INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA

(CASE NO. 31)

# REQUEST FOR AN ADVISORY OPINION SUBMITTED BY THE COMMISSION OF SMALL ISLAND STATES ON CLIMATE CHANGE AND INTERNATIONAL LAW

(REQUEST FOR ADVISORY OPINION SUBMITTED TO THE TRIBUNAL)

WRITTEN STATEMENT
OF THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES - WORLD COMMISSION ON ENVIRONMENTAL LAW,
OCEAN LAW SPECIALIST GROUP

13 JUNE 2023

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WRITTEN STATEMENT OF THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES, WORLD COMMISSION ON ENVIRONMENTAL LAW, OCEAN LAW SPECIALIST GROUP

# CHAPTER 1

# INTRODUCTION

## I. International Union for Conservation of Nature and Natural Resources (IUCN)

1. By Order 2022/4 of 16 December 2022, the President of the International Tribunal for the Law of the Sea ("the Tribunal" or "ITLOS") invited States Parties to the Law of the Sea Convention ("the Convention" or "UNCLOS"),[1] the Commission of Small Island States on Climate Change and International Law ("COSIS" or "the Commission"), and intergovernmental organizations listed in the Annex to Order 2022/4 to present written statements on two questions submitted by COSIS to the Tribunal for an advisory opinion, designated Case No. 29.

2. The International Union for Conservation of Nature and Natural Resources ("IUCN") is an intergovernmental organization with a formally accredited permanent observer mission to the United Nations ("UN"). It was invited to provide this written statement to the Tribunal as an organization listed in the Annex to Order 2022/4.

3. IUCN is the world's oldest and largest global environmental network. It has a democratic membership union with more than 1,400 government and nongovernment member organizations, a secretariat, and almost 15,000 volunteer legal and scientific experts in more than 170 countries who work through seven Commissions. IUCN's mission is to help the world find scientifically sound and equitable solutions to our most pressing environment and development challenges. It supports scientific research, manages field projects all over the world and brings governments, non-government organizations, UN agencies, companies, academia and indigenous peoples and local communities together to develop and implement policies, laws and best practices.

4. The World Commission on Environmental Law ("WCEL") of IUCN is an extensive global network of over 1200 environmental law specialists in more than 130 countries who provide their expertise and services to IUCN on a voluntary basis, *pro bono publico*. WCEL advances environmental law by developing legal concepts and instruments, and by building the capacity of societies to employ environmental law for conservation and sustainable development. WCEL pursues its objectives in concert with the integrated programme of activities adopted by the World Conservation Congress in the IUCN Programme 2021–2024[2] and the mandate given to it by the IUCN Council for the 2021–2024[3] period in cooperation with IUCN Members and components of IUCN, through Commission members and Specialist Groups

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

[2] International Union for Conservation of Nature, *Nature 2030 – One nature, one future: A Programme for the Union 2021–2024* (IUCN World Conservation Congress 2020).

[3] IUCN World Commission on Environmental Law, *World Commission on Environmental Law (WCEL) Mandate 2021–2024* (10 February 2021).

and in partnership with relevant international entities. The Ocean Law Specialist Group has provided its expertise in statements submitted to this Tribunal in its two previous Advisory Opinions, and has supported the negotiation of the international legally binding instrument under the Convention on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction and in other relevant international processes.

## II. Background: COSIS Request

5. COSIS is an international organization comprising six States Parties, all of whom are also States Parties to the Convention. The Commission's statute highlights "the importance of maritime zones and the significant reliance of Small Island States on marine living resources within such zones, as well as the impacts of climate change on the marine environment including marine living resources". Membership in COSIS is open to all members of the Alliance of Small Island States (AOSIS). AOSIS is an intergovernmental organization whose members are 39 low-lying coastal and island States that are highly vulnerable to the impacts of climate change.[4] At its Third Meeting, COSIS decided to request an Advisory Opinion from the Tribunal.[5]

6. COSIS has asked this Tribunal to render an advisory opinion to address two questions pursuant to Article 21 of the Statute of the Tribunal, Article 138 of the Rules of the Tribunal, and Article 2 (2) of the 2021 Agreement for the Establishment of the Commission of Small Island States on Climate Change and International Law, which states:

> Having regard to the fundamental importance of oceans as sinks and reservoirs of greenhouse gases and the direct relevance of the marine environment to the adverse effects of climate change on Small Island States, the Commission shall be authorized to request advisory opinions from the International Tribunal for the Law of the Sea ("ITLOS") on any legal question within the scope of the 1982 United Nations Convention on the Law of the Sea, consistent with Article 21 of the ITLOS Statute and Article 138 of its Rules.

7. The questions for which an advisory opinion is requested are:

> What are the specific obligations of State Parties to the United Nations Convention on the Law of the Sea (the "UNCLOS"), including under Part XII:
>
> (a) to prevent, reduce and control pollution of the marine environment in relation to the deleterious effects that result or are likely to result from climate change, including through ocean warming and sea level rise, and ocean acidification, which are caused by anthropogenic greenhouse gas emissions into the atmosphere?
>
> (b) to protect and preserve the marine environment in relation to climate change impacts, including ocean warming and sea level rise, and ocean acidification?

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[4] Alliance of Small States (AOSIS), "Alliance of Small States" <https://www.aosis.org> accessed 22 May 2023.
[5] Commission of Small Island States on Climate Change and International Law, "Decisions of the Third Meeting of the Commission of Small Island States on Climate Change and International Law" (26 August 2022).

## III. Structure of the Statement

8. The World Commission on Environmental Law, Ocean Law Specialist Group, of the International Union for Conservation of Nature appreciates the opportunity to submit this Statement and to present to the Tribunal the bases for the following conclusions.

9. These are questions about the legal responsibilities of States that are informed by the science of climate change and marine biodiversity. Accordingly, IUCN seeks to address the relevant law and science in this Statement.

10. This Statement first sets out a brief summary of the relevant scientific information that is relied on here. It then explains that activities resulting in the release of the pollutants that have been described amount to the definition of pollution – "introduction of substances or energy into the marine environment" – in the Convention, Article 1(1)(4).

11. Next, it responds to the first question. It identifies States Parties' obligations to address their emissions of greenhouse gases ("GHG") from all sources under the Convention, with reference to international law and in particular to the Paris Agreement as well as Annex VI of the International Convention for the Prevention of Pollution from Vessels. It notes that care must be taken that climate interventions such as marine carbon sequestration do not themselves pollute and cause harm to the marine environment.

12. In addressing the second question, this Statement considers obligations of States Parties under the Convention and international law that include GHGs and other climate pollutants and extend beyond the specific articles relating to pollution. It discusses positive and negative obligations that include cooperating with each other, taking measures to increase ocean resilience such as creating marine protected areas, paying due regard to low-lying island and coastal States' right to a stable global climate system given their dependence on the physical marine environment, and performing environmental impact assessments that consider cumulative impacts of climate change and ocean acidification.

13. Then, this Statement turns to the special capabilities and needs of developing States.

14. Finally, this Statement addresses responsibility and liability under the Convention for deleterious effects on the marine environment from human activities that harm the marine environment through warming, deoxygenation, acidification, sea level rise, and other related impacts.

# CHAPTER 2

# DELETERIOUS IMPACTS ON THE MARINE ENVIRONMENT RESULT FROM EMISSIONS OF GREENHOUSE GASES AND OTHER HUMAN ACTIVITIES: THE SCIENCE

15. The best available science demonstrates that global temperatures, ocean acidification, and other consequences of climate change continue to worsen, with dire consequences for the marine environment and humankind. Here, we briefly describe some of the observations and projections in reports from the Intergovernmental Panel on Climate Change ("IPCC"), the First and Second World Ocean Assessment, IUCN reports, and other peer-reviewed sources.[6] The science relevant to increasing the marine environment's resilience and climate interventions are discussed here because the need for them is a direct consequence of the failure of States to control their GHG emissions, and they provide both opportunities for adaptation and risks of additional harm.

## I. Climate forcing

16. The Request for an Advisory Opinion specifically refers to greenhouse gas emissions in the first question; the second question is inclusive of all climate forcing agents. In this submission we refer to greenhouse gases ("GHGs") and other climate forcers collectively as climate pollutants, which is especially relevant to chapter 4, responding to question (b) of the request.

17. The warming of global climate that Earth is now experiencing is due in large part to human activities that cause heat to be trapped rather than released to space, and that change the reflectivity of the Earth's surface (albedo) consequently absorbing rather than radiating heat to space. The difference between incoming and outgoing radiation is called a planet's climate forcing. When climate forcing factors result in greater incoming solar radiation than outgoing energy, the planet warms. Climate forcing factors, natural and anthropogenic, are also called climate drivers.

18. GHGs are climate drivers that trap heat; when they are emitted in quantities that destabilize the climate, they are considered pollutants. The greenhouse gases that are the chief contributors to climate change are regulated under various conventions including the UN Framework Convention on Climate Change ("UNFCCC") and the Montreal Protocol. GHGs that must be reported under the UNFCCC are: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride ($SF_6$) and nitrogen trifluoride ($NF_3$). Methane is a particularly strong driver of

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[6] IPCC, *Climate Change 2023: Synthesis Report of the IPCC Sixth Assessment Report* (2023) ("IPCC Sixth Assessment Report"); IPCC, *Special Report on the Ocean and Cryosphere in a Changing Climate* (2019) ("IPCC, *Special Report on the Ocean and Cryosphere"*); IPCC, *Global Warming of 1.5°C* (2018).
UN, *First Global Integrated Marine Assessment: World Ocean Assessment I* (UN, 2017) ("First World Ocean Assessment"); *Second World Ocean Assessment: Volumes I and II* (UN, 2022) ("Second World Ocean Assessment").
D. Laffoley and J.M. Baxter, (eds.), *Ocean deoxygenation: Everyone's problem - Causes, impacts, consequences and solutions* (IUCN, 2019) ("Laffoley and Baxter, *Ocean deoxygenation* (IUCN)"); D. Laffoley and J.M. Baxter (eds), *Explaining Ocean Warming: Causes, Scale, Effects and Consequences* (IUCN, 2016) ("Laffoley and Baxter, *Explaining Ocean Warming* (IUCN)").

warming and is a favored mitigation target because once it is no longer emitted, its heat-trapping effects are short-lived. Water vapor ($H_2O$) is the most common GHG; observations show that the amount leading to atmospheric water vapor is increasing as the climate warms, creating a feedback loop of increasing warming. $CO_2$ constitutes the majority of GHG emissions other than water vapor, and it causes both warming and ocean acidification.

19. Substances such as black carbon (also known as soot) have also been recognized as climate forcers, in the case of soot, because it darkens Earth's surface which contributes to heat absorption and reduces heat radiation. Other climate forcers include aerosols such as nitrogen oxides (NOx), ammonium ($NH_3$) and sulfur oxides (SOx).

## II. Changes to the ocean caused by climate pollutants have increased over the past 30 years of IPCC reports

20. In 2019, the IPCC published its *Special Report on the Ocean and Cryosphere in a Changing Climate*. Past and future changes to the ocean from GHGs and other climate drivers documented in the report's Summary for Policymakers include: increased global mean sea surface temperatures, increases in marine heat content and marine heatwaves (when the daily sea surface temperature exceeds the local 99th percentile over the period 1982 to 2016), decreases in oxygenation levels (deoxygenation), increased surface pH levels (acidification), and increases in global mean sea levels (sea level rise).[7]

[7] IPCC, *Special Report on the Ocean and Cryosphere*, Summary for Policymakers, p. 9.

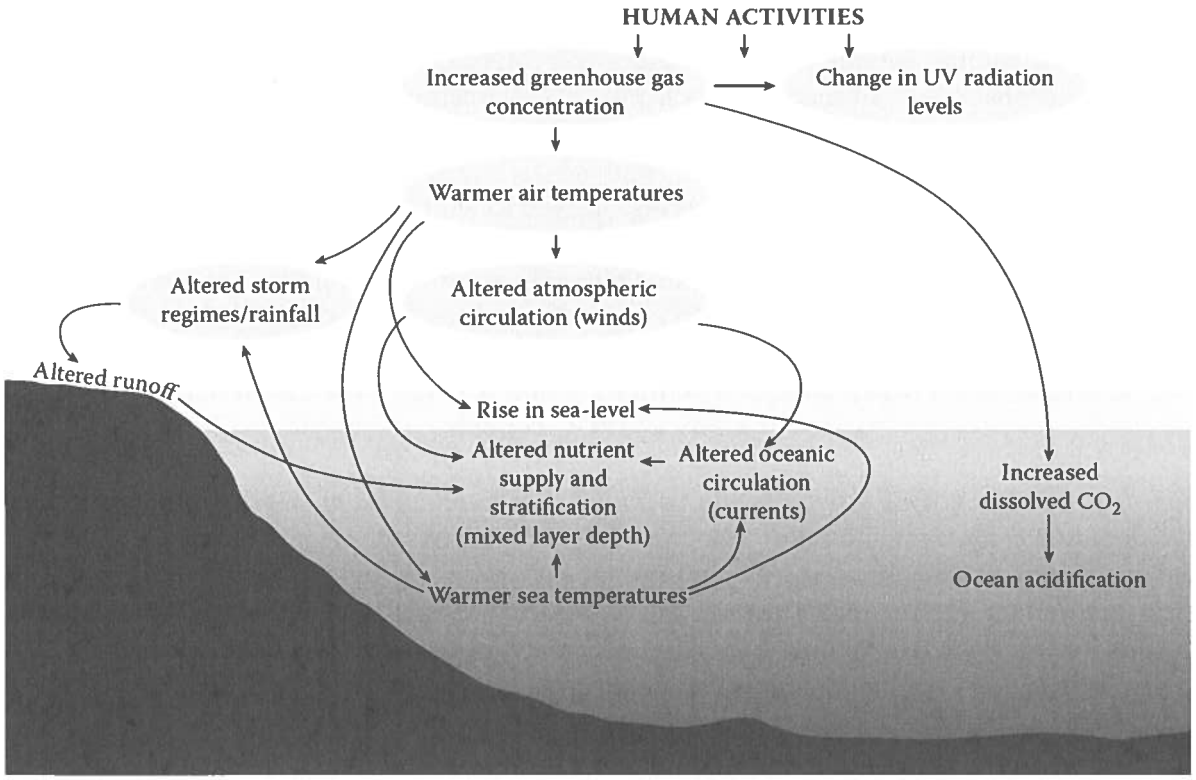


Figure 1 – Important physical and chemical changes in the atmosphere and oceans as a result of climate change.[8]

21. The polluting effects of anthropogenic GHG emissions on the ocean must be viewed in the context of the critical role that the ocean plays in key Earth systems. The ocean is a climate regulator due to its characteristics as a sink that facilitates the uptake and redistribution of anthropogenic carbon dioxide and heat. The ocean is a vital component of the hydrological cycle and provides a myriad of services to people, including "food and freshwater, renewable energy, health and wellbeing, cultural values, trade and transport."[9]

22. With this context in mind, the effects of releasing climate pollutants into the atmosphere are complex and interdependent but generally manifest in four major stressors on the marine environment, namely: ocean acidification, ocean warming, ocean deoxygenation, and sea level rise (see Figure 1).[10]

23. While scientific understanding of the effects of climate change on the ocean is constantly evolving in light of new scientific knowledge driven by developments in, *inter alia*, data, technology, and climate models,[11] the most recent IPCC assessments confirm that evidence and understanding of changes to the ocean caused by climate pollutants have

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[8] Poloczanska et al., "Climate Change and Australian Marine Life", in R.N. Gibson, R.J.A. Atkinson and J.D.M. Gordon (eds), *Oceanography and Marine Biology: An Annual Review, Volume 45* (Taylor & Francis, 2007) pp. 407-478.

[9] IPCC, *Special Report on the Ocean and Cryosphere*, ch. 1, p. 75.

[10] IPCC Sixth Assessment Report, Summary for Policymakers, p. 13; IPCC, *Special Report on the Ocean and Cryosphere*, Summary for Policymakers, pp. 6-17; UN, The Second World Ocean Assessment: Volume I, ch. 5; UN, *The Second World Ocean Assessment: Volume II*, ch. 9.

[11] See e.g., UN, *The Second World Ocean Assessment: Volume I*, pp. 47-57.

increased over the past 30 years of IPCC reports.[12] In scenarios with increasing $CO_2$ emissions, the IPCC has projected with virtual certainty that the heat content of the global ocean, global mean sea level rise, and ocean acidification will continue to increase,[13] and with high confidence that deoxygenation will increase.[14] Every increment in global warming will "intensify multiple and concurrent hazards" creating cascading risks that will be more complex and difficult to manage.[15] In this regard, it is important to bear in mind that the climate change-induced pollutants to the ocean interact with, and amplify, each other as well as with other forms of non-climate induced pollution of the marine environment, leading to cumulative deleterious effects to the marine environment.[16]

## III. Effects of heat: heat waves, stratification and deoxygenation of marine waters, and sea level rise

24. In the context of impacts on the ocean over time, the IPCC documented that marine heatwaves have very likely doubled in frequency since 1982 and are increasing in intensity. The IPCC found that it is very likely that between 84–90 percent of marine heatwaves that occurred between 2006 and 2015 are attributable to anthropogenic temperature increase.

25. Observed surface ocean warming and high latitude additions of freshwater are making the surface ocean less dense relative to deeper parts of the ocean and inhibiting mixing between surface and deeper water, leading to density stratification.[17] Density stratification means that reduced vertical exchange can take place within the water column of heat, salinity, oxygen, carbon, and nutrients. One of the impacts of density stratification is ocean deoxygenation.[18]

26. The IPCC also documented that the rate of global mean sea level rise for 2006–2015 is unprecedented over the last century, and the dominant cause of global mean sea level rise since 1970 is due to anthropogenic climate forcing.[19] The IPCC notes that limiting global surface temperature does not prevent continued changes in climate system components that have multi-decadal or longer timescales of response. Sea level rise is unavoidable for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and sea levels will remain elevated for thousands of years.[20] However, deep, rapid and sustained GHG emissions reductions would limit further sea level rise acceleration and projected long-term sea level rise commitment.

27. Relative to 1995–2014, the *likely* global mean sea level rise under the *very low* GHG emissions scenario is 0.15–0.23 meters by 2050 and 0.28–0.55 meters by 2100; while for the

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[12] See IPCC, *Special Report on the Ocean and Cryosphere*, pp. 75-76; UN, *The Second World Ocean Assessment: Volume I*, ch. 5; UN, *The Second World Ocean Assessment: Volume II*, ch. 9 and pp. 100-101.
[13] IPCC, *Climate Change 2021: The Physical Science Basis, Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (2021) pp. 1211, 1214.
[14] IPCC Sixth Assessment Report, Summary for Policymakers, pp. 12-13.
[15] IPCC Sixth Assessment Report, Summary for Policymakers, pp. 12-15.
[16] GESAMP, "High level review of a wide range of proposed marine geoengineering techniques" (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UN Environment/UNDP/ISA Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection) (2019) 15 ("GESAMP Report").
[17] IPCC, *Climate Change and Land*, Summary for Policymakers (2019) p. 9.
[18] Laffoley and Baxter, *Ocean deoxygenation* (IUCN) p. 175.
[19] IPCC Sixth Assessment Report, Summary for Policymakers, p. 5.
[20] IPCC Sixth Assessment Report, Summary for Policymakers, p. 18.

*very high* GHG emissions scenario it is 0.20–0.29 meters by 2050 and 0.63–1.01 meters by 2100. Over the next 2000 years, global mean sea level is expected to rise by about 2–3 meters if warming is limited to 1.5°C and 2–6 meters if limited to 2°C.

## IV. Effect of Carbon Dioxide: Acidification

28. Ocean acidification is occurring rapidly and "at an unprecedented rate in the Earth's history."[21] The surface of the ocean is in direct contact with the atmosphere and has absorbed a quarter of all anthropogenic $CO_2$ emissions.[22] $CO_2$ reacts with seawater to form carbonic acid in the surface of the ocean resulting in ocean acidification.[23] Global surface ocean pH has declined on average by approximately 0.1 since the industrial revolution, resulting in an increase in acidity of about 30 percent. Ocean pH is projected to decline "approximately by an additional 0.2–0.3 over the next century unless global carbon emissions are significantly curtailed."[24]

29. By absorbing more $CO_2$, it is virtually certain that the ocean has undergone increasing surface acidification, and it is very likely that the ocean has absorbed 20–30 percent of total anthropogenic $CO_2$ emissions since the 1980s. This has resulted in an observed decline in surface pH levels, that is, surface waters have been recorded to have become more acidic.[25] Increasing ocean acidification means that there is less calcium carbonate available in sea water. Calcium carbonate is an essential component of marine animals' shells and skeletons, and ocean acidification thus has the effect of weakening these structures, or even making it impossible to form them, resulting in damage to coral reefs, cold-water corals, rocky shores, barnacles, mussels and shellfish, and connected food webs.[26]

30. While $CO_2$ is the primary cause of ocean acidification, other greenhouses gases and aerosols such sulfur oxides, nitrous oxide and ammonia also contribute to ocean acidification.[27] Emissions of sulfur, nitrogen and particulate pollution are well-correlated with shipping lanes, so vessel-source pollution must be considered a factor. An effect of these gases is understood to significantly reduce the ability of sea water to absorb $CO_2$ from the atmosphere, increasing the warming effect of the $CO_2$.[28]

## V. Consequence: Biodiversity loss

31. The 2023 IPCC Sixth Assessment Report concluded that climate change has already caused widespread impacts, substantial damages and increasingly irreversible losses and

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[21] UN, First World Ocean Assessment, Summary of the First Global Integrated Marine Assessment, p. 41.
[22] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 5, p. 714.
[23] UN, First World Ocean Assessment, Summary of the First Global Integrated Marine Assessment, p. 10; Keith A. Hunter et al., "Impacts of anthropogenic SOx and NOx and NH3 on acidification of coastal waters and shipping lanes", *Geophysical Research Letters* (2011) 38:L13602.
[24] UN, *The Second World Ocean Assessment: Volume I* (UN, 2022) ch. 5, p. 95.
[25] Ibid, p. 8.
[26] UN, First World Ocean Assessment, pp. 10, 14; UN, Second World Ocean Assessment, ch. 9, p. 63; J.M. Hall-Spencer and B.P. Harvey, "Ocean Acidification Impacts on Coastal Ecosystem Services Due to Habitat Degradation", *Emerging Topics in Life Sciences* (2019) 3(2):197-206 ("Hall-Spencer and Harvey").
[27] K. Hunter et al., "Impacts of anthropogenic SOx and NOx and NH3 on acidification of coastal waters and shipping lanes", *Geophysical Research Letters* (2011) 38:L13602.
[28] Ibid.

altered terrestrial, freshwater and ocean ecosystems worldwide.[29] These impacts include hundreds of local losses of species, with mass mortality events recorded in the ocean.[30] According to the IPCC, since about 1950 many marine species across various groups have undergone shifts in geographical range and seasonal activities in response to ocean warming, sea ice change, and biogeochemical changes, such as oxygen loss, to their habitats. These impacts vary by region. In polar regions, for example, ice-associated marine mammals and seabirds have experienced habitat contraction linked to sea ice changes, which have led to impacts on foraging success due to climate impacts on prey distributions for these species.[31]

32. Marine impacts can have cascading and combined effects on species across marine ecosystems. For example, multiple climate-related impacts on polar zooplankton have affected food web structure and function, resulting in reduced biodiversity and less productive fisheries.[32] The combined impacts of ocean acidification and decreased oxygen levels have altered ecosystem structure in the California Current upwelling system , with direct negative impacts on biomass production and species composition.[33] Cold polar waters have a higher capacity to absorb $CO_2$ from the atmosphere and thus are especially vulnerable to ocean acidification;[34] in the Arctic this is expected to negatively impact Norwegian kelp and sea urchins, Barents Sea cod, the Greenland shrimp fishery, Alaska's fishery sector and subsistence fisheries in the western Canadian's Arctic.[35] In multiple regions, the IPCC documented declines in the abundance of fish and shellfish stocks, due to direct and indirect effects of global warming and biogeochemical changes. These have already contributed to reduced fisheries catches.[36]

33. With respect to coastal ecosystems, the IPCC documents a dramatic decline. Nearly 50 percent of coastal wetlands have been lost over the last 100 years, as a result of the combined effects of localized human pressures, sea level rise, warming and extreme climate events. Increased salinity, or increased sea water intrusion in estuaries due to sea level rise, has driven upstream redistribution of marine species and reduced the availability of suitable habitats for marine species.[37] Like trees, vegetated coastal ecosystems are important carbon storehouses, so their loss not only reduces important habitat areas, but it also removes a substantial long-term carbon sink.

## VI. The additive effect of every incremental GHG emission counts

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[29] IPCC, *Sixth Assessment Report*, Summary for Policymakers, p. 6.
[30] Ibid.
[31] IPCC, Summary for Policymakers, in *Special Report on Climate Change and Land* (Cambridge University Press, 2019) p. 12.
[32] Ibid.
[33] Ibid.
[34] T. Stephens, "Ocean acidification at the Poles: regional responses to marine environmental change in the Anthropocene", in K.N. Scott and D.L. VanderZwaag (eds), *Research Handbook on Polar Law* (Edward Elgar Publishing, 2020) pp. 434-454.
[35] Arctic Monitoring and Assessment Programme (AMAP), *AMAP Assessment 2018: Arctic Ocean Acidification* (Tromsø, Norway: Arctic Monitoring and Assessment Programme 2018); N. Steiner and D.L. VanderZwaag, "Ocean acidification and the Arctic: regional scientific and governance responses", in D.L. VanderZwaag, N. Oral and T. Stephens (eds), *Research Handbook on Ocean Acidification Law and Policy* (Edward Elgar Publishing, 2021) pp. 142-163.
[36] IPCC, Summary for Policymakers, in *Special Report on Climate Change and Land* (2019) p. 12.
[37] Ibid, p. 13.

34. The IPCC concludes that over the 21st century, the ocean is projected to transition to unprecedented conditions with increased temperatures, greater upper ocean stratification, further acidification, deoxygenations, and altered net primary production.[38] In terms of frequency, extreme sea level events that were historically rare (once per century in the recent past) are projected to occur frequently (at least once per year) at many locations by 2050 in all scenarios, *but* especially in tropical regions, and those increasing frequencies of high water levels can have severe impacts in many locations.[39] Extreme sea level events that are currently rated as one-in-one-hundred year events are projected to occur at least annually by 2100.[40] The chart below illustrates the risks to various marine resources at escalating temperatures. As noted below, at current temperature increases, warm water coral reefs are already at high to very high risk.

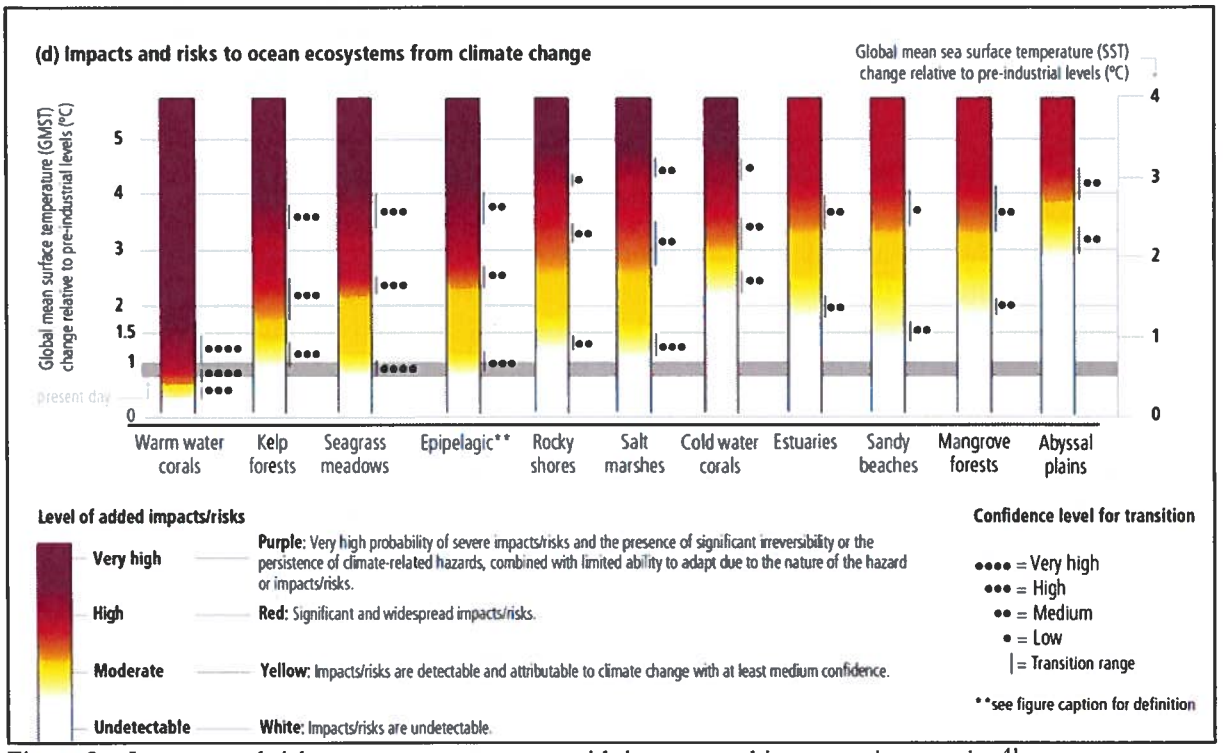

Figure 2 – Impacts and risks to ocean ecosystems with incremental increases in warming[41]

35. Every incremental emission counts. The IPCC illustrates the additive effect of increased emissions to existing increasing temperatures in its 2019 report (see Figure 2).[42] It estimates that cumulatively, each 1000 gigatonnes of $CO_2$ emissions is likely to cause a 0.27°C to 0.63°C increase in global surface temperature.[43] In other words, every tonne of $CO_2$ adds to the global warming effect. Risks and projected adverse impacts and related

[38] IPCC, Summary for Policymakers, in *Special Report on Climate Change and Land* (Cambridge University Press, 2019) p. 18; World Meteorological Organization (WMO), *WMO Global Annual to Decadal Climate Update 2023–2027* (World Meteorological Organization, 2023) p. 8 (predictions for 2023–2027 are aligned with IPCC).
[39] IPCC, *Special Report on Climate Change and Land* (Cambridge University Press, 2019), Summary for Policymakers, p. 20.
[40] IPCC, *Climate Change 2023: Summary for Policymakers, in The Physical Science Basis, Contribution to Working Group I Contribution to the IPCC Sixth Assessment Report* (2023) p. 13.
[41] IPCC, *Special Report on the Ocean and Cryosphere*, Summary for Policymakers, figure SPM.3, p. 23.
[42] Ibid, p. 36.
[43] Ibid.

losses and damage escalate with every increment of warming, and with additional warming, climate risks will interact with non-climate risks, creating compound and cascading risks that will be more complex and difficult to manage.[44]

36. Because even small increments of GHG emissions lead to dangerous climate change, the IPCC evaluated pathways for emission reductions to reach net zero and net negative emissions of GHGs. In the IPCC Sixth Assessment Report, the IPCC assessed the climate response to five illustrative scenarios based on Shared Socio-economic Pathways ("SSPs") that cover the range of possible future development of anthropogenic drivers of climate change found in the literature. These range from *high* and *very high* GHG emission scenarios, to *low* and *very low* GHG emission scenarios. The modelled pathways that could limit warming to 1.5°C would require global emissions of $CO_2$ to reach net zero in the early 2050s and emissions would have to remain net-negative thereafter.[45] Their models demonstrated that global pathways that limit warming to 1.5°C with no or limited overshoot involve rapid, deep and, in most cases, immediate greenhouse gas emission reductions in all sectors (such as land-use, forestry and energy supply) this decade.

37. While some future changes are unavoidable and irreversible, they can be limited by deep, rapid, immediate and sustained GHG emission reductions, and the IPCC notes these types of reductions would lead to a discernable slowdown in global warming.[46]

## VII. Threatened and fragile ecosystems are especially vulnerable

38. Of the IPCC scenarios, the *very low* GHG emission scenario is the only one that would, with more than 50 percent likelihood, hold temperature increase to 1.5°C and is therefore the only feasible option to attempt to protect and preserve many threatened and fragile marine ecosystems. While there is substantial uncertainty regarding the extremity of damage that will occur even at the very low scenario, including risks of surpassing tipping points, this scenario offers the best and safest guardrails that the IPCC proposes to policymakers in order to limit already occurring negative impacts of climate change. To be clear, even in the very low emission scenario, significant damage has been and will continue to be caused to fragile ecosystems, for example, coral reefs with consequential impacts on local communities dependent on these resources.

39. Warm-water coral reefs are particularly vulnerable and are already being negatively affected by extreme temperatures and ocean acidification. The IPCC documents that marine heatwaves have already resulted in large-scale coral bleaching events at increasing frequency causing worldwide reef degradation since 1997.[47] The IPCC notes that even at the 1.5°C threshold of the Paris Agreement,[48] small islands will experience significant degradation or destruction of marine resources, including the loss of coral reefs. For example, even limiting global warning to 1.5 °C will result in the further loss of 70–90 percent of reef-building corals

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[44] IPCC, p. 14.
[45] IPCC, *Climate Change 2023: Synthesis Report: Contribution of Working Groups I, II and III to the Sixth Assessment Report* (2023), Summary for Policymakers, p. 20 ("IPCC, Climate Change 2023").
[46] IPCC, p. 10.
[47] IPCC, *Special Report on Climate Change and Land* (Cambridge University Press, 2019), Summary for Policymakers, p. 13.
[48] Conference of the Parties, Adoption of the Paris Agreement, UN Doc. FCCC/CP/2015/L.9/Rev/1 (adopted 12 December 2015, entered into force 4 November 2016).

compared to today, with 99 percent of corals being lost under warming of 2°C compared to today.[49]

## VIII. Adaptation and increasing resilience of the marine environment

40. As climate change alters the environment, adaptation has become an essential response for humankind and for the natural environment. Across many marine ecosystems, improving resilience is useful and sometimes the only strategy available for coupled human-ocean systems. Resilience can be defined as the capacity of a system to maintain functioning, structure, and feedbacks in the face of disturbance.[50] The goal of ocean resilience is preserving the ability of the marine environment to recover from disturbances of warming, deoxygenation, and acidification, being mindful that these impacts are cumulative with excessive and destructive fishing, seabed mining, ship strikes, ocean noise, pollution from many sources, and other effects of human activities.

41. The marine environment is so complex and so understudied that the most constructive approach to enhance its resilience to climate change is to support ecological properties and processes that have been identified: biological diversity, connectivity at multiple scales of biological organization, and ability to adapt to changing conditions at the species level.[51] Integrated ecosystem-based management is considered a key strategy to support these. Using area-based management tools, including marine protected areas, can reduce cumulative impacts on particular species and ecosystems, and has been selected as a key tool to implement the Convention's conservation and sustainable use goals.[52]

## IX. Geoengineering and its risks

42. Reducing global temperatures with large-scale technological climate intervention has been proposed and research is underway. For present purposes, climate interventions involving the ocean will be broadly described as "marine geoengineering."[53] Marine geoengineering has been defined as "a deliberate intervention in the marine environment to manipulate natural processes, including to counteract anthropogenic climate change and or its impacts, and that has the potential to result in deleterious effects, especially where those effects may be widespread, long lasting or severe."[54] There are two broad categories: 1) actively removing $CO_2$ from the atmosphere, known as carbon dioxide removal ("CDR") and 2) exerting a cooling influence on Earth by reflecting sunlight (known as solar radiation management, "SRM") or altering thermal emissions to space by thinning cirrus clouds. The

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[49] IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2022), Small Islands, ch. 15, p. 2056 ("IPCC, *Sixth Assessment Report, Working Group II*, Small Islands").

[50] C. Folke et al., "Regime shifts, resilience, and biodiversity in ecosystem management", *Annu. Rev. Ecol. Evol. Syst.* (2004) 35:557-581.

[51] J.R. Bernhardt and H.M. Leslie, "Resilience to Climate Change in Coastal Marine Ecosystems", *Annual Review of Marine Science* (2013) 5(1):374-381 ("Bernhardt and Leslie").

[52] Ibid; UN General Assembly, 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, A/res/72/249 (2017) (mandating negotiation of a treaty to include area-based management tools).

[53] IPCC, *Special Report on the Ocean and Cryosphere* (2019), Annex I Glossary, p. 686.

[54] 2013 Amendment to the London Protocol to Regulate the Placement of Matter for Ocean Fertilization and other Marine Geoengineering Activities (adopted 18 October 2013, not in force), Art. 1(5) *bis* (2013 Amendment to the London Protocol).

methods currently under consideration would have very different risks of harm and benefit for the marine environment and would have different distributive effects on States. Their potential for effectiveness in reducing global temperature and for risk of harm are both subject to great uncertainty. An assessment of more than 20 techniques for marine geoengineering by the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection ("GESAMP") concluded,

> For each and every technique, information on marine geoengineering approaches available in the permanent public record, and/or as peer-reviewed documents, is inadequate to permit a robust scientific assessment, much less one that can be readily intercompared with other approaches to climate intervention.[55]

43. CDR proposals aim to draw $CO_2$ from the atmosphere and store it in the ocean, with the goal of augmenting the natural carbon sequestration process described above, effecting a "cure" for climate change. A version of CDR is carbon capture and sequestration, which involves the capture of $CO_2$ at final emitters (either at land or sea), compression and then transport either by pipeline or ships to the disposal site, which could include offshore platforms, and then injections into the water column or geological formations.[56] They include large-scale seaweed cultivation followed by sinking it in the deep ocean; creating artificial upwellings and ocean alkalinization, both intended to stimulate phytoplankton growth; adding alkaline minerals to increase $CO_2$ absorption; and electrochemical approaches. Concerns have been raised about the risks of all these proposed techniques.

44. For example, carbon capture and sequestration involves capturing $CO_2$, transporting it to a suitable storage site and final storage and disposal by pumping $CO_2$ deep into the ocean or into sub-sea geological formations such as depleted offshore oil and gas fields or saline aquifers. [57] Pumping $CO_2$ into the deep ocean water column would certainly exacerbate harmful ocean acidification.[58] Sub-seabed $CO_2$ sequestration may not lead to deleterious effects if the $CO_2$ remains securely contained, however risks include "induced seismicity and possible loss of containment resulting in locally elevated pH levels in the water column,"[59] contributing to ocean acidification and all its concomitant effects outlined above.

45. Ocean fertilization is another form of artificial carbon sequestration and has been defined as "any activity undertaken by humans with the principal intention of stimulating primary productivity in the ocean."[60] It involves the introduction of iron or other nutrients such as urea or phosphorous to the ocean to stimulate the growth of phytoplankton that draw

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[55] GESAMP Report, p.12.
[56] N. Bankes, "Carbon Capture and Storage and the Law of the Sea", in E. Johansen, S.V. Busch and I.U. Jakobsen, *The Law of the Sea and Climate Change: Solutions and Constraints* (Cambridge University Press, 2020), p. 166 ("Bankes").
[57] IPCC, *Special Report on Carbon Dioxide and Storage* (Cambridge University Press, 2005); International Energy Agency (IEA), *Technology Roadmap: Carbon Capture and Storage* (IEA, 2013).
[58] GESAMP Report, p. 62.
[59] Bankes, p. 164.
[60] 2013 Amendment to the London Protocol, Annex 4; IMO, "Resolution LC-LP.1 on the Regulation of Ocean Fertilization" (31 October 2008) LC 30/16.

$CO_2$ from the atmosphere in order to enhance the ocean's biological pump.[61] Ocean fertilization also risks deleterious effects to the marine environment as large-scale phytoplankton blooms could deplete surface areas of the ocean of oxygen which would in turn harm ecosystems; and it may also contribute to ocean acidification.[62]

46. Other proposals seek to prevent temperature increases caused by climate change by reflecting or deflecting sunlight from the Earth, merely addressing "symptoms".[63] They do not address the levels of carbon dioxide in the atmosphere or the ocean.[64] These proposed technologies include adding reflective foams to the ocean surface and marine cloud brightening. Solar radiation management ("SRM"), adding reflective aerosols to the stratosphere, is not always considered a marine geoengineering technique, but it could be staged in the marine environment.

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[61] K. Brent, "Marine geoengineering governance and the importance of compatibility with the law of the sea", in J. McDonald, J. McGee, and R. Barnes (eds), *Research Handbook on Climate Change, Oceans and Coasts* (Edward Elgar Publishing, 2020), p. 446 ("Brent").

[62] Ibid, GESAMP Report, pp. 42 – 46.

[63] Brent, p. 442; K. Scott, "Mind the Gap: Marine Geoengineering and the Law of the Sea", in Beckman et al. (eds), *High Seas Governance: Gaps and Challenges* (Brill, 2019), pp. 37-38 ("Scott").

[64] Scott, "Mind the Gap," p. 39.

# CHAPTER 3

## QUESTION (A): SPECIFIC OBLIGATIONS OF STATES PARTIES TO PREVENT, REDUCE AND CONTROL POLLUTION OF THE MARINE ENVIRONMENT IN RELATION TO THE DELETERIOUS EFFECTS THAT RESULT OR ARE LIKELY TO RESULT FROM CLIMATE CHANGE, INCLUDING THROUGH OCEAN WARMING AND SEA LEVEL RISE, AND OCEAN ACIDIFICATION, WHICH ARE CAUSED BY ANTHROPOGENIC GREENHOUSE GAS EMISSIONS INTO THE ATMOSPHERE

47. In the first question, COSIS asks the Tribunal to determine the specific obligations of States Parties to the Convention to prevent, reduce and control pollution of the marine environment in relation to the deleterious effects that result or are likely to result from climate change which are caused by anthropogenic GHG emissions into the atmosphere. The Convention defines pollution, establishes a general obligation of environmental protection, then specifies pollution as a form of environmental harm that requires specific measures, and identifies the measures that States should take.

48. In chapter 3, it is submitted that anthropogenic emissions of GHGs into the atmosphere result in pollution of the marine environment as defined in Article 1(1)(4) of the Convention. To frame the subsequent analysis, the role of precaution and the meaning of obligations of result and conduct are discussed. Then States Parties' obligations to prevent, reduce and control pollution from GHG emissions from all sources as well as source-specific obligations are discussed.

### I. Anthropogenic emissions of GHGs into the atmosphere result in "pollution of the marine environment" as defined in the Convention

49. The obligations set out in Part XII of the Convention relating to pollution of the marine environment must be interpreted with reference to Article 1(1)(4) of the Convention, which defines "pollution of the marine environment" as:

> the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, 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.

50. The natural meaning of "the marine environment," is the water column, the superjacent air space, the interface of water and air, and the seabed and sediments below. Current scientific studies of the connectivity of each of these elements of the marine environment demonstrate their interdependency as an integrated whole,[65] and other articles of the Convention and subsequent jurisprudential interpretations support this. The Convention

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[65] See, e.g., E. Popova et al., "Ecological connectivity between the areas beyond national jurisdiction and coastal waters: Safeguarding interests of coastal communities in developing countries", *Marine Policy* (2019) 104:90-102; Poloczanska et al., "Climate Change and Australian Marine Life", in R.N. Gibson, R.J.A. Atkinson and J.D.M. Gordon (eds), *Oceanography and Marine Biology: An Annual Review, Volume 45* (Taylor & Francis, 2007), pp. 407-478, 413.

does not define "marine environment" but the negotiating history of Article 1(1)(4) suggests that the "absence of any specific meaning for this term allows the Convention an element of flexibility in accommodating the continuously-expanding human knowledge and human activities relating to the marine environment, including its protection and preservation."[66] Article 145 of the Convention on the protection of the marine environment from activities in the Area refers to "the flora and fauna" of the marine environment. The inclusion in Article 194(5) of the need to preserve "ecosystems" and "habitats" indicates that both marine life and physical elements are part of the marine environment. In the *South China Sea Arbitration,* the arbitral tribunal found that the term "ecosystem" should have the same definition as Article 2 of the Convention on Biodiversity as a "dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit."[67] In the *Southern Bluefin Tuna* Provisional Measures Order and affirmed in the *Sub-Regional Fisheries Commission (SRFC)* Advisory Opinion ("SRFC Advisory Opinion"), this Tribunal determined that the "conservation of the living resources of the sea is an element in the protection and preservation of the marine environment."[68]

51. It is also relevant that the Exploration Regulations adopted by the International Seabed Authority ("ISA"), which can be used "to clarify and supplement certain aspects of the relevant provisions of" the Convention,[69] have defined "marine environment" as including the "physical components, conditions and factors which interact and determine the productivity, state, condition and quality of the marine ecosystem, the waters of the seas and oceans and the airspace above those waters as well as the seabed and ocean floor and subsoil thereof."[70]

52. Anthropogenic GHG emissions into the atmosphere that drive ocean warming, ocean deoxygenation, sea-level rise, and ocean acidification, as described in chapter 1, fall within the definition of "pollution of the marine environment" in Article 1(1)(4) of the Convention. This is because they constitute a direct or indirect introduction by man of substances or energy into the marine environment; and they result in deleterious effects to the marine environment (which have been outlined in detail in chapter 2 and will be briefly summarized sub-sections A–D below).

53. These serious harms are synergistic and are rapidly being made worse by an overriding heating signature across the whole ocean and all ocean depths.[71] One fifth of world fisheries are in areas subject to heating, acidification, and deoxygenation. The world's

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[66] S. Nandan and S. Rosenne (eds.), *United Nations Convention on the Law of the Sea 1982: A Commentary,* Volume II (1993), p. 42.

[67] *South China Sea Arbitration* (Philippines v. China), PCA Case No. 2013-19, Award, 12 July 2016, para. 945 (hereinafter "*South China Sea* arbitration").

[68] *Southern Bluefin Tuna* (*New Zealand v. Japan*; *Australia v. Japan*), Provisional Measures Order, Order of 27 August 1999, ITLOS Reports 1999, p 280, para. 70; *Request for Advisory Opinion submitted by the Sub-Regional Fisheries Commission*, Advisory Opinion, 2 April 2015, ITLOS Reports 2015, p. 4, para. 120 (hereinafter the "SRFC Advisory Opinion").

[69] *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area* (Advisory Opinion of 1 February 2011) ITLOS Reports 2011, 10, para. 93 (hereinafter "Seabed Mining Advisory Opinion").

[70] See, e.g., ISA Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, ISBA 19/C/17, regulation 1(3) (e).

[71] Laffoley and Baxter, *Ocean deoxygenation* (IUCN); Laffoley and Baxter, *Explaining Ocean Warming* (IUCN).

largest aggregated fishery (tuna) is now massively affected. IUCN Red List species such as sharks are being forced into contact with fishing due to warming and deoxygenation.

54. GHG emissions into the superjacent air space, water column, seabed or sediments from vessels and installations at sea directly pollute the marine environment. The Convention does not define what is meant by "indirect introduction" but an ordinary meaning of the phrase indicates that the introduction of substances or energy is not confined to direct introduction in the water column or seabed of the marine environment.[72] GHG emissions from other anthropogenic sources may originate elsewhere but are well-mixed in the atmosphere and introduced into seawater through chemical and physical processes. GHG emissions are accordingly within the scope of Article 194(3) obligations to address all sources of pollution of the marine environment, which will be further discussed in Section II. below.

A. Ocean warming is caused by an introduction of energy into the marine environment and has deleterious effects on the marine environment

55. Ocean warming, which refers to the average increased temperature of the sea and ocean heat content, results from the introduction of energy (heat) into the ocean. The ocean moderates anthropogenic climate change by absorbing significant parts of the heat resulting from increase in global temperatures caused by GHG emissions and it is estimated that the ocean has absorbed 90 percent of the excess heat in the climate system.[73] This manifests as increases in sea surface temperature as well as increases in ocean heat content, which are likely to continue even in low emissions scenarios due to the slow circulation of the deep ocean.[74]

56. Ocean warming results in deleterious effects in that it results in "harm to living resources and marine life." Ocean warming affects other ocean processes such as ocean circulation and salinity. While the impacts of the changes in ocean circulation vary on a regional basis, it includes reducing ocean carbon uptake, and exacerbating regional sea level rise.[75] Ocean circulation plays a key role in the redistribution of heat from the tropics to the poles as part of the Meridional Oceanic Circulation ("MOC"), referred to as the "global conveyor belt,"[76] and the IPCC Sixth Assessment Report states that the MOC will very likely decline over the 21st century for all SSP scenarios.[77] One of the critical consequences is the shifting of marine species away from the equator and towards the polar regions, which results in disruptions to marine ecosystems as predator and prey relationships become decoupled,

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[72] See, e.g., the meaning of "indirect" in Merriam Webster online dictionary at https://www.merriam-webster.com/dictionary/indirect.

[73] IPCC, *Special Report on the Ocean and Cryosphere*, Summary for Policymakers, p. 9; IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021) ch. 9, pp. 1213-1214.

[74] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 9, p. 1214. Also see Laffoley and Baxter, *Explaining Ocean Warming* (IUCN).

[75] UN, *The Second World Ocean Assessment: Volume* II (UN, 2022), ch. 5, p. 90.

[76] Laffoley and Baxter, *Explaining Ocean Warming* (IUCN).

[77] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 9, pp. 1214.

and species moving into new areas disrupt existing ecosystems.[78] It could also impact marine ecosystems and primary production given that currents transport nutrients.[79] Similarly, observed changes in the salinity of waters where certain regions (for example, sub-tropical ocean regions and the entire Atlantic regions) have become more saline whereas other regions have become fresher also impact the productivity of marine life.[80] Ocean warming has other deleterious effects on living resources and marine life including ocean stratification, coral bleaching, and redistribution of fish and other marine life. Stratification of ocean layers reduces ocean mixing and inhibits the ability for heat, oxygen, and carbon dioxide from the surface to be transported deeper into the ocean and for nutrients to be brought from the deep ocean to the surface, which will also cause changes in the productivity of living resources as well as increase in disease among marine organisms.[81]

57. Additionally, ocean warming can lead to extreme climate events and pose "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." Marine heatwaves (sustained periods of anomalously high near-surface temperatures) can lead to severe and persistent impacts on marine ecosystems.[82] For example, it can cause coral bleaching as corals warm, they expel algae called zooxanthelle and turn white - large scale coral bleaching means the death of corals which can have an indirect effect for other marine species that rely on corals for food and production.[83] This will in turn hinder fishing, tourism and recreational activities. Ocean warming may also result in more intense hurricanes and cyclones which will feed off increasingly warmer sea surface,[84] and will have disproportionate impacts on low-lying and island communities constituting "hazards to human health." Apart from extreme events such as hurricanes and cyclones, ocean warming also contributes to storms which cause storm surge. Storm surge negatively impacts coral reefs, erodes beaches and destroys wetlands and mangroves, which are nurseries for fish and other resources.

58. Ocean warming is also one of the drivers for other climate change-induced impacts i.e., oxygen deoxygenation and sea level rise, which will be addressed below.

## B. Ocean deoxygenation is caused by introduction of energy into the marine environment and has deleterious effects on the marine environment

59. Ocean deoxygenation is the loss of oxygen in the ocean and is caused by ocean warming and associated changes in ocean circulation as outlined in the section above.[85] Ocean deoxygenation is therefore a result of the introduction of heat energy into the marine environment as it "decreases the solubility of dissolved oxygen in seawater" and is estimated

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[78] See Laffoley and Baxter, *Explaining Ocean Warming* (IUCN), 47-53.
[79] UN, *The Second World Ocean Assessment: Volume I* (UN, 2022), Ch. 5, p. 90.
[80] UN, *The Second World Ocean Assessment: Volume I* (UN, 2022), Ch. 5, p. 94.
[81] IPCC, *Special Report on the Ocean and Cryosphere*, Summary for Policymakers, p. 22.
[82] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 9, p. 1214; IPCC, *Special Report on the Ocean and Cryosphere*, Summary for Policymakers, p. 13.
[83] IPCC, *Special Report on the Ocean and Cryosphere*, Summary for Policymakers, p. 13.
[84] UN, *The Second World Ocean Assessment: Volume II* (UN 2022), ch. 9, pp. 58-59.
[85] See generally Laffoley and Baxter, *Ocean deoxygenation* (IUCN).

(with medium confidence) to contribute to about 15 percent of the dissolved oxygen decrease in the ocean.[86]

60. Deoxygenation has deleterious effects on the marine environment and results in "harm to living resources and marine life." Ocean deoxygenation is driving vast changes in the physical and biological make-up of the sea, including changing the physiology and behavior of marine organisms resulting in decreased biodiversity, shifts in species distributions, displacement, and reduction in fisheries resources, threatening the ocean's food provisioning ecosystem services.[87]

C. Sea-level rise is caused by introduction of energy (heat) and substances (freshwater) into the marine environment with deleterious effects

61. Sea-level rise, which refers to the change in the local and global height of sea level, arises from a combination of processes that are a result of the anthropogenic GHG emissions. First, sea-level rise is caused by thermal expansion attributable to the increased ocean temperature and heat content, which increases ocean density and increases the volume per unit of mass.[88] As explained above increased ocean temperature and heat content is caused by the introduction of heat energy into the ocean. The IPCC has observed that it is very likely that the observed increased ocean heat content for 1971 - 2018 has led to a global mean sea level change of 0.03 to 0.06 meters out of 0.07 to 0.15 meters.[89] Second, sea-level rise is also caused by the melting of the Greenland and Antarctic ice sheets and glaciers attributable to the increase in global temperatures.[90] This has led to the direct introduction of substances (fresh water) into the ocean.

62. The deleterious effects of sea-level rise on the marine environment are manifold. They include "harm to living resources and marine life" in that sea-level rise threatens coastal habitats, including mangroves, salt marshes and seagrasses which absorb carbon dioxide; and leads to "hazards to human health, and hindrance to marine activities" as coastal communities are impacted by flooding, salinization of soil leading to nutritional impacts, and related impacts to coastal infrastructure such as roads and communication facilities.[91]

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[86] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 5, p. 714.

[87] IUCN, "IUCN Brief: Ocean Deoxygenation" (IUCN, 2019); Laffoley and Baxter, *Ocean deoxygenation* (IUCN), 213-225.

[88] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 9, p. 1220. Sea-level rise can also be caused by salinity variations which causes changes in ocean density but the contribution of salinity variations to global mean sea level change is negligible.

[89] IPCC 2021, Physical Science, ch. 9, p. 1244.

[90] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 9, p. 1220; IPCC Sixth Assessment Report, Summary for Policy Makers, p. 19.

[91] IPCC, *Special Report on the Ocean and Cryosphere*, ch. 4, pp. 367-381.

### D. Ocean acidification is caused by an introduction of substances into the marine environment and has deleterious effects

63. Ocean acidification – the reduction in the pH of the ocean and other chemical changes[92] – is caused by the introduction of a "substance," that is, $CO_2$, into the marine environment. $CO_2$ is introduced into seawater from the atmosphere through chemical and physical processes. It may also be intentionally injected for marine carbon sequestration; at the current stage of development of this technology, it poses a high risk of $CO_2$ pollution of the marine environment.[93]

64. Ocean acidification has deleterious effects, within the scope of the Article 1(1)(4) definition of pollution. Ocean acidification results in "harm to living resources and marine life," per the Convention's definition of pollution. Changes to the chemistry of the ocean have a corrosive impact on marine organisms that that have shells or other structures of calcium carbonate, including corals, crustaceans, echinoderms and mollusks. Coral reefs and associated marine ecosystems risk "dissolution and intensified bioerosion."[94] Ocean acidification may also affect marine life through changes in gene expression, physiology, reproduction and behavior.[95]

65. Ocean acidification also constitutes hazards to: human health; ecosystem health; marine biological diversity; marine activities, including fishing and other uses of the sea; quality for industrial use of sea water; and reduction of amenities.[96] Negative socioeconomic impacts result from reduced fishing yields that affect food security, fishing and tourism-based economies. Equally important is the fact that ocean acidification reduces the capacity of the ocean to absorb $CO_2$ and undermines the critical rôle of the ocean as a $CO_2$ sink.[97]

## II. States Parties obligations under the Convention, Part XII require them to prevent, reduce and control pollution of the marine environment from GHG emissions

66. The quartet of primary climate change impacts on the ocean, namely ocean warming, ocean deoxygenation, sea-level rise, and ocean acidification, are the result of the direct or indirect introduction of substances or energy into the marine environment and collectively cause significant deleterious effects on the marine environment, including at the ecosystem and species level. Moreover, in certain circumstances, ocean-based measures for mitigation of GHG emissions may also fall within the definition of "pollution of marine environment" under Article 1(1)(4) of the Convention (discussed in chapter 5 below). Consequently, the provisions of Part XII concerned with "pollution of the marine environment" are applicable in addressing the deleterious effects of climate change on the ocean.

67. The Convention, Part XII, places direct obligations on States Parties to prevent, reduce and control pollution of the marine environment from anthropogenic GHG emissions.

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[92] See Chapter 2 above; IPCC, *Special Report on the Ocean and Cryosphere*, Glossary of Terms.
[93] See Chapter 5 below.
[94] UN, *The Second World Ocean Assessment: Volume II* (UN, 2022), ch. 9, p. 63.
[95] Ibid.
[96] Ibid, pp. 63-64.
[97] IPCC, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021), ch. 5, p. 728 – 730.

First, Part XII places general obligations on States Parties to prevent, reduce and control pollution of the marine environment from GHG pollution from *any source*. Second, Part XII of the Convention also places source-specific obligations on States Parties to prevent, reduce and control pollution of the marine environment from GHG emissions from (a) land-based sources; (b) seabed activities subject to national jurisdiction; (c) activities in the Area; (d) dumping; (e) vessels; (f) through or from the atmosphere.

68. Before analyzing these obligations, it is necessary to comment on the role of the precautionary approach and precautionary principle, and to set out some observations on the nature of the obligations in Part XII which apply to both the general obligations to prevent, reduce, and control pollution of the marine environment from GHG emissions from *any source* and source-specific obligations.

A. The precautionary approach and precautionary principle are relevant to the scope of States Parties' obligations

69. The precautionary approach is particularly relevant to understanding the scope of State Parties' obligations to manage greenhouse gas emissions, as scientific uncertainty has been used to avoid the significant reductions in greenhouse gas emissions required to avoid dangerous anthropogenic interference with the climate system. IUCN resolutions refer to the precautionary principle and, where appropriate, to the precautionary approach as stated in Rio Principle 15: "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall be not used as a reason for postponing cost-effective measures to prevent environmental degradation."[98] Applying precaution to interpret the Convention's Part XII obligations requires States Parties to provide an additional margin of safety in their measures to reduce greenhouse gas emissions.

70. The Convention does not itself refer to the precautionary approach or principle. The Convention was adopted in 1982, before precaution was being used in international instruments, yet it does include an embryonic reference in the definition of pollution in Article 1(1)(4). There, pollution includes situations that are "likely to result" in harmful effects. Thus, where there is a lack of certainty about whether harmful effects will result from introducing substances or energy into the marine environment, it should be treated as pollution and it will then be subject to the obligations to prevent, control and mitigate under the Convention.

71. However, the 1995 Fish Stocks Agreement, an Implementing Agreement under the Convention does include it in this form in Article 6:

> States shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.[99]

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[98] IUCN World Conservation Congress (2004, Bangkok), WCC-2004-RES-75-EN "Applying the Precautionary Principle in environmental decision-making and management".

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

The precautionary approach reflected in Article 6 and Annex 2 of the 1995 Fish Stocks Agreement, is today accepted as a fundamental customary norm that governs activities that have the potential to significantly affect the environment, including the living marine resources of the ocean environment.

72. The most recent articulation of States' views on precaution is found in the draft Agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction ("BBNJ Agreement"), which will be, once it enters into force, the third Implementing Agreement to the Convention.[100] Its Article 7 states,

> In order to achieve the objectives of this Agreement, Parties shall be guided by the following principles and approaches:
> ...
> (e) The precautionary principle or precautionary approach, as appropriate

73. In its Seabed Mining Advisory Opinion, on the responsibilities of sponsoring States with respect to activities in the Area, the Seabed Disputes Chamber ("the Chamber") observed that the "precautionary approach is also an integral part of the general obligation of due diligence of sponsoring States even outside the scope of the [International Seabed Authority's Regulations]." It noted that the precautionary approach has been incorporated in a growing number of international treaties and other instruments which reflect the formulation of Principle 15 of the Rio Declaration and that "this has initiated a trend towards making this approach apart of customary international law" and thus is relevant in the interpretation of the Convention in light of Article 31(3)(c) of the Vienna Convention on the Law of Treaties ("VCLT").[101] The Chamber explained that the obligation to apply the precautionary approach applies in situations "where scientific evidence concerning the scope and potential of negative impact of the activity in question is insufficient but where there are plausible indications of potential risks."[102]

## B. Nature of obligations under Part XII of the Convention: Standard of care

### *1. Part XII of the Convention contains both obligations of result and obligations of conduct*

74. Part XII of the Convention contains obligations of result and obligations of conduct. Whether a State is expected to achieve a result specified in the Convention ("preserve the marine environment," "prevent pollution") or to employ due diligence in its conduct depends on the nature and terms of the relevant provision. In this regard, it warrants note that the Chamber in its Seabed Mining Advisory Opinion observed that States sponsoring seabed mining in areas beyond national jurisdiction had "direct obligations" under the Convention that were independent of the obligation to ensure that sponsored contractors complied with

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[100] Draft 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 (Draft BBNJ Agreement), available on the BBNJ website (https://www.un.org/bbnj/).

[101] Seabed Mining Advisory Opinion, para. 135. Article 31(3)(c) of the VCLT recognizes that the interpretation of a treaty should consider not only the context but "any relevant rules of international law applicable in the relations between the parties."

[102] Seabed Mining Advisory Opinion, para. 131.

their obligations under the Convention and related instruments.[103] Obligations of result to prevent, reduce, and control pollution may require States Parties to mitigate GHG emissions where they have direct control over the sources, for example with respect to the emissions from state-owned automobile fleets, and buildings.[104] Their direct obligations also include the adoption of laws and regulations to prevent, reduce, and control pollution of the marine environment from specific sources using global rules and standards as a benchmark, for example, Articles 207 (1), 208 (1), 210 (1), 210 (1), 211 (2) and 212 (1)).

75. Obligations of conduct have been described by the Chamber in its Seabed Mining Advisory Opinion as "due diligence" obligations.[105] As is the case with obligations of result described above, whether a particular obligation is an obligation of conduct will often depend on the terms of the obligation itself. For example, the Chamber observed that when provisions in the Convention used terms such as "to ensure," this indicated that it was an obligation "to deploy adequate means, to exercise best possible efforts, to do the utmost, to obtain this result," and such obligations were obligations of conduct or due diligence and not obligations of result.[106] In most cases, the obligations of states to regulate the conduct of private actors under their jurisdiction and control are considered obligations of conduct or due diligence. As observed by the Chamber, the expression "to ensure" is "often used in international legal instruments to refer to obligations in respect of which, while it is not considered reasonable to make a State liable for each and every violation committed by persons under its jurisdiction, it is equally not considered satisfactory to rely on the mere application of the principle that conduct of private persons or entities is not attributable to the State under international law."[107]

76. On this basis, the Chamber found that sponsoring States had due diligence obligations to ensure that sponsored contractors complied with the Convention and related instruments in its Seabed Mining Advisory Opinion. It made similar observations with respect to Article 194(2) of the Convention which reads "States shall take all measures necessary *to ensure* that activities *under their jurisdiction or control* are so conducted as not to cause damage by pollution to other States and their environment [emphasis added].[108] This Tribunal also found that flag States' obligations to ensure that their vessels complied with regulations adopted by the Member States of the Sub-Regional Fisheries Commission (as required in Article 58(3) and Article 62(4)) were due diligence obligations, or in other words, obligations of conduct.[109] Similarly, in the *South China Sea Arbitration*, the arbitral tribunal found that China had a due diligence obligation to ensure that fishing vessels under China's jurisdiction and control did not pollute the marine environment.[110] As the Chamber explained, the "responsibility to ensure ... establishes a mechanism through which the rules of the Convention ... although

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[103] Ibid, paras. 108, 121.
[104] Whether States have direct obligations for the acts of state-owned enterprises is an evolving question and may be context-specific. See, e.g., P. Benoit et al., "Decarbonization in state-owned power companies: Lessons from a comparative analysis," 355 *Journal of Cleaner Production* (2022) (noting that states have to some extent satisfied this obligation by being major providers of low-carbon energy alternatives); UN Human Rights Council, Report of the Working Group on the issue of human rights and transnational corporations and other business enterprises, A/HRC/32/45 (2016).
[105] Seabed Mining Advisory Opinion, paras. 108, 110.
[106] Ibid, para. 110.
[107] Ibid, para. 112.
[108] Ibid, para. 113.
[109] SRFC Advisory Opinion, para. 123.
[110] South China Sea Arbitration, para. 971.

being treaty law and thus binding only on the subjects of international law that have accepted them, become effective for [private actors] which find their legal basis in domestic law. This mechanism consists in the creation of obligations which States Parties must fulfil by exercising their power over entities of their nationality and under their control."[111]

77. The distinction between obligations of conduct and obligations of result is important in establishing the standard of care a State must meet in order to fulfil the relevant obligation. If it is an obligation of result, it will be sufficient to establish the breach if a State has failed to achieve the outcome required under the particular provision. For example, if a State has not adopted any laws and regulations, this will, *prima facie*, be a breach of the relevant obligation. Even if States Parties have adopted laws and regulations to prevent, reduce and control pollution of the marine environment from GHG emissions, such laws and regulations must meet the overarching object and purpose of Part XII, as set out in Article 192 of the Convention, namely, to protect and preserve the marine environment (discussed in further detail in chapter 4). The requirement that laws and regulations to prevent, reduce and control pollution of the marine environment from GHG emissions must meet the overall objective of protecting and preserving the marine environment is supported by the findings of the Chamber in its Seabed Mining Advisory Opinion. The Chamber observed that sponsoring States have discretion on how to fulfill their responsibilities under the Convention. However, it also indicated some general considerations that a sponsoring State may find useful when considering the choice of measures necessary to fulfill its obligations under the Convention.[112] The Chamber emphasized that the adoption of laws, regulations and administrative measures must be reasonably appropriate, that sponsoring States must act in good faith, must not act in an arbitrary manner and that when deciding what measures are reasonably appropriate, the sponsoring State must "take into account, objectively, the relevant options in a manner that is reasonable, relevant and conducive to the benefit of mankind as a whole."[113] Analogously, when States Parties adopt national laws and regulations to prevent, reduce and control pollution of the marine environment, they must do so in a manner that is reasonable, relevant and conducive to the protection and preservation of the marine environment.

78. If it is an obligation of conduct, the standard of care usually requires deploying adequate means, exercising best possible efforts to do the utmost to achieve the outcome specified in the provision. Obligations of conduct usually confer a greater amount of flexibility on States. The Chamber and this Tribunal have identified a certain number of actions that are relevant in assessing compliance with due diligence obligations/obligations of conduct: the adoption of laws and regulations; the taking of administrative measures; the exercise of a "certain amount of vigilance in their enforcement and the exercise of administrative control" and the taking of appropriate enforcement actions.[114] The importance of due diligence obligations should not be underestimated. Due diligence obligations, while conferring greater flexibility and autonomy on States Parties by not requiring the achievement of a certain result or outcome, are still vitally important in bringing about that outcome. Moreover, as will be explained in the section below, due diligence obligations may

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[111] Seabed Mining Advisory Opinion, paras. 108, 110.
[112] Ibid, para. 227.
[113] Ibid, paras. 227 – 230.
[114] *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, p. 14, para. 197 cited with approval in Seabed Mining Advisory Opinion, p. 10, para. 115 and SRFC Advisory Opinion, para. 131.

also impose higher standards on States Parties depending on the developments in scientific and technological knowledge as well as the risks involved.

*2. Prevention, reduction and control of GHG pollution require increased effort proportionate to new evidence of risks*

79. The Chamber has observed that the content of the due diligence is a "variable concept."[115] It explained that the standard may change in light of "new scientific or technological knowledge" as "measures considered sufficiently diligent at a certain moment may become not diligent enough."[116] It may also change in relation to the risks involved in the activity and "the standard of due diligence has to be more severe for the riskier activities."[117] In this regard, it is relevant that the Chamber has recognized that higher standards may be imposed on sponsoring States in light of advancement of scientific knowledge. It observed that the Nodules Regulations, which did not require the application of "best environmental practices" should be interpreted in light of advancement of scientific knowledge, which resulted in the incorporation of the obligation to adopt "best environmental practices" in the subsequently adopted Sulphides Regulations.[118]

80. As outlined in chapter 2 above, in the specific context of pollution of the marine environment from GHG emissions, the IPCC in its Sixth Assessment Report projected that GHG emissions in 2030 (implied by nationally determined contributions announced by October 2021) make it likely that warming will exceed 1.5°C during the twenty-first century, making it harder to limit warming below 2°C; that every increment of global warming will intensify multiple and concurrent hazards; and that widespread and rapid changes in the atmosphere, ocean, cryosphere have occurred, which has led to widespread adverse impacts and related losses and damages to nature and people.[119]

81. Accordingly, to the extent that obligations under Part XII of the Convention to prevent, reduce and control pollution of the marine environment from GHG emissions are due diligence obligations, this requires that States calibrate fulfilment of their international obligations to the level of risk involved. The level of risk from climate change in 2023 has increased significantly, whether measured in comparison to human understanding 1982, when the Convention was adopted, 1992, when the UNFCCC was adopted, or 2015, when the Paris Agreement was adopted. A higher standard of performance is expected of states now than in the past. This context should inform the level of due diligence required.

C. The Convention requires States Parties to prevent, reduce and control pollution of the marine environment from GHG emissions from any source

82. Article 194(1) obliges States Parties to take measures that are necessary to prevent, reduce and control pollution of the marine environment from GHG emissions from *any* source. Of all possible sources that are covered by this, the Convention provides specific direction for six: land-based sources (Articles 207, 213); seabed activities subject to national jurisdiction (Articles 208, 214); pollution from activities in the Area (Articles 209, 215, and

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[115] Seabed Mining Advisory Opinion, para. 117.
[116] Seabed Mining Advisory Opinion, para. 117.
[117] Ibid, para. 117.
[118] Ibid, para. 136.
[119] IPCC Sixth Assessment Report, Summary for Policymakers, p. 6.

Part XI); pollution by dumping (Articles 210, 216); pollution from vessels (Articles 211, 217-221); and pollution from or through the atmosphere (Articles 212, 222). All are relevant; others may be as well. Chapter 2 above described how these sources release GHG pollution into the marine environment; section I of this chapter showed that emissions from these sources result in pollution of the marine environment as defined in the Convention.

83. States Parties must also consider the following in taking measures regarding pollution under Article 194(1). First, Article 195 of the Convention makes it clear that States Parties shall act so as not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution to another. Article 196 also stipulates that States Parties shall take all measures necessary to prevent, reduce and control pollution of the marine environment from the use of new technologies under their jurisdiction and control. These obligations are especially relevant when assessing whether marine geoengineering activities should be conducted and will be elaborated on in chapter 5 below. Second, States Parties also have obligations under Articles 204-206 on monitoring and environmental impact assessment, which are addressed in chapter 4.

84. Article 194 is "not limited to measures aimed strictly at controlling pollution" and extends to measures focused primarily on conservation and preservation of endangered species and rare or fragile ecosystems."[120] This obligation is particularly relevant in view of the significant deleterious effects of GHG emissions on marine biodiversity and ecosystems highlighted in chapter 1.

D. The Convention identifies measures that States Parties must take to prevent, reduce, and control pollution of the marine environment from GHGs from specific sources

85. As mentioned above, Part XII of the Convention establishes the legal framework that requires prevention, reduction, and control of pollution of the marine environment from GHG emissions from six sources: land-based sources; seabed activities subject to national jurisdiction; pollution from activities in the Area; pollution by dumping; pollution from vessels; and pollution from or through the atmosphere. It does this by (1) establishing obligations on States Parties to take measures to address pollution of the marine environment from GHG emissions that that particular activity or source has contributed to; (2) establishing obligations on States Parties to adopt international rules and national legislation to prevent, reduce and control pollution of the marine environment from that source either through the competent international organization or diplomatic conference; and (3) establishing obligations for States Parties to adopt and enforce national legislation to implement the Convention.

86. These are obligations of result in the sense that they require some action to be undertaken by States, for example, to take measures and to adopt laws. Inaction results in a breach of these obligations.

87. The next question is determining the substantive content to prevent, reduce and control GHG emission pollution from these specific sources. It has been recognized by courts and tribunals, including this Tribunal, that the content of measures that need to be taken by

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[120] *Chagos Marine Protected Area Arbitration* (*Mauritius v. United Kingdom*) (Final Award of 18 March 2015) PCA Case no 2011-03 (Chagos Archipelago Arbitration) para. 538; *South China Sea* arbitration, para. 945.

States are informed by the provisions of the Convention itself,[121] and by other applicable rules of international law. Considering other applicable rules of international law in the interpretation of the Convention is also warranted by Article 31(3)(c) of the VCLT which stipulates that "any relevant rules of international law applicable in the relations between the parties," should be taken into account in treaty interpretation; Article 293 of the Convention which provides that "a court or tribunal having jurisdiction under this section shall apply the Convention *and other rules of international law not incompatible with the Convention*" (and which is applicable to advisory proceedings);[122] and Articles 207-212, which explicitly refer to global rules and standards (albeit in different formulations). It should also be noted that "applicable international law" may also include non-binding instruments that may be relevant in establishing the substantive content of due diligence obligations.[123]

88. The Convention obliges States Parties to take measures to prevent, reduce and control pollution from GHG emissions from six sources: land-based sources; seabed activities subject to national jurisdiction; pollution from activities in the Area; pollution by dumping; pollution from vessels; and pollution from or through the atmosphere. Sections E and F below address the content of the obligations to prevent, reduce and control pollution from GHG emissions from land-based, atmospheric and vessel sources.

## E. States Parties have obligations to prevent, reduce and control pollution caused by GHG emissions from land-based and atmospheric sources

89. Article 194 (1), read with Article 207 (1) requires States Parties to take all measures that are necessary to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures.[124] In implementing this obligation, Article 207 calls on States Parties to adopt laws and regulations, taking into account internationally agreed rules, standards and recommended practices and procedures; and to harmonize their policies in this connection at the appropriate regional level.[125] In adopting laws, States must "[take] into account internationally agreed rules, standards and recommended practices and procedures" (Art. 207(1)). This contrasts with Arts 210(6) and 211(2) which requires national rules to "be no less effective than" or "have at least the same effect as" international rules. In other words, the Convention does not require States to have laws that reproduce international norms on emissions of GHGs from land, merely to take account of them.

90. States Parties are also to work to establish global measures to address land-based pollution of the marine environment, taking into account "characteristic regional features, the economic capacity of developing states and their need for economic development." Article 207 provides extra emphasis on minimizing "to the fullest extent possible" the release of toxic, harmful or noxious substances, especially those that are persistent into the marine environment.[126] Of the GHGs discussed in this chapter, some are considered toxic,[127] all are

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[121] SRFC Advisory Opinion, para. 133.
[122] Lan Ngoc Nguyen, "Jurisdiction and Applicable Law in the Settlement of Marine Environmental Disputes Under UNCLOS", *Korean Journal of International and Comparative Law* (2021) 9:337, 339-343.
[123] Regarding recommendations informing content of EIAs, see *Whaling in the Antarctic (Australia v. Japan: New Zealand intervening), Judgment, I.C.J. Reports 2014*, p. 226; Seabed Mining Advisory Opinion, p. 10.
[124] UNCLOS, Articles 194(1), read with Article 207(1).
[125] UNCLOS, Articles 207(1) and (3).
[126] UNCLOS, Articles 207(4) and (5).
[127] *See* Government of Canada, Toxic substances list: schedule 1 (2021) (listing $CO_2$ as toxic).

considered harmful, and $CO_2$ is particularly persistent, so this heightened standard applies to GHGs.

91. Article 194 (3) (a), read with Article 212, requires States Parties to take measures to address pollution of the environment from GHG emissions through or from the atmosphere, including measures designed to fully minimize the release of toxic, harmful, or noxious substances, especially those which are persistent through or from the atmosphere. Article 212 closely mirrors article 207.

92. Articles 213 and 222 articulate two very important steps that States must take to make Articles 207 and 212, respectively, effective. The first is that they must enforce the national laws that they have adopted. The second is that they must "adopt laws and regulations and take other measures necessary to implement applicable international rules and standards" to which they have agreed. Most multilateral agreements must be implemented through national law in this way, so it is striking that the Convention underscores this as a requirement.

### *1. Article 207 and Article 212 govern GHG emissions from land-based sources and the atmosphere*

93. There can be little doubt that GHG emissions are a form of atmospheric pollution under Article 212. Article 212 complements Article 207, as the atmosphere, like a river, is the medium for transporting pollutants from their origins to the marine environment. In addition to responsibility for GHG emissions to the atmosphere from various sources, where air space is under the sovereignty of a State, including vessels and aircraft, the State is responsible for preventing, reducing and controlling pollution "from or through the atmosphere". Shipping and aviation are consequential contributors of GHG emissions.

94. Article 207 must be interpreted to include GHG emissions from land-based sources. Although GHG emissions are not explicitly mentioned in Article 207, and the applicability of Article 207 to greenhouse gas emissions as land-based pollution has been subject to debate,[128] the list of sources contained therein is non-exhaustive. Article 207 mentions natural features: rivers and estuaries; and industrial objects: pipelines, and outfall structures. This diversity in the types of sources referred to in Article 207 suggests that its scope embraces any pollution that does not enter the marine environment through one of the other specified categories of sources. Logically, this should be understood to include the dominant sources of greenhouse gasses, such as coal-fired power plants, oil refineries and other industrial activities, agriculture, and most forms of transport. The effects of land-based pollution are manifold and include the impacts of GHG pollution in all their manifestations, including ocean acidification and deoxygenation;[129] and increases in surface temperature leading to, *inter alia*, marine heatwaves and coral bleaching.[130]

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[128] Alexander Proelß, *United Nations Convention on the Law of the Sea: A Commentary* (C.H. Beck, 2017) 1277-1314. The argument is that land-based greenhouse gas emissions still need to be transmitted through the atmosphere and fall thus under the scope of Article 212.
[129] UN, *The Second World Ocean Assessment: Volume I* (UN, 2022), p. 74.
[130] Ibid, 293.

*2. The UNFCCC and the Paris Agreement are relevant internationally agreed rules, standards and recommended practices and procedures*

95. Articles 207(1) and 212(1) provide that States shall adopt laws and regulations that take into account "internationally agreed rules, standards and recommended practices and procedures." These can include implementing agreements to the Convention and other treaties operationalizing its provisions; as well as instruments that are not directly associated with the Convention.

96. In the identification of more specific benchmarks to determine international standards for the control of greenhouse gases, the rules and norms contained in the UNFCCC and the Paris Agreement are particularly relevant. As explained so far, the Convention's requirements for States Parties to manage pollution encompass climate change and greenhouse gas emissions, and the Paris Agreement is a "reference to specific obligations set out in other international agreements"[131] when detailing the direct and due diligence obligations that flow from these provisions. This moreover follows from the application of the principle of systemic integration, as in Article 31(3)(c) VCLT. Pursuant to this principle, when interpreting a treaty provision in the context of an issue that falls within the scope of an external set of rules, those rules must be considered. The standard of care included in the Paris Agreement in addressing climate change and its adverse effects is relevant in determining what is required of States in adopting "necessary measures" when complying with Part XII of the Convention in relation to pollution of the marine environment from greenhouse gases.

97. The UNFCCC, Article 2, sets forth the objective to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. There is now overwhelming scientific evidence indicating that this is a level at which global average temperature increases do not surpass 1.5°C above pre-industrial levels,[132] reflected in the Paris Agreement, Article 2(1):

> This Agreement … aims to strengthen the global response to the threat of climate change … including by: (a) 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 ....

98. While the Paris Agreement itself sets a two-fold temperature goal, successive decisions by the governing body of the Agreement, the Conference of the Parties serving as the Meeting of the Parties ("CMA"), in recognizing that the impacts of climate change will be much lower at the temperature increase of 1.5°C compared with 2°C, "resolved to pursue efforts to limit the temperature increase to 1.5°C".[133]

99. This provision cannot be viewed in isolation from Article 4.1 of the Paris Agreement, which specifies a tentative timeline for peaking and decline of GHGs to meet the long-term temperature goal, to "reach global peaking of greenhouse gas emissions as soon as possible ...

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[131] *South China Sea* arbitration, para. 942.
[132] IPCC Sixth Assessment Report, Summary for Policymakers.
[133] Decision 1/CMA.3, "Proposal by the President" (10 November 2021) para. 21 and Decision 1/CMA.4, "Sharm el-Sheikh Implementation Plan" (2022), para. 8.

so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century". Thus, this provision delineates the objective of reaching global net zero GHG emissions after 2050. This is in line with the IPCC Sixth Assessment Report. The two scenarios that, according to the IPCC, are very likely to result in temperature increases close to 1.5 °C in the mid- and long-term (scenarios SSP1-1.9 and SSP1-2.6) have $CO_2$ emissions declining to net zero around or after 2050, followed by varying levels of net negative $CO_2$ emissions. For non-$CO_2$ emissions, these scenarios have a slightly longer timeframe.[134] The timeframe set out in Article 4.1 of the Paris Agreement for achieving global net zero emissions is thus fully supported by the assessment of the IPCC.

100. Many States have acknowledged the importance of this objective by pledging to reach either net-zero $CO_2$ ("carbon neutrality") or net-zero GHG emissions ("climate neutrality") at some point during the second half of this century.[135] Thus, State practice recognizes the importance of reaching net-zero emissions on or after 2050, which adds to the normative force of this provision. To achieve this timeline for reaching global net-zero GHG emissions, the Paris Agreement incorporates various mechanisms to progressively scale up ambition by expecting that each Party's nationally determined contributions ("NDCs") will represent a "progression over time"[136] and each successive NDC will "represent a progression beyond the Party's then current nationally determined contribution and reflect its highest possible ambition".[137]

101. These obligations must be viewed against the background of the scientific developments since 2015. Although there was already a pressing sense of urgency when the Paris Agreement was adopted, the broad scientific consensus is now that 1.5°C warming above pre-industrial levels cannot be surpassed. At the request of the Paris Agreement Parties, the IPCC dedicated a specific report to this very threshold, published in 2018, which clearly indicates that 1.5°C warming would have severe consequences. In addition, the report concludes that 2°C would have even more significant detrimental impacts across all indicators.[138] Of particular importance to COSIS (and AOSIS) members, this report concluded that 1.5°C warming would lead to a significant percent of coral reef losses, increasing multiple risks to those low-lying countries. The IPCC found significant differences in impacts between keeping temperatures within 1.5°C or well below 2°C. As explained in chapter 2 above, every additional increment of emissions, and of consequent warming, has a significant impact on marine ecosystems.

102. Limiting global warming to 1.5°C compared to 2°C is projected to reduce increases in ocean temperature as well as associated increases in ocean acidity and decreases in ocean oxygen levels (high confidence). Consequently, limiting global warming to 1.5°C is projected to reduce risks to marine biodiversity, fisheries, and ecosystems, and their functions and

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[134] IPCC Sixth Assessment Report, Working Group I, Summary for Policymakers, pp. 12, 14.

[135] Canada, for example, states its target to reach net zero in 2050 in its "Canadian Net-Zero Emissions Accountability Act"; The European Union similarly aims to be the first "climate-neutral continent" by 2050, and comprehensively outlines how it seeks to achieve this target in its "Green Deal". As of March 2022, 33 countries and the European Union set a net-zero target. See "Net Zero Targets" *Climate Action Tracker* < https://climateactiontracker.org/methodology/net-zero-targets/#:~:text=Introduction,or%20in%20a%20policy%20document.> last accessed 23 May 2023.

[136] Paris Agreement, Article 3.

[137] Paris Agreement, Article 4(3).

[138] IPCC, *Global Warming of 1.5°C* (2018).

services to humans, as illustrated by recent changes to Arctic sea ice and warm-water coral reef ecosystems.[139]

103. The IPCC Sixth Assessment Report confirms that only the *very low* shared socio-economic pathway is feasible to attempt to protect and preserve many threatened and fragile marine ecosystems. While there is a large amount of uncertainty regarding the level of damage that will occur even at the very low scenario, which includes risks of surpassing tipping points, this scenario represents the best and safest guardrail that the IPCC proposes to policymakers to limit already occurring negative impacts of climate change. Even in this scenario, small islands will experience significant degradation or destruction of marine resources, including the loss of coral reefs. For example, even limiting global warning to 1.5˚C will result in the further loss of 70–90 percent of reef-building corals compared to today, with 99 percent of corals being lost under warming of 2˚C compared to today.[140] Marine resources such as coral reefs, constitute rare or fragile ecosystems, which State Parties have specific obligations to protect under Article 194(5) of the Convention.

104. State Parties to the Paris Agreement in December 2021 resolved to limit temperature increase to 1.5°C, and explicitly recognized that "limiting global warming to 1.5 °C requires rapid, deep and sustained reductions in global greenhouse gas emissions, including reducing global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net zero around midcentury as well as deep reductions in other greenhouse gases".[141] Parties reaffirmed that outcome in November 2022.[142] As part of the Paris Agreement, States recognized the importance of averting, minimizing and addressing loss and damage associated with the adverse impacts of climate change under Article 8(1). Loss and damage include impacts from extreme events and slow-onset events. Parties also agreed to enhance understanding and support with respect to loss and damage (Article 8(3)). Slow-onset events are understood to include events such as sea level rise, ocean warming, ocean acidification, and adverse effects such as coral reef bleaching and death. Most recently, at COP 27 in 2022, Parties to the Paris Agreement expressed alarm at the outcomes of the IPCC Sixth Assessment Report, and so agreed to establish a fund for responding to loss and damage, whose mandate includes a focus on addressing loss and damage in decision 1/CMA.4.

105. This subsequent consensus, as expressed in decisions 1/CMA.3 and 1/CMA.4, has normative bearing on the interpretation of the temperature goal in Arts. 2.1(a) and 4.1 of the Paris Agreement, as they can be seen as a "subsequent agreement … regarding the interpretation of the treaty or the application of its provisions"[143] as well as "subsequent practice in the application of the treaty". CMA decisions are not formally binding, but where they interpret a treaty article that is binding, the interpretation can be as a reflection of evolving understandings by the parties. Interpreting these provisions in light of subsequent consensus expressed in CMA decisions, and informed by best available science, allows for

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[139] IPCC, Summary for Policymakers, *Global Warming of 1.5°C* (2018) pp. 3-24.
[140] IPCC, *Sixth Assessment Report, Working Group II, Small Islands*, p. 2056.
[141] Decision 1/CMA.4, Sharm el-Sheikh Implementation Plan (2022) preambular paras. 7 and 8.
[142] Decision 1/CMA.3, Proposal by the President (10 November 2021) para. 21. Moreover, parties explicitly recognized that "limiting global warming to 1.5 °C requires rapid, deep and sustained reductions in global greenhouse gas emissions, including reducing global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net zero around midcentury as well as deep reductions in other greenhouse gases". Ibid, para. 22.
[143] Vienna Convention on the Law of Treaties (adopted 22 May 1969, entered into force 27 January 1980) 1155 UNTS 331 Article 31(3)(a) ("VCLT").

several understandings. First, that parties are putting a stronger normative weight on the 1.5°C limit compared to the "well below 2°C", and recognizing that limiting the impacts of climate change, including to marine resources, will be much lower at the temperature increase of 1.5°C compared with well below 2°C. Second, that they are specifying and anticipating the timeline to reach global net-zero $CO_2$ emissions from the "middle of this century" as expressed in the Paris Agreement, Article 4.1, to "around mid-century."[144] And third, that they are committing collectively to a quantified, global short-term $CO_2$ reduction target (40 percent in 2030), in addition to a quantified global mid-century target of global "net-zero" emissions.

106. As mentioned above, "the precautionary approach is also an integral part of the general obligation of due diligence". Despite our deepened understanding of climate change, scientific uncertainty remains in relation to a number of issues, such as *inter alia* remaining carbon budgets;[145] ice-sheet processes[146] and sea level rise.[147] It is therefore necessary to take a precautionary approach when determining the conduct required by States in combatting climate change, which adds further to the degree of stringency of the norms reflected in Articles 192, 194, 207 and 212.

107. These factual and legal changes must be considered when setting the standard of conduct required Part XII. Articles 192 and 194 set out evolutionary norms, as they meet the criteria outlined by the ICJ in *Dispute regarding Navigational and Related Rights*: they contain generic terms, and the Convention is of "continuing duration".[148] Thus, the due diligence obligation placed upon the Convention's States Parties must be understood with reference to the UNFCCC framework, including the Paris Agreement and the temperature and net-zero and net-negative goals enshrined therein, as well as the present scientific understanding of the issue of climate change, which clearly indicates that warming beyond 1.5°C would result in dangerous anthropogenic interference with the climate system.

108. Taking into account these considerations, it is submitted that compliance with the obligations flowing from Articles 192, 194, 207, and 212 requires States to take mitigation measures consistent with a pathway no higher than 1.5 °C warming above pre-industrial levels. States Parties, when adopting laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources or atmospheric pollution, are required to take into account temperature targets and the process of setting nationally determined contributions at the level of their highest possible ambition (4.3). That said, taking into account the precautionary approach, which is an integral part of the general obligation of due diligence, as well as the broad scientific consensus around the need to stay within the 1.5°C threshold and the recent State practice recognizing the need to address the impacts of climate change, the Convention requires States to act with due diligence which requires taking all necessary measures[149] in order to rapidly, deeply and immediately reduce

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[144] Paris Agreement, Article 2.1(a) did not single out CO2 emissions but established the aim of reaching a balance of removals and emissions of all GHGs.
[145] IPCC, Summary for Policymakers, *Global Warming of 1.5°C* (2018) p. 12.
[146] IPCC Sixth Assessment Report, p. 19.
[147] Ibid.
[148] *Dispute regarding Navigational and Related Rights (Costa Rica v. Nicaragua)*, Judgment, I.C.J. Reports 2009, p. 213, para. 66.
[149] Such measures include, *inter alia*, adopting domestic laws and regulations, providing financial assistance to developing countries, effective implementation, adequate compliance, and enforcement mechanisms, and regulating private actors.

GHG emissions, with a view to achieving net-zero $CO_2$ emissions by 2050 and net-negative emissions thereafter.[150]

*3. States Parties are required to take specific measures under the Convention to address ocean acidification and protect and preserve fragile ecosystems*

109. The UNFCCC and Paris Agreement, aimed at an overall reduction of GHG emissions, are largely focused on the atmosphere and not the ocean.[151] The Paris Agreement preamble notes the "importance of ensuring the integrity of all ecosystems, including oceans," and also calls on parties to "take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gasses as referred to in Article 4(1)(d) of the UNFCCC, including forests," which implicitly includes the ocean.[152] However, the Paris Agreement does not specify an emissions reduction target but instead requires States to determine their own commitments at the national level designed to meet the Agreement's objective to limit temperature rise to 1.5°C, at the level of individual State's highest possible ambition.

110. Although in most cases reducing greenhouse gas emissions will, in effect, protect the marine environment from the adverse effects of climate change, this is not always the case. The Paris Agreement, although relevant in determining the standard of due diligence required by States under certain provision in Part XII, does not exhaust States' obligations to protect and preserve the marine environment from the adverse impacts of climate change. An example to illustrate this is the issue of ocean acidification. Ocean acidification is principally caused by $CO_2$ sequestration, which causes a decrease in ocean pH levels. The Paris Agreement does not provide any individual State-based targets for $CO_2$ emissions, or ocean pH values. Thus, States can, in theory, comply with their obligations under the Paris Agreement without making significant cuts in their $CO_2$ emissions, and, as a result, not meaningfully address ocean acidification. In the shorter term, the temperature goals of the Paris Agreement can be met by significantly reducing emissions of other greenhouse gases such as methane, and in the longer term, by using alternative means such as geoengineering.

111. Accordingly, the due diligence obligation under the Convention to prevent, reduce and control pollution of the marine environment by GHG emissions is not necessarily met when States fully comply with the Paris Agreement. Thus, States are required to take specific measures in addition to their Paris Agreement NDCs, insofar those commitments do not sufficiently address ocean acidification, as well as other specific impacts of climate change on the ocean.[153] It is important to emphasize that these obligations, although normatively deeply intertwined, exist in parallel to one another. The obligations of result and the due diligence obligations outlined above are ultimately derived from articles 192, 194, 207 and 212, and set a very demanding standard of conduct, of which the precautionary approach is an integral part. It is moreover key to consider the application of 194(3)(a) and Article 207(5), which sets a particularly stringent standard of conduct ("minimize, to the fullest extent possible") in relation to the release of persistent harmful substances, such as $CO_2$.

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[150] IPCC, *Synthesis Report of the IPCC Sixth Assessment Report* (2023), p. 46.
[151] D.L. VanderZwaag, N. Oral, and T. Stephens, "Introduction to the Research Handbook on Ocean Acidification Law and Policy", in D.L. VanderZwaag, N. Oral and T. Stephens (eds), *Research Handbook on Ocean Acidification Law and Policy* (Edward Elgar Publishing, 2021) p. 2; N. Oral, "Ocean Acidification", *Ecology Law Quarterly* (2018) 45(1):9.
[152] Paris Agreement, Art 5(1)(d).
[153] To be further discussed in Chapter 3.

112. Another example is the obligation set forth in Article 194(5) to take necessary measures to "protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life," which is not limited to the impacts of marine pollution. It cannot, in any case, be met by reducing GHG emissions and mitigating marine pollution alone. Even when pollution from GHGs is drastically and immediately reduced, the impacts on rare and fragile ecosystems such as coral reefs are already severe, as indicated in chapter 1, and mitigating these effects requires additional efforts by States. Chapter 4 further outlines States' obligations under Article 192, which has a broader scope than Article 194 and includes other measures such as those necessary to enhance ecosystem resilience, conserve marine living resources and mitigate ocean acidification.

113. Given the stringency and legal force of these norms, it may be questioned whether compliance with this due diligence obligation to rapidly, deeply, and immediately reduce GHG emissions, with a view to achieving net-zero $CO_2$ emissions by 2050 and net-negative emissions thereafter, suffices to adequately protect and preserve the marine environment and protect and preserve rare and fragile ecosystems and to prevent marine pollution. The impacts of climate change have already resulted in deleterious effects for the marine environment, as well as for those whose livelihoods and economies depend on a healthy ocean. Climate change has already caused widespread impacts and related losses and damages on human communities, and altered terrestrial, freshwater and ocean ecosystems worldwide.[154] In the current climate trajectory, at around one per cent warming since 1850-1990,[155] the ocean is already heavily impacted. Marine heatwaves are occurring at an increasing frequency, leading to severe bleaching and mass mortality of corals,[156] significant sea ice reduction in the Arctic,[157] and large-scale acidification and deoxygenation across the globe. These effects are not only detrimental to marine life, but also lead to an increased risk to food security linked to decreases in seafood availability and could significantly affect coastal indigenous peoples and local communities that depend on resources extracted from the open ocean, as about 60 per cent of the world's population lives and derives livelihoods in coastal areas.[158] As noted above and articulated by the IPCC, every tonne of carbon counts. Even limiting temperature increases to 1.5°C leads to significant and detrimental impacts on marine resources, coastal communities, and vulnerable States such as Small Island Developing States.

114. Given existing impacts, State Parties have separate obligations, under the Convention, to protect and preserve the marine environment, and in particular specific obligations in relation to rare and fragile ecosystems such as coral reefs. These obligations exist independently from the Paris Agreement. The Paris Agreement, although relevant in determining the standard of due diligence required by States under certain provision in Part XII, does not exhaust States' obligations to protect and preserve the marine environment from the adverse impacts of climate change.

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[154] IPCC, *Climate Change 2023: Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (IPCC, 2023), Summary for Policymakers, p. 7.
[155] IPCC, *Climate Change 2021: The Physical Science Basis* (Cambridge University Press, 2021).
[156] UN, *The Second World Ocean Assessment: Vol I* (2022) p. 146.
[157] Ibid.
[158] UN, *The Second World Ocean Assessment: Vol I* (2022) pp.150, 270, 484.

## F. States Parties have obligations to prevent, reduce and control pollution caused by GHG emissions from vessels

### *1. Article 211 governs GHG emissions from vessels*

115. Vessels can be a source of GHG emissions, including $CO_2$, $CH_4$, and $N_2O$, with $CO_2$ being the main GHGs emitted by shipping. Vessels are also a source of other climate pollutants described in chapter 2, including black carbon, $NO_X$ and $SO_X$. While shipping is one of the more efficient means to transport goods globally, GHG emissions from total navigation (international, domestic, and fishing) were estimated by the International Maritime Organization ("IMO") to be 2.89 percent of global anthropogenic GHG emissions in 2020.[159] The IPCC estimated that as of 2019, GHG emissions from shipping made up 9 percent of direct GHG emissions from the transport sector, second only to road transportation.[160] Such emissions from the maritime sector are projected to increase to between 50 percent and 250 percent by 2050 unless action is taken.[161]

116. Accordingly, GHG emissions from vessels are also a form of "marine pollution to the marine environment" under Article 1(1)(4) of the Convention. Vessels emit GHGs into the superjacent air space above the ocean (which is a component of the marine environment) where they are well-mixed in the atmosphere and introduced into the oceans through chemical and physical processes which result in deleterious effects on the marine environment, including ocean warming, ocean deoxygenation, sea level rise and ocean acidification, as outlined in section I above. Accordingly, GHG emissions from vessels constitute "pollution of the marine environment from vessels" under Article 211 of the Convention.

### *2. MARPOL, Annex VI provides relevant internationally agreed rules and standards*

117. Article 194(3)(b) of the Convention, read with Article 211, requires States Parties to take measures to prevent, reduce and control GHG emissions from vessels. These include measures designed to fully minimize intentional and unintentional discharges, and regulations on the design, construction, equipment, operation, and manning of vessels. In implementing these measures States Parties, through the competent international organization or general diplomatic conference, must establish international rules and standards to prevent, reduce and control pollution of the marine environment from vessels.[162]

118. GHG pollution prevention rules and standards apply to vessels through the national laws and regulations of flag States and coastal States. Flag States, under Article 211(2), must adopt laws and regulations for the prevention, reduction, and control of pollution of the marine environment from vessels flying their flag or of their registry. Coastal States may adopt laws and regulations for the prevention, reduction and control of marine pollution from

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[159] IMO, *Fourth IMO Greenhouse Gas Study 2020: Executive Summary* (IMO, 2021).
[160] IPCC, *Climate Change 2022: Mitigation of Climate Change, Contribution of Working Group III to the Sixth Assessment Report of the IPCC* (2022), ch. 10, p. 1056.
[161] IMO, *Fourth IMO Greenhouse Gas Study 2020: Executive Summary* (IMO, 2021); IPCC, *Climate Change 2022: Mitigation of Climate Change, Contribution of Working Group III to the Sixth Assessment Report of the IPCC* (2002), ch. 10, p. 1055-1056.
[162] UNCLOS, Article 211(1).

foreign vessels within their territorial sea, provided that any laws and regulations applying to the construction, design, manning or equipment of foreign ships give effect to generally accepted international rules and standards.[163] Coastal states may also adopt laws and regulations for the prevention, reduction and control of pollution from vessels in their EEZ consistent with generally accepted international rules and standards, and in clearly defined areas of the EEZ they may apply more stringent rules due to "oceanographical and ecological conditions as well as [the EEZ's] utilization or the protection of its resources and the particular character of its traffic."[164]

119. In relation to pollution from vessels, it is widely recognized that the IMO is the competent international organization under Article 211(1).[165] The Paris Agreement does not expressly include international shipping as part of the emissions reduction commitments established in their NDCs, although there is nothing in the Paris Agreement to prevent a Party from reporting on emissions from international shipping in some form as part of their NDCs.[166] The IMO adopted international rules and standards to prevent, reduce and control pollution from GHG emissions from vessels under Annex VI of the International Convention for the Prevention of Pollution from Vessels ("MARPOL") in 1997. These limit the main air pollutants contained in ship exhaust gas, including sulphur oxides and nitrous oxides (indirect GHGs), and prohibit deliberate emissions of ozone depleting substances.[167]

120. MARPOL Annex VI was subsequently amended and there is now also a chapter that covers mandatory technical and operational energy efficiency measures aimed at reducing GHG emissions from ships. A 2011 amendment added a new chapter on energy efficiency for ships that requires ships built from 2014 onwards to comply with the Energy Efficiency Design Index, which sets minimum levels of energy efficiency that increase at 5-year intervals up to 2025. Ships built before 2014 must have a Ship Energy Efficiency Management Plan under which they must monitor their energy efficiency. An additional amendment to Annex VI in 2016 required all ships over 5000 gross register tonnage to record their fuel consumption and to report it to their flag State and the IMO. All amendments to Annex VI of MARPOL that address GHG emissions are in force through the tacit acceptance procedure.[168]

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[163] UNCLOS, Article 211(4), read with Article 21(1) and (2).
[164] UNCLOS, Article 211(5) and (6).
[165] United Nations, Division for Ocean Affairs and the Law of the Sea Office of Legal Affairs (DOALOS), "Competent or relevant international organizations" under the United Nations Convention on the Law of the Sea (1996) *Law of the Sea Bulletin No. 31,* pp. 79 – 95. The Paris Agreement does not expressly include international shipping as part of the emissions reduction commitments established in their NDCs, although there is nothing in the Paris Agreement to prevent a Party from reporting on emissions from international shipping in some form as part of their NDCs.
[166] See A. Chircop, M. Doelle and R. Gauvin, *Shipping and Climate Change: International Law and Policy Considerations: Special Report* (Centre for International Governance Innovation. 2018), 15. Article 2 (2) of the 1997 Kyoto Protocol required Annex I parties to pursue limitation or reduction of emissions from the shipping sector through the IMO and the maritime transport sector was also excluded from the Protocol's Annex A, which lists the sectors wherein national emission reduction should be attained.
[167] International Convention for the Prevention of Pollution from Ships (MARPOL), Annex VI Prevention of Air Pollution from Ships (entered into force 19 May 2005) 1340 UNTS 61 (MARPOL Annex VI).
[168] IMO, Status of IMO Treaties: Comprehensive information on the status of multilateral Conventions and instruments in respect of which the INO or its Secretary-General performs depositary or other functions, 5 June 2023, pp. 180-188.

121. Most recently, the IMO announced a policy framework for GHG emissions through the adoption of the Initial IMO Strategy on Reduction of GHG Emissions from ships.[169] The Strategy contained objectives, *inter alia,* to reduce carbon intensity of ships and to reduce emissions by at least 50 percent by 2050 compared to 2008; it also included implementation measures. The Strategy recognized the development and deployment of alternative low-or zero-carbon fuel for international shipping are critical to decarbonization targets.

122. States Parties that are flag States must adopt laws and regulations that have at least the same effect as that of "generally accepted international rules and standards" adopted by the IMO to prevent, reduce, and control pollution from GHG emissions from vessels. Similarly, Convention States Parties that are coastal States may adopt laws and regulations that have at least the same effect as that of "generally accepted international rules and standards" adopted by the IMO to prevent, reduce, and control pollution from GHG emissions from ships in the EEZ. MARPOL Annex VI is the "generally accepted international rules and standard" for flag States and coastal States. It has been ratified by 105 states, which account for approximately 96.81 percent of the gross tonnage of the world's merchant fleet.[170]

123. While what constitutes "generally accepted international rules and standards" is not defined in the Convention, an ordinary meaning of the term suggests that the degree of international acceptance of these standards by States is important in the determination.[171] In this regard, it is pertinent that the arbitral tribunal in the *South China Sea Arbitration* found that the 1972 Convention on the International Regulations for Preventing Collisions at Sea had met the threshold of "generally accepted" on the basis there were 156 contracting parties representing more than 98 percent of world tonnage.[172] Annex VI meets this threshold by the fact that it has attained sufficient ratifications to enter into force; it has received 105 ratifications to date; States ratifying Annex VI represent 96.81 percent of world tonnage; and there were few objections to the amendments to Annex VI that addressed mitigation of GHG emissions from vessels.[173]

124. Accordingly, States Parties are obliged to adopt laws and regulations which have the same effect as MARPOL Annex VI (even if they are not parties to MARPOL or have not accepted Annex VI) in order to meet their obligations to prevent, reduce and control pollution from GHG emissions from ships. These are obligations of result. States Parties to the Convention that are flag States also have due diligence obligations to ensure that their flagged vessels are in compliance with Annex VI of MARPOL, including through the adoption of laws, regulations, administrative measures and enforcement actions. States Parties to the Convention must also take into account the IMO's Initial Strategy when adopting laws and regulations to prevent, reduce and control pollution of the marine environment from GHG emissions.

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[169] Initial IMO Strategy on Reduction of GHG Emissions from Ships, Annex 11, Resolution MEPC.304 (72), MEPC 72/17/Add 1, adopted on 13 April 2018.

[170] IMO, Status of IMO Treaties: Comprehensive information on the status of multilateral Conventions and instruments in respect of which the INO or its Secretary-General performs depositary or other functions, 5 June 2023, pp 180-188.

[171] IMO, Implications of UNCLOS for the IMO, LEG/MISC.8, 30 January 2014, 11.

[172] South China Sea Arbitration, para. 1081.

[173] AHA Soons, "An Ocean Under Stress: Climate Change and the Law of the Sea," in *KNVIR, Climate Change Options and Duties under International Law* (2018), pp. 87-88.

# CHAPTER 4

## QUESTION (B): SPECIFIC OBLIGATIONS OF STATES PARTIES TO PROTECT AND PRESERVE THE MARINE ENVIRONMENT IN RELATION TO CLIMATE CHANGE IMPACTS, INCLUDING OCEAN WARMING AND SEA LEVEL RISE, AND OCEAN ACIDIFICATION

125. Question (b) interrogates the content of obligations to protect and preserve the marine environment in a way that is different from the more specific obligations related to pollution that are the focus of Question (a), although there is overlap between the two. State Parties to the Convention have a general obligation to protect and preserve the marine environment, under Article 192 and specific obligations under other provisions of the Convention. These general and specific obligations are also expressed in other provisions of international law, which are referenced by the Convention.[174]

126. The COSIS Agreement characterizes climate change itself as "a common concern of humankind", reflecting the UNFCCC Preamble, "change in the Earth's climate and its adverse effects are a common concern of humankind." As Small Island Developing States, COSIS members have both the duty to protect and preserve the marine environment from the effects of climate change, and the right to the fulfillment of the same duty by other States.[175] The general obligation to protect and preserve the marine environment is a responsibility of all States Parties that is owed to all other States Parties.

127. The general obligation to protect and preserve the environment encompasses positive and negative duties. It includes "'protection' of the marine environment from future damage and 'preservation' in the sense of maintaining or improving its present condition".[176] It includes "the negative obligation not to degrade the marine environment", that is, certain harmful activities must be avoided to protect the environment. Amongst these are the polluting activities discussed in chapter 3 of this Statement. However, all climate pollutants (as defined in chapter 2) are within the scope of question (b), while question (a) of the request asked about obligations with respect to GHG emissions into the atmosphere. Even were it to be found that some or all GHG emissions do not constitute "pollution of the marine environment," the indisputable fact that they cause serious harm means that States Parties have the obligation to mitigate them under Article 192.

128. Article 192 duties are also positive, "active measures to protect and preserve the marine environment," that include taking steps to build resilience, discussed in chapter 2 and in this chapter.[177] The arbitral tribunal in the *Chagos Archipelago Arbitration* expressly rejected the proposition that Part XII might be limited to measures "aimed at controlling

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[174] UNCLOS makes frequent reference to other rules of international law that are not incompatible with the Convention, for example, UNCLOS, Article 58(3).
[175] Climate change is a common concern of all humankind. See United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107, Preamble. Accordingly, even non-parties to the Convention share this responsibility.
[176] *South China Sea* Arbitration, para. 941.
[177] Ibid.

marine pollution."[178] Given the evolutionary nature of Article 192,[179] it must be interpreted so as to cover all contemporary threats to the marine environment, including those that emerged following the adoption of the Convention. Hence, in addition to marine pollution, the scope of Article 192 extends to the conservation of living resources,[180] the establishment of marine protected areas,[181] as well as addressing the full range of climate change impacts, including ocean warming, ocean deoxygenation, sea level rise, and ocean acidification.

129. Article 192 thus encapsulates a broad range of obligations with spatial application that comprises all maritime zones or areas. Notwithstanding the breadth and seeming generality of this provision, it is important to emphasize the finding in the *South China Sea* arbitration that "although phrased in general terms, the Tribunal considers it well established that Article 192 does impose a duty on States Parties".[182] These duties are "informed by the other provisions of Part XII and other applicable rules of international law".[183] Consistent with this finding, the following sections present an outline of these duties – insofar as relevant with regard to climate change impacts – starting with those arising from the Convention and its implementing agreements.

### I. Cooperation to reduce climate pollutants and to take measures to increase ocean resilience is required to protect and preserve the marine environment

130. A key element of the general obligation to protect and preserve the marine environment is the obligation to cooperate to this end by virtue of Article 197:

> States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features.

131. This provision codifies the customary principle of cooperation, as reflected in Principle 27 of the Rio Declaration. The present Tribunal observed in the *MOX Plant* case that "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".[184] The obligation is given further substance in various provisions throughout the Convention related to specific activities or maritime areas, e.g. in relation to enclosed or semi-enclosed seas (Article 123), conservation and management of living resources on the high seas (Article 118), and marine living resources in the EEZ (Articles 63 and 64). This Tribunal

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[178] Chagos Archipelago Arbitration, para. 320.

[179] In its *Dispute Regarding Navigational and Related Rights*, the ICJ formulated two cumulative requirements for evolutive interpretation: first, that the treaty "has been entered into for a very long time" or is "of continuing duration", and second, that the parties have used "generic terms". Both these requirements are met by Article 192. *Navigational and Related Rights (Costa Rica v Nicaragua)* (Judgment), ICJ Reports 2009, p. 242.

[180] *Southern Bluefin Tuna (New Zealand v. Japan; Australia v. Japan)*, Provisional Measures Order, Order of 27 August 1999, ITLOS Reports 1999, p 280, para. 70; SRFC Advisory Opinion, para. 120.

[181] Chagos Archipelago Arbitration, para. 320, where the present Tribunal found that the dispute concerning the establishment of the Chagos Marine Protected Area relates to the preservation of the marine environment.

[182] *South China Sea* Arbitration, para. 941.

[183] Ibid.

[184] *MOX Plant Case (Ireland v. United Kingdom),* Provisional Measures Order, Order of 3 December 2001, ITLOS Reports 2001, p. 95, para. 83 ("MOX Plant, Provisional Measures").

observed that these "are 'due diligence' obligations which require States Parties concerned to consult with one another in good faith, pursuant to article 300 of the Convention. The consultations should be meaningful in the sense that substantial effort should be made by all States concerned, with a view to adopting effective measures necessary to coordinate and ensure the conservation and development of shared stocks".[185] The obligation to enter into consultations was similarly stressed in the *MOX Plant* case, which was found to encompass, *inter alia,* exchanging information and monitoring the risks and effects of activities.[186]

132. Extending these obligations to the impacts of climate change, States Parties are required to cooperate for the protection and preservation of the marine environment from climate impacts on a global or regional basis, as appropriate.

133. The Paris Agreement can be said to give effect to this requirement in relation to GHG emissions; its application in relation to the marine environment is discussed in chapter 3, section II.E. However, it is not exhaustive of the obligations under Article 197, given the scarce attention it pays to the impacts of climate change on the marine environment. Therefore, States Parties are required to cooperate globally and regionally, as appropriate, in mitigating and adapting to the impacts of climate change on the marine environment. This duty entails, *inter alia*, cooperating and coordinating in designating measures to address future damage and degradation by enhancing ecosystem resilience, as further detailed below; cooperating in monitoring the impacts of climate change on marine environment, and exchange information with other States; and, parallel to their obligations to conduct environmental impact assessments, as discussed below, notify and consult States in relation to any activities that may induce serious climate impacts.

134. The obligations under Article 194 and other provisions of Part XII concerned with pollution of the marine environment that are outlined in chapter 3 above are not, however, contingent upon the application of Article 194 *per se*. Given the immense threat posed to the marine environment by climate change, any State seeking to comply with its obligations under Article 192 needs to take measures to reduce GHG emissions and protect the marine environment from the adverse effects of climate change. Any other conclusion would render Article 192 void, and would arguably be in violation of the principle of good faith as enshrined in Article 306 of the Convention and Articles 26 and 31 of the VCLT. Regardless of whether GHGs are considered pollution of the marine environment under Article 1(1)(4), the obligation to protect and preserve the marine environment under Article 192 encompasses these same duties. Its content is informed by other rules of international law, including the Paris Agreement, and the stringency and content of the due diligence obligation flowing therefrom is subject to the same considerations, as outlined in chapter 3. Therefore, Article 192 requires States Parties to act with due diligence, to take all necessary measures in order to rapidly, deeply, and immediately reduce GHG emissions with a view to achieving net-zero $CO_2$ emissions by 2050 and net-negative emissions thereafter.

135. Reducing GHG emissions are one element in the duties flowing from Article 192, since not all climate-induced impacts are mitigated by reducing GHG emissions. It was observed in chapter 3 above that States Parties can reduce their GHG emissions without meaningfully addressing ocean acidification. States Parties are therefore required to take

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[185] SRFC Advisory Opinion, para. 210.
[186] MOX Plant, Provisional Measures, p. 95, 110-111.

additional measures, specifically designed to address the impacts of climate change on the ocean, including ocean acidification. Such measures could entail, for instance, setting specific national targets for $CO_2$ emissions, since ocean acidification is principally caused by $CO_2$ sequestration, or measures to enhance ecosystem resilience as outlined below.

136. The impacts of climate change significantly impact virtually all forms of marine life, including fish. These impacts include warming-induced changes in spatial distribution and abundance, reduction of suitable habitats such as coral reefs and a decrease in global biomass of marine animal communities and their production.[187] Article 192 requires States Parties to address these adverse impacts, as the conservation of marine living resources is an element of the duty to protect and preserve the marine environment under Article 192.[188] This umbrella obligation encapsulates several more specific obligations, found in the Convention as well as in the 1995 Fish Stocks Agreement. By virtue of the Convention, States Parties are required to conserve living resources in their exclusive economic zone (Article 61) as well as in areas beyond national jurisdiction (Article 119). The 1995 Fish Stocks Agreement modernized and further elaborated States Parties' obligations in relation to straddling and highly migratory fish stocks, requiring States Parties to apply a precautionary approach to fisheries management (Articles 5(a) and 6) as well as an ecosystem approach to fisheries management (Article 5 (d–g)). Although these provisions do not directly refer to climate change, the obligation to manage fisheries using best scientific knowledge requires coastal states and high seas fishing states to take account of climate change impacts in fisheries management.[189] Hence, when read in conjunction with the general obligation of Article 192, which encompasses climate change impacts, States are required to take measures to address the adverse impacts of climate change to marine living resources. Such measures much embody a precautionary approach as well as an ecosystem approach.

137. In addition to the obligations derived directly from the Convention and its implementing Agreements, the content of Article 192 is informed by "the corpus of international law relating to the environment".[190] Thus, in complying with their duties to protect and preserve the marine environment from the impacts of climate change, States Parties' obligations are further shaped by other norms flowing from general international law. An important obligation, in this regard, is the responsibility not to cause environmental damage or transboundary harm, as an element of States' sovereign rights over their natural resources as reflected in Article 193 of the Convention. This obligation is reflected in Principle 2 of the Rio Declaration on Environment and Development as "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", and has been declared customary international law by the ICJ in its *Nuclear Weapons* advisory opinion.[191] This general duty to prevent environmental harm from

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[187] IPCC, *Special Report on the Ocean and Cryosphere,* Summary for Policymakers, pp. 12, 14.
[188] IPCC, *Special Report on the Ocean and Cryosphere,* Summary for Policymakers, pp. 12, 14.
[189] E.J. Molenaar, "Integrating Climate Change in International Fisheries Law", in E. Johanssen, S.V. Busch and I.U. Jakobsen (eds) *The Law of the Sea and Climate Change* (Cambridge University Press, 2021).
[190] *South China Sea* Arbitration, para. 941.
[191] *South China Sea* Arbitration, para. 941; C.R. Payne, "Judicial Development" in L. Rajamani and J. Peel (eds), *The Oxford Handbook of International Environmental Law* (2nd ed) (OUP, 2021) pp. 462-462 ("Payne, Judicial Development"); *Pulp Mills on the River Uruguay* (Argentina v. Uruguay), Judgment (2010) ICJ Rep. 14, 78, para. 193; *Legality of the Threat or Use of Nuclear Weapons,* Advisory Opinion (1996) ICJ Rep. 241-242, para. 29.

activities under a States' jurisdiction or control sits against the backdrop of the more general duty to protect the rights of other States, as elaborated in the ICJ's *Corfu Channel* case, that is, the obligation of every State not to allow knowingly its territory to be used for acts contrary to the rights of other States.[192]

138. This is also known as the "no harm" principle, expressed in the *maxim sic utere tuo ut alienum non laedas*, which entails 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 [State]".[193] Closely related to the duty not to cause transboundary harm is the principle or duty of prevention, requiring States to prevent damage to the environment, and otherwise to reduce, limit or control activities that might cause or risk such damage. The PCA, in *Iron Rhine*, found that the "duty to prevent, or at least mitigate, such [environmental] harm … has now become a principle of general international law".[194] The principle of prevention is intricately linked with the general obligation of due diligence and, as such, "is not intended to guarantee that significant harm be totally prevented, if it is not possible to do so. In that eventuality, the State of origin is required … to exert its best possible efforts to minimize the risk."[195] Other relevant norms and principles flowing from general international law that have a bearing on the content of Article 192 are, *inter alia*, the principle of sustainable development; intergenerational equity; precaution; as well as principles and rules flowing from other areas of international law, such as human rights law, in which the emerging right to a healthy environment,[196] which logically includes a healthy ocean, merits mention.

139. The general obligation is reinforced, with respect to the high seas, by the duty to adopt measures for conservation of the living resources of the high seas, stated in Article 117, with respect to the Area through the duty to ensure effective protection for the marine environment as reflected in Article 145, and with respect to the EEZ by the Convention's recognition of the sovereign rights of coastal States to conserve and manage the natural resources of their EEZ as well as affirming that coastal States have jurisdiction to prescribe measures for protection and preservation of the marine environment in their EEZ.[197]

140. States Parties must give special attention to protect and preserve the marine environment in relation to climate change impacts on "rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life", under Article 194(5). Although other paragraphs of Article 194 address pollution specifically, its paragraph 5 refers to all of Part XII, and invokes the phrasing of Article 192, "protect and

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[192] Corfu Channel Case (1949) ICJ Rep 244, p. 4, p. 22.
[193] Trail Smelter Arbitration (1939) 33 AJIL 182; (1941) 35 AJIL 684, 1965.
[194] *Iron Rhine (Belgium/Netherlands)* [2005] ICGJ 373 (PCA 2005) para 59.
[195] Commentaries to the Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, *Yearbook of the International Law Commission* (2001-II) Part 2, para 7, cited in P. Sands and J. Peel, *Principles of International Environmental Law* (4th ed) (Cambridge University Press, 2019), 211.
[195] UN General Assembly, A/76/300; Human Rights Council Resolution 48/13, UN Doc A/HRC/RES/48/13 (2021) at 1, see also Comunidades Indígenas Miembros de la Asociación Lhaka Honhat (Nuestra Tierra) v. Argentina, Inter-Am. Ct. H.R. (Feb 6, 2020).
[196] UN General Assembly, A/76/300; Human Rights Council Resolution 48/13, UN Doc A/HRC/RES/48/13 (2021) at 1, see also Comunidades Indígenas Miembros de la Asociación Lhaka Honhat (Nuestra Tierra) v. Argentina, Inter-Am. Ct. H.R. (Feb 6, 2020).
[197] UNCLOS, Article 56 (Rights, jurisdiction and duties of the coastal State in the exclusive economic zone) (in balance with rights of other States to navigate, overfly, lay submarine cables, and lay pipelines and the other States" duties to, *inter alia*, protect and preserve the marine environment).

preserve". It states that "[t]he measures taken in accordance with this Part shall include those necessary to protect and preserve" these sensitive ecosystems and habitats.

141. Preservation of polar sea ice and ice sheets would also fall under these responsibilities. In setting their nationally determined contributions under the Paris Agreement, states should consider the need to protect and preserve the ecological integrity of polar regions which includes the cryosphere.[198] These responsibilities are reinforced by the Paris Agreement's preambular call for protecting the ecological integrity of the ocean.[199] With Arctic warming occurring three to four times faster than the global average, Arctic sea ice has lost nearly three-quarters of its summer volume since the early 1980s and the Arctic might face an ice-free summer by 2050.[200] The need to ensure the integrity of ocean ecosystems is an evolving responsibility under international law.[201]

142. The Convention also provides tools for States Parties to fulfill their obligations and to achieve the Convention's objective of conserving the ocean's living resources and "study, protection and preservation of the marine environment".[202] Those that are especially relevant to address climate change are: cooperation (Article 197),[203] monitoring and environmental assessment (Articles 202, 204-206,),[204] technical assistance to developing States (Articles 202-203 and Part XIV),[205] conduct and promotion of marine scientific research (Article 200, Part XIII),[206] and the provisions for developing international rules and national legislation that are discussed in great detail in chapter 3 above (Articles 207-212).[207]

143. It is submitted that the traditional deference to individual States' rights to freedom of navigation and sovereign rights to regulate under the Convention need to be rebalanced with greater regard for the rights of the international community to a safe climate and a healthy ocean. GHGs are well-mixed in the atmosphere, which means that wherever emissions occur – unlike most pollutants – they will cause transboundary harms affecting other States and areas beyond national jurisdiction. The remainder of this chapter identifies specific measures that can be taken or are required under the Convention to implement this rebalancing.

## II. Enhancing ecosystem resilience is an essential measure to protect and preserve the marine environment with respect to climate change impacts, including ocean acidification

144. The BBNJ Agreement will be, once it enters into force, the third Implementing Agreement to the Convention. As such, the agreed text has special force and relevance to the

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[198] On the need to consider Arctic climate change threats in national laws and policies, see M. Doelle and R. Dremliuga, "Comparing Russian and Canadian Climate Policy: Protecting Arctic Interests?" *Arctic Review on Law and Politics* (2022) 13:258-285.

[199] C. Engler, D.L. VanderZwaag, K. Fennel, "Ocean Acidification Post-Paris: Gauging Law and Policy Responses in Light of Evolving Scientific Knowledge", *Ocean Yearbook* (2019) 33:207-249.

[200] International Cryosphere Climate Initiative, State of the Cryosphere 2022: Growing Losses, Global Impacts: We cannot negotiate with the melting point of ice (2022).

[201] K. Bosselmann, "Conclusion: the ever-increasing importance of ecological integrity in international and national law", in L. Westra et al. (eds), *Ecological Integrity, Law and Governance* (Routledge, 2018), ch. 22.

[202] UNCLOS, Preamble.

[203] UNCLOS, Article 197.

[204] UNCLOS, Arts. 202, 204-206.

[205] UNCLOS, Arts. 202-203 and Part XIV.

[206] UNCLOS, Article 200 and Part XIII.

[207] UNCLOS, Articles 207-212.

question of the protection and preservation of the marine environment. Its preamble establishes the intent of negotiating States to address the triple crisis of climate change, biodiversity, and pollution in the Agreement:

> *Recognizing* the need to address, in a coherent and cooperative manner, biological diversity loss and degradation of ecosystems of the ocean, due, in particular, to the adverse effects of climate change on marine ecosystems, such as warming and ocean deoxygenation, as well as ocean acidification, pollution, including plastic pollution, and unsustainable use …

145. States are responsible for governing activities under their jurisdiction or control that will harm other States and areas beyond national jurisdiction. This is a longstanding rule of customary international law, and an element of the obligation to protect and preserve the marine environment under Article 192 of the Convention. This obligation finds expression in many treaties, especially multilateral environmental agreements, which ought to be taken into account when giving effect to Article 192, the content of which is informed by other relevant rules of international law. This obligation includes the requirement to manage activities such as impacts of bottom trawling, seabed mining, noise, shipping, and pollution that, cumulatively, undermine marine environmental resilience to climate change impacts.

146. Two approaches that can be taken to protect and preserve the marine environment in relation to climate change are mitigation and adaptation.[208] Mitigation requires reducing the sources of ocean warming, deoxygenation, acidification, and other climate change impacts. The leading approach to adaptation for biodiversity of the marine environment is increasing its resilience by reducing other threats, for example by creating marine protected areas, as discussed in chapter 2 above. The BBNJ Agreement states resilience as an objective for taking measures such as area-based management tools, including marine protected areas:

> The objectives of this Part are to: … protect, preserve, restore and maintain biodiversity and ecosystems, including with a view to enhancing their productivity and health, and strengthen resilience to stressors, including those related to climate change, ocean acidification and marine pollution …[209]

147. Resilience for marine ecosystems can be defined as "the capacity of a system to maintain functioning, structure, and feedbacks in the face of disturbance."[210] Management of human activities that negatively affect these ecosystems can improve their ability to be resilient when confronted with warming water temperature, reduced oxygen availability, changing pH and other impacts. For example, managing fishing intensity on salmon in Bristol Bay, Alaska can preserve the diversity of subpopulations whose varied spawning times and

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[208] UN, *The Second World Ocean Assessment: Volume II* (UN, 2022), p. 64. "Proposed actions to lessen the impacts of ocean acidification and to build resilience are primarily intended to reduce CO2 emissions but also include: reduction of pollution and other stressors (such as overfishing and habitat damage); seaweed cultivation and seagrass restoration; water treatment, (e.g., for high-value aquaculture); adaptation of human activities such as aquaculture; and repair of damaged ecosystems (Cooley and others, 2016), for example, through the rewilding of the ocean."

[209] Draft BBNJ Agreement, Article 17(b).

[210] Bernhardt and Leslie, "Resilience to Climate Change," p. 371; M. Nyström, C. Folke, and F. Moberg, "Coral reef disturbance and resilience in a human-dominated environment", *Trends in Ecology and Evolution*, (2000) 15(10):413.

locations in turn allows greater adaptation of the species to environmental changes.[211] Other aspects of diversity at the genetic, species and ecosystem levels are understood to similarly increase resilience to harmful impacts, including those of climate change.[212]

148. Rapidly implementing area-based management tools, including marine protected areas, both within and beyond national jurisdiction is likely to be one of the most effective ways to implement Article 192.

## III. Protecting the marine environment by performing environmental impact assessment that considers the cumulative effects of climate change, ocean acidification and related impacts is an essential measure to protect and preserve the marine environment with respect to climate change impacts, including ocean acidification

149. Activities that can have significant harmful impacts on the marine environment are subject to environmental impact assessment, which increasingly requires assessment of the consequences of climate change, ocean acidification and related impacts.[213] Even activities that are not themselves harmful can have cumulative negative impacts when they increase in frequency or scale or are synergistic with other activities. Ocean warming, deoxygenation, acidification, changes in ocean circulation and the carbon pump, can exacerbate the harm from activities that might otherwise not meet the threshold of "significant".[214]

150. Environmental impact assessment is a tool that allows a State to prevent activities under its jurisdiction and control from harming the marine environment, consistent with its obligations under Article 192. During the assessment, a State notifies other States of its plans, consults with them, collects information about its proposed activities, examines alternatives (best practice includes the option of not undertaking the activity), and through this process should prevent or minimize harmful effects.[215]

151. The Convention and customary international law have established the obligation to conduct environmental impact assessment.[216] Assessment has been described both as a direct obligation of the State and as an element of a State's due diligence obligation to oversee those under its jurisdiction and control, in the context of sponsoring deep seabed mining contractors

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[211] Bernhardt and Leslie, "Resilience to Climate Change," p. 375.
[212] Ibid, pp. 375-376.
[213] See generally Inter-American Commission on Human Rights, *Indigenous and Tribal Peoples' Rights over Their Ancestral Lands and Natural Resources: Norms and Jurisprudence of the Inter-American Human Rights System* (IACHR 2009) OEA/Ser.L/V/II. Doc. 56/09, paras. 252-259; *Case of the Saramaka People v. Suriname* (Judgment) [2007] IACHR Series C No. 172, para. 129. See also *Case of the Saramaka People v. Suriname* (Interpretation of the Judgment on Preliminary Objections, Merits, Reparations, and Costs) [2008] IACHR Series C No. 185 paras. 40-41.
IUCN World Conservation Congress (2012, Jeju), WCC-2012-Rec-154-EN ("CONCERNED that the cumulative impacts of the range of threats faced by the GBRWHA have the potential to cause significant damage to one of the most iconic protected areas on earth … coral reef ecosystems are amongst the most vulnerable natural systems to the impacts of climate change, and that the GBRWHA has previously experienced mass coral mortality from extreme climate events").
[214] Bernhardt and Leslie, "Resilience to Climate Change".
[215] This is consistent with the Inter-American Court of Human Rights. See *Case of the Saramaka People v. Suriname* (Interpretation of the Judgment) para. 41.
[216] UNCLOS, Article 206; Seabed Mining Advisory Opinion, para. 145 and operative part; *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, p. 14, para. 204.

in the Area.[217] The International Court of Justice, too, found that there is an international obligation to conduct an environmental impact assessment "where there is a risk that [a] proposed industrial activity may have a significant adverse impact in a transboundary context, in particular, on a shared resource."[218]

152. The Convention requires States Parties to assess potentially harmful activities and to report the results to all States, through the competent international organizations.[219] Assessment is necessary 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," under Article 206. Further explanation beyond this minimal description of what is required by the Convention can be found in the decisions of this Tribunal and the International Court of Justice, and in customary international law.

153. Most immediately pertinent, is the state practice and *opinio juris* reflected in the BBNJ Agreement text.[220] As an implementing agreement to the Convention that has been under formal negotiation since 2015,[221] it represents the views of the majority of States Parties as well as States that are not parties to the Convention on how to operationalize Article 206.

154. The BBNJ Agreement includes cumulative effects analysis as an important environmental impact assessment measure to take account of climate change and ocean acidification impacts. Other specific steps for environmental impact assessment delineated in the BBNJ Agreement are relevant, but do not need to be recited here. "Cumulative impacts" are defined in Article 1 of the BBNJ Agreement as, "the combined and incremental impacts resulting from different activities, including known past and present and reasonably foreseeable activities, or from the repetition of similar activities over time, and the consequences of climate change, ocean acidification and related impacts."

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[217] Seabed Mining Advisory Opinion, paras. 122, 141.

[218] *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, p. 14, para. 204. See also *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua) and Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica)*, Judgment, I.C.J. Reports 2015, p. 665, para. 104 (If an EIA indicates that there is a risk of significant transboundary harm, the state with jurisdiction and control over 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"); *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Courts Judgment of 20 December 1974 in the Nuclear Tests (New Zealand v. France) Case,* Order, I.C.J. Reports 1995, p. 288, para. 5 ("New Zealand contends that, both by virtue of specific treaty undertakings ... and customary international law derived from widespread international practice, France has an obligation to conduct an environmental impact assessment before carrying out any further nuclear tests"; *Gabčíkovo-Nagymaros Project (Hungary/Slovakia)*, Judgment, I.C.J. Reports 1997, p. 7 (Separate Opinion of Vice- President Weeramantry).

[219] UNCLOS, Arts. 205, 206.

[220] Draft BBNJ Agreement, Part IV-Environmental Impact Assessments, Arts. 27-39.

[221] UN General Assembly, Res 69/292 "Development of an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction", UN Doc A/RES/69/292 (19 June 2015).

155. Cumulative effects related to GHG pollutants can occur when, for example, warming waters drive an already heavily fished stock to new, cooler waters.[222] The declining health of the Great Barrier Reef is associated with the cumulative effects of "climate change, (cyclonic) storms and flooding, nutrient and sediment run-off from land use, pollutants (including pesticides, marine debris, plastics, nanoparticles, noise and light), human uses of the marine environment and disease"[223]

156. The Second World Ocean Assessment expressed the need for cumulative impact assessment because,

> There continues to be a lack of quantification of the impacts of pressures and their cumulative effects. A general failure to achieve the integrated management of human uses of coasts and the ocean is increasing risks to the benefits that people draw from the ocean, including in terms of food safety and security, material provision, human health and well-being, coastal safety and the maintenance of key ecosystem services.[224]

157. Cumulative impact assessment methodologies are described in the Second World Ocean Assessment and other guidelines developed for national use can be adapted to address the kind of transboundary impacts that are understood to occur in relation to greenhouse gas pollutants.[225]

158. A crucial point, with respect to the obligations of States in relation to climate change, is the need to consider the activity in question in the context of the climate-changed world where it will take place. Previously, assessments assumed a "static" world, one where environmental conditions were not changing in any significant way. Scientific evidence indicates that conditions are not only changing, but doing so more rapidly than even the IPCC reports indicated.[226] The Second World Ocean Assessment recommends that, in addition to considering past and current activities, cumulative impact assessment should also provide for "foresighting".[227]

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[222] UN, *The Second World Ocean Assessment: Volume II* (UN, 2022), ch. 25 (Cumulative Effects); see also Keith Brander, "Impacts of climate change on fisheries", *Journal of Marine Systems*, (2010) 79(3): 389; AE Bates et al., "Defining and observing stages of climate-mediated range shifts in marine systems shared fish stocks", *Global Environmental Change* (2014) 26:27; Ove Hoegh-Guldberg and John F. Bruno, "The impacts of climate change on the world's marine ecosystems," *Science*, 328(5989): 1523; Ove Hoegh-Guldberg, "Coral Reef Ecosystems under Climate Change and Ocean Acidification," *Frontiers in Marine Science* (2017) 1:4.

[223] UN, *The Second World Ocean Assessment: Volume II* (UN, 2022), ch. 25, p. 404; IUCN World Conservation Congress (Jeju, 2012), WCC-2012-REC-154-EN "Protecting the Great Barrier Reef World Heritage Area of Australia" (IUCN expressed concern "that the cumulative impacts of the range of threats faced by the GBRWHA have the potential to cause significant damage to one of the most iconic protected areas on earth).

[224] UN, *The Second World Ocean Assessment: Volume I* (UN, 2021), ch. 1, p. 5.

[225] UN, *The Second World Ocean Assessment: Volume II* (UN, 2022), ch. 25; and see e.g., Swedish Agency for Marine and Water Management, "Symphony – a tool for ecosystem-based marine spatial planning" (*Swedish Agency for Marine and Water Management*, 2 September 2020) <https://www.havochvatten.se/en/eu-and-international/marine-spatial-planning/swedish-marine-spatial-planning/the-marine-spatial-planning-process/development-of-plan-proposals/symphony---a-tool-for-ecosystem-based-marine-spatial-planning.html> accessed 24 May 2023.

[226] IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2022), p. 42.

[227] UN, *The Second World Ocean Assessment: Volume I* (UN, 2021), ch. 1, p. 14.

159. This discussion focuses on the role of cumulative impact analysis that includes the effects of climate change and ocean acidification in environmental impact assessment; cumulative impact analysis is also one of the criteria that must be considered in proposals for area-based management tools, including marine protected areas, to be adopted by the BBNJ Conference of Parties.[228]

160. An objective of the BBNJ Agreement is to "support consideration of cumulative impacts" when operationalizing the provisions of the Convention on environmental impact assessment for areas beyond national jurisdiction.[229] This is an essential part of the process to "ensure that activities covered by this Part are assessed and conducted to prevent, mitigate and manage significant adverse impacts for the purpose of protecting and preserving the marine environment."[230]

161. Thus, the agreed text requires consideration of the cumulative impacts of climate change and ocean acidification when a State considers whether an activity in areas beyond national jurisdiction over which it has jurisdiction or control may have more than a minor or transitory effect on the marine environment, or when the effects of the activity are unknown or poorly understood.[231] If this screening determines that there are "reasonable grounds for believing that the activity may cause substantial pollution of or significant and harmful changes to the marine environment" a full environmental impact assessment must be conducted.[232] The cumulative impacts analysis is then a part of the full environmental impact assessment review and report.[233] More specific standards or guidelines for cumulative impact analysis will be developed by the BBNJ Agreement's Scientific and Technical Body.[234]

162. Environmental impact assessment can also be understood as a process that effectuates the duty to consult with and pay due regard to the rights of other States. The weight of this duty is expressed by the arbitral tribunal in the *Chagos Archipelago Arbitration*:

> procedural rules exist elsewhere in international environmental law, for instance in the general international law requirement to carry out an environmental impact assessment in advance of large scale construction projects ... such procedural rules may, indeed, be of equal or even greater importance than the substantive standards existing in international law. In the [Arbitral] Tribunal's view, the obligation to consult with and have regard for the rights of other States, set out in multiple provisions of the Convention, is precisely such a procedural rule.[235]

163. States, in fulfilling their general obligation to protect and preserve the marine environment, have an obligation to conduct environmental impact assessments that include the cumulative effects of climate change, ocean acidification, deoxygenation and other related harms. In most contexts, environmental impact assessment, including cumulative

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[228] Draft BBNJ Agreement, Article 19, Annex I (q).
[229] Ibid, Article 27(c).
[230] Ibid, Article 27(b).
[231] Ibid, Article 30(1)(a)(ii).
[232] Ibid, Article 30(1)(b).
[233] Ibid, Article 31(1)(b), (c), 33(2).
[234] Ibid, Article 38(1)(b).
[235] Chagos Archipelago Arbitration, para. 322.

effect analysis, will need to include socio-economic impacts as well as ecological and physical dimensions.

164. Strategic environmental assessment is emerging as a practice in international law that is associated with environmental impact assessment. States declined to define it in the BBNJ Agreement text, but did find enough value in various proposals to include it in the treaty.[236] An indication of its growing use in relation to international commitments, the World Heritage Committee encouraged the Australian Government to "ensure comprehensive assessment of the impacts of mining and gas expansion, including consideration of cumulative impacts and use of strategic assessments where appropriate."[237]

## IV. States Parties owe due regard for low-lying island and coastal States' right to a stable global climate system given their dependence on the physical marine environment

165. States Parties' activities "in exercising their rights and performing their duties" under the Convention, are conditioned on giving due regard to the rights and duties of other States.[238] The *Chagos Archipelago Arbitration* tribunal found that rights and duties included those "as they otherwise arise as a matter of international law, as well as … under the Convention."[239] The present Tribunal, in its SRFC Advisory Opinion, observed that due regard is an element in the obligations flowing from Article 192, as it observed that "in exercising their rights and performing their duties under the Convention ... they must have due regard to the rights and duties of one another. This flows from ... the States Parties' obligation to protect and preserve the marine environment, a fundamental principle underlined in articles 192 and 193 of the Convention".[240] Chapter 3 examines the duties relevant to the Convention that States have undertaken under the UNFCCC, the Paris Agreement, and MARPOL Annex VI. These duties are complementary to the rights of other States. For example, a coastal State that exercises its sovereign rights to explore, exploit, conserve and manage the natural resources of the water column in its EEZ must do so with due regard to the rights of other States to a safe climate and an ocean unaffected by processes of acidification and deoxygenation.

166. The existential threat from climate change to the continuation of some States Parties positions their right to territorial integrity in new terms that should be taken into account when assessing the respective rights and duties of States Parties under the Convention. States have a fundamental right to non-infringement of territorial integrity that international law normally addresses as a matter of peace and national security in contexts such as the UN Charter, Article 2 and the Convention, Article 301.[241] Obligations to prevent transboundary

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[236] Draft BBNJ Agreement, Article 27(d), (f).

[237] United Nations Educational, Scientific and Cultural Organization (UNESCO), World Heritage, Mission Report-Great Barrier Reef (2012).

[238] UNCLOS, Arts. 56(2) (Rights, jurisdiction and duties of the coastal State in the exclusive economic zone), 58 (Rights and duties of other States in the exclusive economic zone), 60 (Artificial islands, installations and structures in the exclusive economic zone), 87 (Freedom of the high seas).

[239] Chagos Archipelago Arbitration, para. 293.

[240] SRFC Advisory Opinion, para. 216.

[241] United Nations Charter (adopted 26 June 1945, entered into force 24 October 1945) 1 UNTS XVI, Article 2(4) ("[a]ll Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state") and similar language in UNCLOS Article 301. See also *M/V "SAIGA" (No. 2)* (*Saint Vincent and the Grenadines v. Guinea*), Judgment, ITLOS Reports 1999,

harms, which have been applied to environmental threats, are not ordinarily understood to apply to existential threats. The legal regime governing peace and national security assumes intent on the part of a belligerent State to harm other States and it is assumed to address the threat or use of force against another State; it is therefore not directly relevant to States' rights to retain their territory vis-à-vis environmental impacts. However, the gravity of the present impacts of climate change exceeds the expectations of the "no harm" legal regime that has developed in contemporary international law for transboundary impacts and that has shaped understanding of what is required in fulfilling the obligation.

167. The Convention establishes the maritime sovereignty of a State "beyond its land territory".[242] Continued greenhouse gas emissions threaten the land territory of small islands and low-lying coasts, and their coastal and marine environments. The IPCC reports document increased flooding events due to sea level rise in small islands which have degraded and threatened land territories and coastal areas. Studies cited in the IPCC Sixth Assessment Report, confirmed that projected changes in the wave climate superimposed on sea level rise, will rapidly increase flooding in small islands.[243] In particular, one study cited showed that even a 5–10-cm additional sea level rise (expected around 2030–2050) will double flooding frequency in much of the Indian Ocean and Tropical Pacific, while tropical cyclones will remain the main driver of (rarer) flooding in the Caribbean Sea and Southern Tropical Pacific. Some Pacific atolls, which are already experiencing major flooding now, will likely experience flooding over their entire surface from the 2060s–2070s.[244] Where coral reefs now buffer flooding events, these flooding events will be exacerbated with coral reef decline.[245] The IPCC notes that even at the 1.5°C threshold of the Paris Agreement, small islands will experience significant degradation or destruction of marine resources, including the loss of coral reefs. The report states, "[e]ven achieving emission reduction targets consistent with the ambitious goal of 1.5°C of global warming under the Paris Agreement will result in the further loss of 70–90 percent of reef-building corals compared to today, with 99 percent of corals being lost under warming of 2°C or more above the pre-industrial period."[246] These losses will have cumulative ecological and socio-economic impacts, including increased flooding events, detrimental impacts to food security, health, fisheries, tourism and recreational activities.

## V. Marine scientific research, capacity building and technology transfer are essential measures to protect and preserve the marine environment with respect to climate change impacts, including ocean acidification

168. Marine scientific research is just beginning to provide the information that is necessary to "protect and preserve the marine environment" in relation to GHG emissions and other impacts of climate change,[247] which is an essential complement to the management

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p. 10, paras. 15, 155; *Guyana v. Suriname* (Award of the Arbitral Tribunal of 17 September 2007) PCA Case no 2004-04. Note that this is distinct and different from questions of territorial sovereignty.

[242] UNCLOS, Arts. 2-16.

[243] IPCC, Sixth Assessment Report, Working Group II, Small Islands, Ch. 15, p. 2055 (noting that attribution to sea level rise is complex, and there can be highly contrasting exposure profiles between ocean sub-regions).

[244] Ibid, p. 2046.

[245] Ibid.

[246] Ibid, p. 2056.

[247] Bernhardt and Leslie, "Resilience to Climate Change", (n 239) p. 376 ("We still have much to learn about the roles of biological diversity in generating ecological resilience. … This information will be critical to

activities discussed in this Statement so far. The Convention's Part XIII chiefly addresses the rules for conducting marine scientific research in national and international waters. It emphasizes access and international cooperation while guarding States sovereign rights and jurisdiction, expressed most succinctly in Article 242

> 1. States and competent international organizations shall, in accordance with the principle of respect for sovereignty and jurisdiction and on the basis of mutual benefit, promote international cooperation in marine scientific research for peaceful purposes.
>
> 2. In this context, without prejudice to the rights and duties of States under this Convention, a State, in the application of this Part, shall provide, as appropriate, other States with a reasonable opportunity to obtain from it, or with its cooperation, information necessary to prevent and control damage to the health and safety of persons and to the marine environment.

169. The Convention's Part XIV, Development and Transfer of Marine Technology is another necessary complement to the management measures required under Part XII. The scientific record for developing States has major gaps, including baseline ecological information, climate change impacts on ecosystems, exacerbating anthropogenic factors, and impacts on human communities.[248] Article 266 calls for States Parties to "cooperate in accordance with their capabilities to promote actively the development and transfer of marine science and marine technology on fair and reasonable terms and conditions." The BBNJ Agreement recognizes "that support for developing States Parties through capacity-building and the development and transfer of marine technology are essential elements for the attainment of the objectives of the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction" and seeks to implement capacity building and transfer of marine technology.[249]

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forecasting the role of diversity in ameliorating ecosystem responses to climate change over the next century. However, adaptation to climate change impacts by people and other species is already under way and will not pause while multidecadal studies are completed. In light of this changing social-ecological context, adaptive management strategies, which incorporate new knowledge of ecosystem functioning as it becomes available, will be critical").

[248] IPCC, Sixth Assessment Report, Working Group II, Small Islands, Ch. 15, notes research gaps that include developing island-scale data availability, adaptation and resilience.

[249] Draft BBNJ Agreement, Preamble, Arts. 9(b), 14(2)(f), 17(e), 27(f), 31(3), 40-46, 51(3), 52, Annex II.

# CHAPTER 5

## MARINE GEOENGINEERING TECHNOLOGIES ACTIVITIES ARE SUBJECT TO THE OBLIGATION TO PROTECT AND PRESERVE THE MARINE ENVIRONMENT AND MAY BE REGULATED AS POLLUTION OF THE MARINE ENVIRONMENT

170. As outlined in chapter 2, marine geoengineering activities are a potential pathway of pollution of the marine environment from anthropogenic GHG emissions to the extent that such activities involve the direct introduction of a substance ($CO_2$) into the marine environment and have a deleterious effect on the marine environment. When this could be the case, States Parties must take measures to protect and preserve the marine environment, including assessing and reporting the potential effects, subject to Articles 1(1)(4), 192, 205 and 206 of the Convention. They have additional obligations under the Convention's provisions regulating pollution.

171. Under Article 194(2), States Parties must ensure that activities under their jurisdiction or control are conducted so as not to cause damage by pollution to other States and their environment; this general obligation to control pollution is applicable to marine geoengineering activities. In the effort to achieve, rapid, deep, and immediate GHG emissions, States Parties that are undertaking marine geoengineering, regardless of the technique employed, must consider the potential effects of marine geoengineering on the marine environment and whether they might constitute pollution. The novelty of geoengineering technologies, the uncertainty regarding their effects on the marine environment, and potential for significant harm mean that States Parties must exercise precaution in both geoengineering research and deployment.

172. Article 195 explicitly requires States Parties to avoid transferring damage or hazards from one area to another or transforming one type of pollution into another. This warning applies to forms of geoengineering that remove excess $CO_2$ from the atmosphere and transfer it to marine waters if so doing might harm the marine environment.

173. Further, Article 196 requires States Parties to take all measures necessary to prevent, reduce and control pollution of the marine environment from GHG emissions "from the use of technologies under their jurisdiction and control, or the intentional … introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto." It is foreseeable that technologies to enhance blue carbon might include the creation of new species or use of alien species of seagrasses, phytoplankton, or other life forms. These articles together counsel precaution in the research, field testing and deployment of geoengineering technologies.

174. When a marine geoengineering activity may cause pollution of the marine environment as defined in Article 1(1)(4) of the Convention, it also constitutes pollution from "dumping" and accordingly triggers obligations of States Parties to address pollution from dumping activities. The following sections first argue that certain marine geoengineering activities fall within the definition of dumping and second, outline the applicable obligations on State Parties to address pollution of the marine environment from these activities under the dumping regime set out in the Convention.

175. Carbon capture and sequestration can be considered "dumping" within the meaning of the Convention. The Convention defines dumping as "any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea," in Article 1(1)(5). Direct injection of $CO_2$ into the water or seabed can be considered disposal of a waste. Placement of substances like iron (for ocean fertilization) or olivine (to enhance ocean alkalinity) might not be considered disposal; however, while Article 1(1)(5) excludes from dumping "the placement of matter for a purpose other than the mere disposal thereof," that exclusion only applies "provided that such placement is not contrary to the aims of the Convention." Therefore, any placement of matter that is contrary to the aims of the Convention – which include the protection and preservation of the marine environment and the conservation of its living resources – can be considered "dumping" under the Convention.

176. States Parties will need to adopt national laws and regulations to manage geoengineering activities that might cause pollution of the marine environment, and they must try to establish global and regional rules, standards, and recommended practices and procedures. Similarly to other pollution-related provisions, Article 210 directs States Parties to adopt a national legal regime and to take other measures necessary to prevent, reduce and control pollution of the marine environment from dumping. Different from the requirements for land-based sources of pollution, Article 210 also includes the requirement of State permission for any dumping, and a floor for national laws, regulations and measures: they must be no less effective than the global rules and standards. Where a different coastal State is involved, dumping in its EEZ is subject to its regulatory control.

177. Global rules and standards, called for by Article 210 of the Convention, are being developed, *inter alia*, through the Convention on Biological Diversity,[250] the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, and its 1996 London Protocol ("London Convention" and "London Protocol," respectively). It warrants note that Article 210 (6) obliges UNCLOS States Parties to adopt national laws, regulations and measures which shall be no less effective than "global rules and standards." The number of ratifications of these instruments is not determinative of whether a rule or standard is "global."[251] Many of the resolutions and guidelines discussed next are indicative or have been adopted by meetings of treaty parties but have not entered into force.

178. Amendments and resolutions under the latter two instruments define dumping coherently with the Convention and indicate how States have defined geoengineering in the marine environment. The 1996 London Protocol defines dumping, inter alia, as "any storage of wastes or other matter in the seabed and subsoil thereof from vessels, aircraft, platforms or other man-made structures at sea."[252]

179. More recent non-binding resolutions endorsed under both the London Convention and the London Protocol are also reflective of subsequent practice of many States Parties to the Convention.[253] The 2006 amendment to the London Protocol added to the definition of

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[250] UNEP/CBD/COP/dec/ix/16 (2008); UNEP/CBD/COP/dec/x/33, 8(w) (2010); UNEP/CBD/COP/dec/xi/20 (2012) at para. 16(b).

[251] R. Churchill, V. Lowe, and A. Sander, *The Law of the Sea*, Fourth Edition (2022) p. 669

[252] 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted 7 November 1996, entered into force 24 March 2006) ATS 11 Article 1(4)(1)(3).

[253] Eighty out of the 87 Parties to the 1972 London Convention are parties to the Convention, and 51 out of the 53 Parties to the 1996 London Protocol are parties to the Convention.

dumping, "carbon dioxide streams from carbon dioxide capture processes for sequestration" in sub-seabed geological formations.[254] A 2013 resolution, not yet in force, defined marine carbon sequestration as "a deliberate intervention in the marine environment to manipulate natural processes, including to counteract anthropogenic climate change and or its impacts, and that has the potential to result in deleterious effects, especially where those effects may be widespread, long lasting or severe."[255]

180. It permits dumping carbon dioxide streams for sequestration provided that disposal is into a sub-seabed geological formation; the streams consist overwhelmingly of carbon dioxide; and no other wastes or other matter are added for the purpose of disposing those wastes or other matter.[256] Thus, carbon capture and sequestration into the seabed is permitted, subject to the relevant provisions of the London Protocol.[257]

181. In 2008, Parties to those agreements confirmed that the "scope of the London Convention and Protocol includes ocean fertilization activities" and that "ocean fertilization activities [other than legitimate scientific research] ... should be considered as contrary to the aims of the Convention and Protocol." Moreover, the resolution asserted that "given the present state of knowledge, ocean fertilization activities other than legitimate scientific research should not be allowed."[258]

182. Direct disposal of $CO_2$ in the water column is not permitted under the Protocol. The 2009 amendment to the London Protocol, not in force,[259] would permit the export of a $CO_2$ waste stream for disposal provided that an agreement has been entered into by the countries concerned.

183. The 2010 resolution of the meeting of the Parties to the London Convention and the London Protocol adopted the "Assessment Framework for Scientific Research Involving Ocean Fertilization," which emphasized the importance of consultation, notification, and reporting.[260] It left the assessment of scientific research proposals on a case-by-case basis to the States.

184. Accordingly, States Parties must treat geoengineering research and any potential plan for deployment under the same obligations that apply to other activities that might pollute or

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[254] IMO, Notification of entry into force of the $CO_2$ Sequestration amendments to Annex 1 to the London Protocol 1996 (16 February 2007) IMO Doc LC-LP.1/Circ.11.
[255] 2013 Amendment to the London Protocol, Article 1(5) *bis*.
[256] IMO, "Resolution LP.1(1) on the Amendment to Include CO2 Sequestration in Sub-Seabed Geological Formations in Annex 1 to the London Protocol" (2 November 2006) (entered into force 10 February 2007).
[257] These include Annex 2; and two sets of guidelines adopted by the Scientific Group of the London Protocol. Joint session of the 28th Consultative Meeting of Contracting Parties under the London Convention and the 1st Meeting of Contracting Parties under the London, Risk Assessment and Management Framework for CO2 Sequestration in Sub-seabed Geological Structures (2006) LC/SG-CO2 1/7; IMO, 2012 Specific Guidelines for Assessment of Carbon Dioxide Streams for Disposal into the Sub-Seabed Geological Formations (2 November 2012) LC 34/15.
[258] IMO, Res. LC-LP.1, Regulation of Ocean Fertilization (31 October 2008) LC 30/16.
[259] The 14th Meeting of the Contracting Parties to the Protocol on 11 October 2019 decided to allow the provisional application of the 2009 amendment pending its entry into force by those Contracting Parties which are, to date, Norway, Netherlands, Denmark, Korea, United Kingdom, Belgium, Sweden.
[260] IMO, Res. LC-LP.2, Assessment Framework for Scientific Research Involving Ocean Fertilization (2010); see also IMO, Res. LP.4(8) on the Amendment to the London Protocol to Regulate the Placement of Matter for Ocean Fertilization and other Marine Geoengineering Activities" (adopted 18 October 2013, not in force).

otherwise cause significant harm to the marine environment, found in Part XII of the Convention and discussed in chapters above. They must not transfer damage or hazards from GHG emissions to the marine environment. They must continue to cooperate on a global and regional basis to formulate and adopt international rules, standards and recommended practices and procedures consistent with the Convention to prevent harms. They must comply with their obligations to conduct environmental impact assessment, monitoring and reporting. And they must take all measures necessary to ensure that geoengineering activities under their jurisdiction and control do not cause pollution to other States or to areas beyond national jurisdiction.

# CHAPTER 6

# CONSIDERATIONS FOR DEVELOPING STATES

185. Section I of this chapter explains that the capabilities of States Parties in fulfilling their obligations to protect and preserve the marine environment may be relevant if expressly mentioned by the relevant primary obligation in the Convention and depending on the level of scientific knowledge and technical capacity of the State Party. Section II observes that, under the Convention, developing States Parties are entitled to technical assistance from States Parties and competent international organizations in the fulfilment of their obligations to prevent, reduce and control pollution of the marine environment from GHG emissions.

## I. Capabilities of States Parties in fulfilling their obligations to protect and preserve the marine environment are relevant in certain circumstances

186. It is widely acknowledged that while all States are vulnerable to the adverse impacts of climate change caused by anthropogenic GHG emissions, developing States, particularly Small Island Developing States and least developed States, are particularly vulnerable to these adverse effects and have considerable capacity constraints in addressing such impacts.[261] The COSIS request for an advisory opinion asks what are the specific obligations of States Parties under the Convention to prevent, reduce and control pollution of the marine environment in relation to the deleterious effects that result or are likely to result from climate change, including through ocean warming and sea-level rise and ocean acidification, which are caused by anthropogenic GHG emissions in the atmosphere.

187. An important question is whether developing States are entitled to differential treatment in respect of the fulfilment of these specific obligations. The capabilities of States Parties to fulfill these obligations are relevant if expressly mentioned by the relevant primary obligation in the Convention and other relevant sources of international law and depending on the level of scientific knowledge and capabilities of the State Party under discussion. The nature of the activity and the relevance of other instruments, such as the Paris Agreement, will also have an influence.

188. At the outset, it may be observed that States Parties' obligations under the Convention to prevent, reduce, and control pollution of the marine environment from GHG emissions apply equally to both developing States and developed States. In its Seabed Mining Advisory Opinion, the Chamber found that the general provisions concerning the responsibilities and liabilities of States Parties sponsoring deep seabed mining in the Area apply equally to all sponsoring States, whether developing or developed.[262] This "equality of treatment" was deemed necessary to prevent the spread of sponsoring States of convenience which "would jeopardize uniform application of the highest standards of protection of the marine environment, the safe development of activities in the Area and the protection of the common heritage of mankind."[263] The same reasoning, particularly the need to ensure the "uniform application of the highest standards of protection of the marine environment" would also apply in the present context, particularly when a developing State acts as a flag State.

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[261] UNFCCC, *Climate Change: Small Island Developing States* (Climate Change Secretariat of the UNFCCC, 2005), pp. 5, 14.
[262] Seabed Mining Advisory Opinion, para. 158.
[263] Ibid, para. 159.

189. That said, and as confirmed by the Chamber in the Seabed Mining Advisory Opinion, this does not mean that there is no scope for differential treatment between developing and developed States. The Chamber acknowledged that when the primary obligation explicitly referred to different capabilities of States it might entail some level of differentiation. The Chamber cautioned, however, that the reference to "different capabilities" in a primary obligation "is only a broad and imprecise reference to the differences in developed and developing States" and "what counts in a specific situation is the level of scientific knowledge and technical capability available to a given State in the relevant scientific and technical fields."[264]

190. In the context of the present request to ITLOS, developing States might be held to a less stringent standard than developed States in meeting their obligations under the Convention to prevent, reduce and control pollution of the marine environment from GHG emissions. Based on the Chamber's reasoning, this will depend first, on whether the relevant primary obligation explicitly mentions that the obligation shall be applied according to their capabilities, and second, on "the level of scientific knowledge and technical capacity available to a given State in the relevant scientific and technical fields,"[265] This is consistent with the "variable" nature of the due diligence obligation which allows the economic capacity of a state to be taken into consideration in determining whether a state has complied with a certain obligation. At the same time, "a state's economic level cannot be used to dispense the state from its obligations."[266] It is pertinent to note that in the Chamber's Seabed Mining Advisory Opinion, with the exception of Nauru (which had initiated the request and naturally argued for differentiated obligations between developing and developed States), the submissions of other States that specifically addressed this issue did not argue for differentiation in the obligations for developing sponsoring States. For example, the Philippines did not explicitly argue for differentiated responsibilities for developing States but observed that the Area is the common heritage of mankind; that the special interests and needs of developing States must be considered in order for them to be given equal opportunity to participate in activities in the Area; and that lack of financial and technical capabilities should not hinder a country from participating.[267] Other States such as the United Kingdom, the Russian Federation, Australia and Germany all argued that there should not be differentiation in obligations for developing sponsoring States.[268] Germany acknowledged that the common but differentiated responsibilities principle is becoming widely accepted in international environmental law but that it is always explicitly provided for in treaties.[269] In its submission, IUCN argued that the Convention promotes developing State participation in the Area to the extent specifically provided for in Part XI, but that this does not include diminished responsibility in the context of sponsorship of activities in the Area.[270]

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[264] Seabed Mining Advisory Opinion, para. 161.
[265] Ibid, para. 162.
[266] ILC, "Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, with commentaries" in *Report of the International Law Commission on the work of its fifty-third session* (23 April–1 June and 2 July–10 August 2001), UN Doc A/56/10, Commentary to Article 3.
[267] Written Statement of the Republic of the Philippines, p. 4.
[268] See e.g., Written Statement of the United Kingdom of Great Britain and Northern Ireland (29 July 2010), para. 3.6; Written Statement of the Russian Federation, paras. 9-10; Written Statement of Australia (19 August 2010), para. 21; Written Statement of the Federal Republic of Germany (18 August 2010), paras. 16, 19 and 21.
[269] Written Statement of the Federal Republic of Germany (18 August 2010), para. 16.
[270] Written Statement of IUCN (10 August 2010), paras. 59-60. See also Statement of Stichting Greenpeace Council (Greenpeace International) and World Wide Fund for Nature (13 August 2010), p. 16.

191. What this means for present purposes is that an assessment of whether a State Party that is a developing State is subject to a less stringent standard in fulfilling the relevant obligation is context-specific requiring a textual analysis of the primary obligations as well as an assessment of the particular capabilities of a State. For these reasons, only general observations can be made, and such observations are confined to an analysis of whether the primary obligations to prevent, reduce and control pollution of the marine environment from GHG emissions detailed in previous sections explicitly contextualize obligations by reference to "capabilities."

192. Article 193 obliges States Parties to ensure that exploitation of natural resources pursuant to a State's environmental policies shall be done in accordance with its duty to protect and preserve the marine environment; and in Article 194(1) to take individually or jointly as appropriate, all measures consistent with the Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source "using the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavor to harmonize their policies in this connection." Earlier versions of Article 193 recognized that States have the sovereign right to exploit their natural resources taking into account "their economic needs and their programmes for economic development."[271] However, it was ultimately amended to remove the reference to "economic needs and economic development" and instead replaced with "in accordance to their environmental policies,"[272] mirroring Principle 21 of the 1972 Stockholm Declaration. Similarly, the inclusion of "best practicable means at their disposal and in accordance with their capabilities," in Article 194(1) reflected the concerns of developing States that their economic growth might be impacted due to the imposition of obligations to protect the marine environment. These qualifications are intended to contextualize the obligations in Articles 193 and 194 and are a recognition that not all States have the same capacity to take measures to protect and preserve the marine environment. While these general obligations expressly mention the capabilities of States, the extent to which this will result in a less strict standard being applied to a State in assessing whether they have met their obligations to prevent, reduce and control pollution of the marine environment from GHG emissions from any source will depend on the level of scientific knowledge and technical capacity available to a given State.

193. Regarding source-specific obligations to prevent, reduce and control pollution of the marine environment from GHG emissions set out in Articles 207-212, only Article 207 on pollution from land-based sources mentions the need to consider "the economic capacity of developing States and their need for economic development." Specifically, Article 207(4) provides:

> States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, taking into account characteristic regional features, the economic capacity of

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[271] See, e.g., Third United Nations Conference on the Law of the Sea, "Working papers of the Plenary: Informal Single Negotiating Text, Part III" (1975) UN Doc A/CONF.62/Wp.8/Part III, 171, p. 176.
[272] Third United Nations Conference on the Law of the Sea, "Working papers of the Plenary: Revised Single Negotiating Text (Part III)" (1976) UN Doc A/CONF.62/WP.8/Rev.1/Part III, 173, p. 174.

> developing States and their need for economic development. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

194. As analyzed above, the "global and regional rules, standards and recommended practices and procedures" referred to in Article 207(4) include those developed in the UNFCCC and Paris Agreement treaty regime. The Paris Agreement undoubtedly takes into account "the economic capacity of developing States and their need for economic development," mentioned in Article 207(4). It requires "all Parties … to undertake and communicate ambitious effort … while recognizing the need to support developing country Parties for the effective implementation of this Agreement."[273] It recognizes that States Parties have significant differences both in their contributions to climate challenge as well as in their capacities to address it. It is not premised on historical responsibility alone, but on an amalgamation of country-specific circumstances, notably responsibilities and capabilities. The qualifier "in the light of different national circumstances"[274] to the principle of common but differentiated responsibilities and respective capabilities introduced a dynamic and flexible element for interpreting responsibilities and capabilities, broadening the parameters of differentiation.[275] It allows for taking into account a spectrum of criteria, such as past, current, and projected future emissions, but also financial and technical capabilities, human capacity, population size and other demographic criteria, abatement costs, opportunity costs.[276] In this way, the approach to differentiation of obligations – and thus to the determination of due diligence – in the Paris Agreement is more nuanced than the strict categorization between developed and developing countries expressed in the UNFCCC.[277] States Parties' obligations are thus to be interpreted according to an evolutionary understanding of accountability for climate change, considering parties' constantly changing responsibilities, as well as their social and economic circumstances. Thus, when determining due diligence these criteria are to be given due account. Arguably, this means that Parties with higher GHG contributions and capabilities may have a more stringent level of diligence.

195. To achieve global reductions of $CO_2$ emissions of 45 percent by 2030 and global net zero emissions by mid-century, this implies that Parties that are able to do so will need to set and reach these targets much earlier to enable Parties that might need longer to also reach net zero emissions around 2050. Consequently, States with high capacity would need to cut GHG emissions and enhance removals much earlier and much deeper to ensure the global goal remains achievable. This more nuanced approach is also consistent with the Chamber's emphasis on the level of scientific knowledge and technical capacity available to a given State.

196. The articles dealing with the remaining sources of pollution (seabed activities, activities in the Area, dumping, vessels, and atmospheric sources) do not have an equivalent provision to Article 207(4) nor do they mention the capabilities or economic development of a state. Notably, activities in the Area, dumping, and vessel-source pollution all raise the concern identified by the Chamber regarding sponsoring States of convenience. However, to

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[273] Paris Agreement, Article 3.
[274] Paris Agreement, Article 2(3).
[275] L. Rajamani, "Differentiation in a 2015 Climate Agreement" (Center for Climate and Energy Solutions, 2015) p. 2.
[276] Harald Winkler et al., "What factors influence mitigation capacity", *Energy Policy* (2007) 35(1):692.
[277] C. Voigt and F. Ferreira, "Differentiation in the Paris Agreement", *Climate Law* (2016) 6(1-2):58-74, p. 66.

the extent that there is a competent international organization or conference of parties that has a mandate under the Convention to develop rules, procedures and practices and such rules reflect differential treatment in the form of contextualization of obligations, this differential treatment may be taken into account.

## II. Developing States Parties are entitled to scientific and technical assistance in the fulfilment of their obligations to protect and preserve the marine environment and to prevent, reduce and control pollution

197. In addition to the contextualization of obligations, the Convention also affirms that developing States are entitled to scientific and technical assistance. Section 3 of Part XII addresses scientific and technical assistance to developing States based on the recognition that developing States needed support to implement their environmental obligations, and this applies equally to obligations to prevent, reduce, and control pollution of the marine environment from GHG emissions. Article 202 provides that:

> States shall, directly or through competent international organizations:
> (a) promote programmes of scientific, educational, technical and other assistance to developing States for the protection and preservation of the marine environment and the prevention, reduction and control of marine pollution. Such assistance shall include, *inter alia*:
> (i) training of their scientific and technical personnel;
> (ii) facilitating their participation in relevant international programmes;
> (iii) supplying them with necessary equipment and facilities;
> (iv) enhancing their capacity to manufacture such equipment;
> (v) advice on and developing facilities for research, monitoring, educational and other programmes;
> (b) provide appropriate assistance, especially to developing States, for the minimization of the effects of major incidents which may cause serious pollution of the marine environment;
> (c) provide appropriate assistance, especially to developing States, concerning the preparation of environmental assessments.

198. Article 203 relates to the technical assistance to be provided by international organizations and stipulates that developing States shall, for the purposes of prevention, reduction, and control of pollution of the marine environment or minimization of its effects, be granted preference by international organizations in (a) the allocation of appropriate funds and technical assistance; and (b) the utilization of their specialized services. These provisions apply to the obligations of developing States to prevent, reduce, and control pollution of the marine environment from GHG emissions.

# CHAPTER 7

## PART XII OBLIGATIONS ARE SUBJECT TO ARTICLE 235 RESPONSIBILITY AND LIABILITY

199. States Parties are responsible to fulfill their obligations to prevent, reduce and control pollution of the marine environment from GHG emissions and are liable in accordance with international law. The Convention, Article 235, restates these fundamental customary international law principles with respect to Part XII. States Parties may incur liability if they fail to perform their direct obligations or fail to act with due diligence with respect to other obligations also addressed here. The 2001 ILC Draft Articles on State Responsibility explains that a State is responsible for acts or omissions that are attributable to it under international law and that constitute a breach of an international obligation.[278] Accordingly, if it can be established that a State Party has breached an obligation under the Convention to prevent, reduce and control pollution of the marine environment from GHG emissions (as outlined above) by not acting in conformity with such obligations, and that such actions are attributable to the State concerned, it has incurred responsibility.[279] The fact that many States Parties to the Convention may be in breach of their obligations to prevent, reduce and control pollution of the marine environment from GHG emissions does not prevent a claimant State from invoking the responsibility of only one.[280]

200. The legal consequences of an internationally wrongful act are cessation and non-repetition, and reparation.[281] Reparation includes satisfaction, restitution and compensation.[282] Article 235(1) does not limit responsibility and liability to circumstances where there has been damage – a State will still incur responsibility even where there is no material damage.[283] States may make political acknowledgement of responsibility, liability, and compensation obligations; in a judicial context, evidence of the breach, the harm, and its causal nexus with the respondent State's acts or omissions would all be necessary. In recent years there have been important developments in both legal systems and jurisprudence to extend reparations to breaches of environmental obligations.[284] Recognition of the importance of ecological function has led to including both restoration of the damaged environment and, where the recovery of the damaged site will be long or permanently delayed, compensatory restoration "not of the same but of similar level of resources and/ or services, including, as appropriate, at another site".[285]

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[278] ILC, Draft Articles on Responsibility of States for Internationally Wrongful Acts, with commentaries in *Report of the Commission to the General Assembly on the work of its fifty-third session* (23 April–1 June and 2 July–10 August 2001), UN Doc A/56/10, Arts. 1 and 2. ("ASR").

[279] ASR, Article 12 elaborates on what a breach of an international obligation entails. The rules on attribution are set out in Chapter II of the ASR.

[280] ASR, Article 47.

[281] ASR, Arts. 28, 30 and 31.

[282] ASR, Articles 34-37.

[283] ASR, commentary to Article 2, 36, para. 9; Seabed Mining Advisory Opinion, para. 178.

[284] Payne, Judicial Development, pp. 459-460; *see Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica/ Nicaragua)* (Judgment of 2 February 2018 on Compensation owed by Nicaragua to Costa Rica) ICJ, paras 41-42 (full reparation can require compensation for "damage caused to the environment, in and of itself").

[285] E. Brans, "Estimating Damages under the 2004 EC Directive on Environmental Liability", in F. Maes (ed), *Marine Resource Damage Assessment, Liability and Compensation for Environmental Damage* (1st ed.) (Kluwer Academic Pub, 2005), pp. 3, 23.

201. All three approaches to reparations may be relevant to damage to the marine environment from climate pollutants. For example, where a State has an obligation to adopt laws and regulations in accordance with the Convention and it has not done so, the remedy could include satisfaction: acknowledgement of the breach. It may be imagined that this would contribute to remedying the omission. Restitution, that is, re-establishing the situation which existed before the wrongful act was committed, could include in-kind measures to offset damage to the marine environment and to affected low-lying island and coastal communities. Compensation is a financial remedy that is required to address damage that is not made good by restitution. International law has now accepted various methods of valuing the environment as such, with a priority set on maintaining and restoring ecological function.[286]

202. A State Party can invoke the responsibility of another State Party as an "injured state" on the basis that the obligations to prevent, reduce and control pollution of the marine environment from GHG emissions are obligations owed to other States Parties and the State Party invoking responsibility is specially affected by that breach, for example, if the wrongful act has particular adverse effects on one State or on a small number of States.[287] States Parties may also invoke responsibility on the basis that the obligation breached is owed to States Parties to the Convention and is established for the protection of the collective interest of the group, sometimes referred to as obligations *erga omnes partes*.[288] The Chamber referred to Article 48 of the 2001 ILC Draft Articles on State Responsibility, in stating its view that any State Party to the Convention would be entitled to claim compensation in respect of damage to the marine environment of the high seas or the Area.[289] In this context, States at risk from sea level rise would be specially affected; while all States Parties to the Convention have an interest in preventing significant harm to the marine environment from climate change.

203. States Parties agreed, in Article 235(2),

> [to] ensure that recourse is available in accordance with their legal systems for prompt and adequate compensation or other relief in respect of damage caused by pollution of the marine environment by natural or juridical persons under their jurisdiction.

204. This article does not differentiate between damage within or beyond national jurisdiction.[290] Moreover, the Chamber has also identified the obligation to provide recourse

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[286] M.T. Huguenin et al., "Assessment and Valuation of Damage to the Environment", in C. Payne and P. Sand (eds), *Gulf War Reparations and the UN Compensation Commission: Environmental Liability* (Oxford University Press, 2015), pp. 67-94.

[287] ASR, Article 42(b).

[288] ASR, Article 48; see ASR, commentary to Article 48, para. 6.

[289] Seabed Mining Advisory Opinion, para. 180.

[290] Article 235 can be traced back to Principle 22 of the Stockholm Declaration. See M.H. Nordquist, S. Rosenne, L. Sohn, *United Nations Convention on the Law of the Sea 1982, Volume V: A Commentary* (1989) commentary to Arts. 235, p. 401. Article 235(2) reflects the principle of effective access to judicial remedies, as reflected in Principle 10 of the 1992 Rio Declaration which provides that "effective access to judicial and administrative proceedings including redress and remedy shall be provided," as well as the ILC's 2006 Draft Principles on Allocation of Loss, principle 6(1) which provides that "States shall provide their domestic judicial and administrative bodies with the necessary jurisdiction and competence to ensure that these bodies have prompt, adequate and effective remedies available in the event of transboundary damage caused by hazardous activities located within their territory or otherwise under their jurisdiction or control. See ILC, "Draft principles

under Article 235 as an element of a sponsoring State's due diligence obligation that serves the purpose of ensuring that the sponsoring State meets its broader liability obligations where its wrongful acts cause damage.[291] Accordingly, when natural or juridical persons under the jurisdiction or control of States Parties have caused pollution of the marine environment from GHG emissions, that State is obliged to ensure prompt and adequate compensation or other relief within its national legal system. Other relief might include, for example, in-kind assistance for ecological restoration, establishment of marine protected areas, or adaptation measures for communities injured by sea level rise.

205. Article 235(3) further requires States

> [to] cooperate in the implementation of existing international law and the further development of international law relating to responsibility and liability for the assessment of, and compensation for damage and the settlement of related disputes, as well as, where appropriate, development of criteria and procedures for the payment of adequate compensation, such as compulsory insurance or compensation funds.

206. The Chamber, referring to Article 235(3), suggested that the International Seabed Authority might wish to establish a trust fund to compensate for damage not covered by the existing rules on responsibility and liability for harm arising from activities in the Area.[292]

207. Building upon this, under the current version of the Draft Exploitation Regulations developed by the ISA, there is mention of an 'Environmental Compensation Fund', the main purposes of which include assuring "necessary measures designed to prevent, limit or remediate any damage to the Area arising from activities in the Area", where the costs cannot otherwise be recovered from contractors or sponsoring States, but also providing funds for matters such as research, education and training and general restoration and rehabilitation of the Area.[293] The BBNJ Agreement also envisages that its Conference of Parties may consider the possibility to establish additional funds, as part of the mechanism to finance rehabilitation and ecological restoration of marine biological diversity of areas beyond national jurisdiction.[294]

208. This reflects a growing recognition that liability for harm to the marine environment from any source, including GHG emissions, may also be addressed through mechanisms such as compensation funds. These mechanisms are particularly relevant for liability for climate change impacts on the ocean given the number of diverse actors potentially responsible for such harm, causation complexities, scientific uncertainty, and challenges in valuing damage to the marine environment.

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on the allocation of loss in the case of transboundary harm arising out of hazardous activities, with commentaries" in *Report of the International Law Commission on the work of its fifty-eighth session* (1 May–9 June and 3 July–11 August 2006), UN Doc A/61/10, principle 6(1), p. 85.

[291] Seabed Mining Advisory Opinion, para. 140.

[292] Ibid, para. 205.

[293] Legal and Technical Commission, "Draft regulations on exploitation of mineral resources in the Area" (22 March 2019) Doc ISBA/25/C/WP.1, Reg 55.

[294] Draft BBNJ Agreement, Art 52 (5).

## CHAPTER 8

## SUMMATION

To summarize -

In answer both questions, it is submitted that:

209. Greenhouse gases and other climate forcing agents, are "pollution" within the meaning of the Convention, Article 1(1)(4), causing deleterious effects on the physical and living marine environment. (Chapter 2 and Chapter 3, Section I)

210. Most recent reports of the IPCC indicate that to avoid catastrophic effects of climate change on the marine environment, warming should be limited to no more than 1.5°C by rapid, deep, and immediate GHG emission reductions in all sectors, reaching net-zero emissions by 2050. (Chapter 2)

In answer to the first question (a), it is submitted that:

211. Part XII of the Convention establishes an obligation to protect and preserve the marine environment that has specific obligations with regard to climate pollutants. (Chapter 3)

212. Obligations under the Convention with respect to pollution of the marine environment apply to climate pollutants emitted from all sources, including land-based sources, atmospheric sources, and vessels. (Chapter 2, Section II)

213. Specific obligations with respect to pollution require that States base the measures they take on appropriate scientific criteria, and it is submitted that the scientific information now available indicates that climate pollutants are beginning to cause irreversible harm to the marine environment, which must be taken into account in determining States' obligations. Part XII obligations to ensure prevention, reduction, and control of GHG pollution require an increased effort proportionate to new evidence of risks (Chapter 2, Section II.A.2)

214. The Paris Agreement provides a standard of care for implementing obligations to prevent, reduce and control GHG emissions under the Convention. Its threshold of 1.5°C is a crucial guardrail, and achieving the goal of net-zero GHG emissions by 2050 the Paris Agreement is a measure of compliance with the due diligence obligation States have with regard to activities under their jurisdiction and control. (Chapter 2, Section II.D.2)

In answer to the second question (b), it is submitted that:

215. Part XII of the Convention establishes an obligation to protect and preserve the marine environment that has a broad scope of obligations with regard to climate pollutants. (Chapter 4, Section1)

216. States Parties must conduct assessments and monitor the risks and effects of activities under their jurisdiction and control and publish reports available to all States; and that these

assessments must consider the cumulative impacts of climate change, ocean acidification and related impacts. (Chapter 4, Section III)

217. States Parties have a duty to cooperate to protect and preserve the marine environment. (Chapter 4)

218. States Parties must adopt national laws and regulations to manage geoengineering activities that might cause pollution of the marine environment, and they must try to establish global and regional rules, standards, and recommended practices and procedures. (Chapter 5)

219. Scientific and technical assistance must be provided to developing States in these matters. (Chapter 6)

220. States Parties are responsible to fulfill their obligations to prevent, reduce and control pollution of the marine environment from GHG emissions and are liable in accordance with international law. (Chapter 7)

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## LEGAL COUNSEL FOR THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE – WORLD COMMISSION ON ENVIRONMENTAL LAW

CYMIE R. PAYNE, Chair, IUCN-WCEL Ocean Law Specialist Group; Associate Professor, Rutgers University, New Jersey, United States of America, Member of the Bar of the State of California, the Commonwealth of Massachusetts, and the Supreme Court of the United States

CHRISTINA VOIGT, Chair, IUCN World Commission on Environmental Law (WCEL); Co-Chair, Paris Agreement Implementation and Compliance Committee; Professor, Department of Public and International Law, University of Oslo

ROBIN CHURCHILL, Emeritus Professor, Dundee Law School, School of Humanities, Social Sciences and Law

LISA BENJAMIN, Associate Professor, Lewis & Clark Law School, United States of America

TARA DAVENPORT, Assistant Professor, Faculty of Law, National University of Singapore

BASTIAAN EWOUD KLERK, PhD Fellow, Norwegian Centre for the Law of the Sea, Arctic University of Norway (UiT)


Dr. Grethel Aguilar
Deputy Director General
International Union for Conservation of Nature and Natural Resources

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*And*
Michelle Mycoo, Professor of Urban and Regional Planning, University of the West Indies, St. Augustine, Trinidad and Tobago

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