publish reports "to the competent international organizations, which should make them available to all States". However, as highlighted by

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[256] ITLOS (2016) *Ibid 149.* 990.

[257] Mbengue, M. M. (2016). *The South China Sea Arbitration: Innovations in Marine Environmental Fact-Finding and Due Diligence Obligations.* American Journal of International Law Unbound. Vol. 110. 285-289. 287.

[258] ICJ (2015) *Ibid 187.* 104.

[259] *Ibid.* 153.

[260] Craik, N. (2018). *Environmental Impact Assessment* in Krämer, L. and Orlando, E. (2018) *Principles of Environmental Law*. Edward Elgar Publishing. 195-207.

[261] See discussion in Craik, N. (2015) *Ibid 25.* 18.

Robin Warner, "these organizations are not specified".[262] According to *Craik*, the most obvious candidates for competent international organizations "would most likely be regional seas commissions, or possibly the Secretariat of the London Protocol".[263] Moreover, notably, as emphasised by *Warner*, "[n]o global body bears overarching responsibility for protection and preservation of the marine environment, conservation, or sustainable use of marine biodiversity [in ABNJ]".[264] In the words of *Warner*, there are "no comparable global institution with environmental protection powers for the high-seas water column".[265] As we have seen, CCS and Ocean Fertilization activities may involve impact to such areas. Furthermore, according to *Craik*, it is surprising "there is no express obligation in Articles 205 or 206 to notify those states whose marine environment is likely to be affected by a planned activity".[266] However, this might be explained by the global concern and interest in the protection and preservation of the marine environment.[267] Also worth noting is that the issue of notification and consultation is not necessarily restricted to States. Distinct from State to State notification, the principle of public participation is found in Principle 10 of the Rio Declaration.[268] Public participation is also included as an obligation in relation to EIA under the Espoo (EIA) Convention, and under the CBD.[269] As we have seen, LOSC do not contain any requirement for public participation in EIA processes.

To conclude, it is not a clear relationship between the procedural elements of EIA obligations under LOSC and the substantive obligation to prevent harm. LOSC contains only brief information on procedural elements of EIA, which makes it difficult to deduct the EIA requirements when engaging in CCS and Ocean Fertilization activities. Consequently, it is not clear if the substantive obligation to prevent "substantial pollution of or significant and harmful changes to the marine environment" is met in such cases.

As in the words of *Scott* however, "[w]here…marine geoengineering can be classified as a specific form of pollution that is subject to more detailed regulation by the LOSC, it may be subject to much tighter control".[270] An example is "pollution by dumping", regulated by the London Convention and London Protocol representing the "global rules and standards" as

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[262] Warner, R. (2018). *Ibid 22.* 41. For a discussion on Article 205 and the obligation to communicate, see e.g. Craik, N. (2008). *Ibid 69.* 144-146.

[263] Craik, N. (2015). *Ibid 25.* 21. See also discussion in Craik, N. (2008). *Ibid.* 145.

[264] Warner, R. (2018). *Ibid 22.* 41.

[265] *Ibid.* 41-42.

[266] Craik, N. (2008). *Ibid 69.* 145.

[267] Nordquist, et.al. (eds.). (1990). *Ibid 87.* 119, 205.3.

[268] Rio Declaration. *Ibid 77.* Principle 10.

[269] Espoo (EIA) Convention. *Ibid 29.* Article 2. CBD *Ibid 96.* Art. 14.

[270] Scott, K.N. (2015). *Ibid 198*. 465.

referred to by LOSC Article 210. The Contracting Parties to the London Convention and London Protocol have adopted specific assessment rules for geoengineering activities. However, these rules might not apply to all CCS and Ocean Fertilization activities, as it is a matter of debate if they qualify as "pollution by dumping".[271] Moreover, the rules adopted in the London Protocol will only apply to those States that are Parties to the Protocol. It is still relevant to have a brief look at these rules, as they might apply to some CCS and Ocean Fertilization activities.

4.4 EIA framework under the London Convention and Protocol

The State Parties to the London Protocol have adopted two sets of guidelines for CCS activities. These are the Risk Assessment and Management Framework for CO2 sequestration in sub-seabed geological structures (RAMF),[272] and the Specific Guidelines for the Assessment of carbon dioxide for disposal into sub-seabed geological formations.[273] Both include specific descriptions of the particular assessment process, such as risk management and permit conditions.[274] As in the words of *Nigel Bankes*, "[t]he RAMF aims to provide generic guidance to the Parties in order to help them characterize the risks to the marine environment associated with an offshore CCS project and in order to collect the necessary information to develop a management strategy to address uncertainties and residual risks".[275] The CO2 Specific Guidelines highlight that Contracting Parties "should strive at all times to enforce procedures that minimize the potential for adverse consequences for the marine environment…".[276] Moreover, when applying these Guidelines "uncertainties in relation to assessments of impacts on the marine environment will need to be considered and a precautionary approach applied in addressing these uncertainties".[277]

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[271] For a debate on the London Convention and London Protocol applicability to CCS and Ocean Fertilization, see Bankes, N. (2020) *Ibid 40.* Johansen, E. (2020) *Ibid 15.*

[272] RAMF Guidelines, Adopted at the joint session of the 28th Consultative Meeting of Contracting Parties under the LC and the 1st Meeting of Contracting Parties under the LP, 30 October – 3 November 2006. Available at (accessed 30.11.19):

http://www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Pages/default.aspx

[273] Specific guidelines for the assessment of carbon dioxide for disposal into sub-seabed geological formations, Adopted 2 November 2012, LC 34/15, annex 8 (Specific Guidelines, 2012). Available at (accessed 30.11.19):

http://www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf

[274] RAMF *Ibid 272.* CO2 Specific Guidelines *Ibid.*

[275] Bankes, N. (2020). *Ibid 40.* 17.

[276] CO2 Specific Guidelines *Ibid 273.* 1.7.

[277] *Ibid.* 1.4.

In 2008, the Contracting Parties adopted the Resolution on the Regulation of Ocean Fertilization.[278] The Resolution stated that only Ocean Fertilization considered as legitimate scientific research on a case by case basis should be permitted, if carried out in accordance with the Assessment Framework for Scientific Research Involving Ocean Fertilization (Assessment Framework).[279] The Assessment Framework sets out a two-stage process involving an initial assessment and an environmental assessment.[280] *Johansen* emphasise that this framework represents "a "model of precautionary and adaptive management", as it offers both procedural and substantive environmental requirements".[281] In 2013, the Parties adopted an amendment to the Resolution.[282] The Resolution add a new Article 6*bis*.[283] Article 6*bis* states that Contracting Parties shall not allow the placement of activities listed in Annex 4, "unless the listing provides that the activity or the sub-category of an activity may be authorized under a permit".[284] In so regard, a new annex 5 adds the Assessment Framework for matter that may be considered for permit.[285] *Craik* argues that the Assessment Framework for Ocean Fertilization under the London Convention and Protocol "includes very detailed requirements for the content of the assessment" and as "[t]here is no minimum threshold for the application of the framework…[it] will apply to all ocean fertilization activities, even where the activity is not anticipated to have a likelihood of significance impact".[286] Moreover, when considering a lower threshold requirement than "significant" for geoengineering activities, *Craik* suggest that "the approach under the London Protocol suggests that a more precautionary threshold might be welcomed, in light of the concerns surrounding [such activities]".[287]

To conclude, this section identify that for those CCS and Ocean Fertilization activities covered by the London Protocol and Convention, more detailed EIA rules may apply compared to those under LOSC.

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[278] Resolution LC-LP.1 (2008) on the Regulation of Ocean Fertilization. LC 30/16. Annex 6.

[279] *Ibid.* cf. Assessment Framework for Scientific Research Involving Ocean Fertilization (2010) LC 32/15. Annex 6.

[280] *Ibid.* 1.3.

[281] Johansen, E. (2020). *Ibid 15*. 13. Scott, K.N. (2013). *Ibid 11*. 351.

[282] The Amendment to the London Protocol to Regulate the Placement of Matter for Ocean Fertilization and other Geoengineering Activities (adopted 19 October 2013) Resolution LP.4(8) (amendment not yet in force cf. Article 21 (3) of the London Protocol), Article 6*bis*(1).

[283] *Ibid.*

[284] *Ibid.*

[285] *Ibid* Annex 5.

[286] Craik, N. (2015). *Ibid 25.* 12.

[287] *Ibid.* 16.

4.5 EIA under draft ILBI in BBNJ negotiations[288]

Highlighted by *Warner*, there have not been any "overarching international agreement which develops in more specific terms the obligation contained in Article 206 of the LOSC to assess the potential effects of planned activities under States' jurisdiction or control in ABNJ".[289] After well over a decade long process, in 2017, the General Assembly decided to convene an Intergovernmental Conference under the auspices of the United Nations, to consider the recommendations of the Preparatory Committee[290] and to elaborate the text of an international legally binding instrument (ILBI) under the LOSC on the conservation and sustainable use of marine biological diversity of ABNJ.[291] The Conference address "the conservation and sustainable use of marine biological diversity of [ABNJ], in particular, together and as a whole".[292] The negotiations mandate consist of four elements, including the design of an EIA regime for ABNJ.[293] Detailed proposals for the EIA set of rules are included in Articles 22 to 41 in Part VI of the draft text of the ILBI made by the President of the Conference.[294] In the view of *Doelle* and *Sander*, "[t]he ongoing negotiations on a legally binding instrument on marine biodiversity of areas beyond national jurisdiction (BBNJ) provides a rare opportunity to take the lessons learned through almost 50 years of domestic practice to design an effective international marine EA regime".[295] However, there can be identified some issues with the suggested EIA obligations. Though it is important to keep in mind that the negotiations for ILBI is in an early phase, meaning that the drafted suggestions will further evolve.

To begin with, the drafted ILBI does not make any reference to CCS and Ocean Fertilization activities, or to marine geoengineering as such. It is however, suggested through draft Article 29, to include an annex with a list of activities that either require or do not require an EIA.[296] It is emphasised that such a list shall be updated by the Conference of the Parties on regular

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[288] For a discussion on the EIA obligations suggested in ILBI, see M. Doelle, G. Sander (2019). *Ibid 29.*

[289] R. Warner (2015). *Ibid 170.* 293.

[290] Preparatory Committee established by General Assembly resolution 69/292 Information can be found at (accessed 21.11.19):

https://www.un.org/depts/los/biodiversity/prepcom.htm

[291] Resolution adopted by the General Assembly on 24 December 2017 on International legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. For information about the Interngovernmental Conference and its background see (accessed 21.11.19): https://www.un.org/bbnj/

[292] *Ibid*. Nr. 2.

[293] *Ibid*.

[294] Draft text of an agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction – Note by the President of 17 May 2019 (draft ILBI).

[295] Doelle, M., Sander, G. (2019) *Ibid 29.*

[296] Draft ILBI *Ibid 294.* Art. 29 nr. 1.

basis.[297] This indicates that it might be intended to include developing activities involving a risk of harm, such as CCS and Ocean Fertilization activities, being subject to EIA in accordance with this annex. At the second session of the Preparatory Committee, the African Group proposed that emerging activities such as marine geoengineering and others should be subject to EIAs.[298]

Next, Article 3 of the drafted ILBI suggests that "the provisions of this agreement apply to ABNJ".[299] In the view of *Doelle* and *Sander* the geographical scope of the treaty will have implications for the EIA process.[300] If the ILBI is only applicable to ABNJ, the EIA provisions will not apply to activities carried out in areas within national jurisdiction (AWNJ). As we have seen, CCS and Ocean Fertilization might be planned for in AWNJ, but still involve risks of to ABNJ. As highlighted by *Doelle* and *Sander;* "while there is broad support for the duty to assess how activities in ABNJ may affect adjacent coastal States areas, support for assessing activities in AWNJ that affect ABNJ is more limited".[301] As such, broader applicability of the ILBI than only for ABNJ may be needed if the EIA rules should be fully applicable when conducting CCS and Ocean Fertilization activities.

Considering the question if EIA is required under the ILBI, several drafted Articles describes the harm threshold.[302] According to Article 24, one option is the "substantial pollution of or significant and harmful changes to the marine environment" criterion from LOSC.[303] The alternative suggests that a simplified EIA will be triggered when "there is a likelihood of more than minor or transitory effects", and a comprehensive assessment when "there is a risk of significant harm".[304] There are also proposals to have lower thresholds, and stricter assessment procedures, for activities planned to be undertaken in ecologically significant, vulnerable or protected areas.[305] It is however unclear whether the scope of EIA under the ILBI will be limited to biophysical impacts, or also include social and other relevant impacts and benefits.[306] As we have seen, a lower or more flexible harm threshold and a broader scope than physical impacts

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[297] *Ibid.* Nr. 2.

[298] See Summary of the second session of the Preparatory Committee on marine biodiversity beyond areas of national jurisdiction: 26. August – 9. September 2016. Vol. 25 No. 118 Published by the International Institute for Sustainable Development (IISD). Monday, 12 September 2016 at p. 9. Available at (accessed 21.11.19): https://enb.iisd.org/download/pdf/enb25118e.pdf

[299] Draft ILBI *Ibid 294.* Art. 3.

[300] Doelle, M., Sander, G. (2019). *Ibid 29.* 17.

[301] *Ibid.*

[302] Draft ILBI *Ibid 294.* Arts. 24, 27, 29 and 30.

[303] *Ibid.* Art. 24 alt 1.

[304] *Ibid.* alt 2.

[305] *Ibid.* Art. 27.

[306] *Ibid.* Arts. 31.2, 35 (2) d.

will make EIA obligations more applicable when conducting CCS and Ocean Fertilization activities.

5 Conclusions

The IPCC acknowledge the CCS and Ocean Fertilization activities as necessary measures to mitigate global warming. Yet, these activities impose risks to the marine environment. EIA is a legal tool with the potential to assess those risks, included in the LOSC to implement the obligations to protect and preserve the marine environment.

The question if EIA is required when conducting CCS and Ocean Fertilization activities is a matter of legal interaction. This thesis analyses if the EIA obligations contained in the LOSC apply to CCS and Ocean Fertilization activities. Arguments are made both ways. The thesis therefore identifies factors with CCS and Ocean Fertilization activities that might support a lower or more flexible threshold for EIA to be required for such activities. Moreover, the analysis shows that the LOSC regulation for EIA contains limited procedural elements. That makes interpretation challenging and hence to deduct what is required to secure that CCS and Ocean Fertilization activities do not cause illegal harm to the marine environment. Against that background, the thesis have seen that the London Protocol provide detailed EIA rules better fit to protect and preserve the marine environment when engaging in CCS and Ocean Fertilization activities. However, it is debatable whether these rules applies to all such activities or not. In any case they are only required for the Contracting Parties to the London Protocol.

Finally, the thesis have briefly explored the EIA obligations suggested in the ongoing BBNJ negotiations, and highlighted some concerns for its applicability to CCS and Ocean Fertilization activities.

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1992 United Nation Framework Convention on Climate Change (UNFCCC)
1992 United Nations Convention on Biological Diversity (CBD)
1991 The Convention on Environmental Impact Assessment in a Transboundary Context (The Espoo (EIA) Convention)
1982 The United Nations Convention for the Law of the Sea (LOSC)
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