

Oceans and Climate Change

Implications for UNCLOS and the UN Climate Regime

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2.1 INTRODUCTION

The projected impacts of climate change on the oceans pose a significant threat to marine fisheries and biodiversity that might outpace other stress factors.¹ Increases in anthropogenic greenhouse gas (GHG) emissions and the consequential increase in GHG concentrations in the atmosphere have significant direct and indirect impacts on oceans and marine life.² Ocean warming might affect fish stocks, their health and migratory routes.³ Ocean acidification linked to increased uptake of CO₂ as well as de-oxygenation due to increasing ocean stratification and less ventilation between surface and deeper waters are another two phenomena that could affect certain marine species as well as entire marine ecosystems.⁴ At the same time, the global biomass of marine animals as well as the maximum catch potential of fisheries are both projected to decline.⁵ Rebuilding overexploited and depleted fisheries and managing them sustainably is already being addressed under the United Nations Convention on the Law of the Sea (UNCLOS),⁶ though much still needs to be done. However, using the oceans in a way that helps mitigate climate change provides an opportunity to address both concerns – climate change and declining ocean biomass – at the same time. It will require comprehensive governance structures for port, flag, coastal and market States, structures which also address

¹ Intergovernmental Panel on Climate Change (IPCC), 2019, Summary for Policymakers. In: H.-O. Poertner et al. (eds.), *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*.

² Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), Report of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on the work of its seventh session (Report, IPBES/7/10/Add.1, 29 May 2019).

³ IPCC, *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (n 1).

⁴ Ibid.

⁵ Ibid.

⁶ Montego Bay, 10 December 1982, in force 16 November 1994, 1833 UNTS 397.

the causes and impacts of climate change. This raises the question if and to what extent the international legal regime under UNCLOS and the UN climate regime can be coordinated and integrated, and how they can support one another in fully addressing the critical issue of the ‘oceans and climate change nexus’.

The United Nations Framework Convention on Climate Change (UNFCCC)⁷ was negotiated when the impacts of climate change on the oceans were not well understood and studied. However, we are facing the dilemma that, on the one hand, UNCLOS provides a comprehensive framework that is intended to cover all matters related to the oceans but does not expressly refer to climate change. On the other hand, we have an international regime – consisting of the UNFCCC, the Kyoto Protocol⁸ and the Paris Agreement⁹ – which is intended to cover matters related to climate change but which is territorial and atmospheric in scope, with very limited application to the ocean.

Addressing both concerns could open the way to opportunities for comprehensive and synergetic regulation. Such regulation contributes to strengthening the rule of law, in terms of enhancing effectiveness and legal certainty for marine protection. Compliance with both marine law and climate law could reinforce the targets and objectives of both regimes, so that the effects of climate change on the oceans decrease (for example, through setting climate targets) and the climate-mitigating capacity of oceans increases (for example, by conservation of a marine biology and ecosystems through marine protection measures). Appropriate synergy and coherence at a legal level between the marine and climate regimes will contribute to better protection of oceans in implementation at national, regional and local levels, thereby enhancing the rule of law for oceans.

2.2 SCIENTIFIC BACKGROUND

The interrelationship between the oceans and climate change is twofold. On the one hand, oceans are crucially important for regulating the global climate. They serve as the most important and biggest sink of anthropogenic CO₂, which is the strongest driver of climate change. Over millennia, they have been absorbing and storing CO₂ from the atmosphere, including about 30 per cent of emitted anthropogenic CO₂.¹⁰ Ocean water also absorbs large quantities of energy (i.e., heat). More than 90 per cent of the excess heat in the climate system accumulated between

⁷ New York, 9 May 1992, in force 21 March 1994, 1771 UNTS 107, <https://unfccc.int/resource/docs/convkp/conveng.pdf>.

⁸ Kyoto Protocol to the United Nations Framework Convention on Climate Change, 11 December 1997, in force 16 February 2005, 2303 UNTS 162.

⁹ Paris, 12 December 2015, in force 4 November 2016, https://unfccc.int/sites/default/files/english_paris_agreement.pdf.

¹⁰ IPCC, *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (n 1).

1971 and 2010 was absorbed by ocean waters, with only 1 per cent stored in the atmosphere.

On the other hand, oceans are significantly affected by the impacts of climate change, which can already be observed. Ocean properties are changing due to climate change, especially temperature, pH, oxygen content, salinity, carbon, ice sheet and albedo. The Intergovernmental Panel on Climate Change (IPCC) in its 2019 special report on oceans notes with virtual certainty that oceans are warming and that the rate of warming has doubled since 1993.¹¹

The absorption of anthropogenic CO₂ is causing increasing surface acidification (decrease in pH). Moreover, de-oxygenation is occurring due to increasing ocean stratification, that is, reduced vertical exchanges of heat, salinity, oxygen, carbon and nutrients. Also, the conveyor belt of the Atlantic Meridional Overturning Circulation (AMOC) has started to weaken.¹²

Global sea levels are rising due to climate change caused by increasing ice loss from the Greenland and Antarctic ice sheets, as well as glaciers melting and ocean thermal expansion. From 2007 to 2016, the mass loss from the Antarctic ice sheet tripled compared to the previous decade, while loss from the Greenland ice sheet doubled and is accelerating. Ice loss from Antarctica has the potential to lead to a sea level rise of several metres within a few centuries. The IPCC warns that the changes already observed may mark the onset of irreversible ice sheet instability.

Ocean warming contributes to an overall decrease in maximum catch potential, compounding the impacts from illegal fishing and overfishing. This phenomenon also impacts biodiversity and ecosystem functioning, including impacts on catches, economic benefits, livelihoods, local and indigenous culture.¹³ Given the close interconnection between oceans and climate change, this chapter aims to analyse the mutual links between the international regulatory framework for the oceans as expressed in UNCLOS and the UN regulatory framework to address climate change contained in the UNFCCC and the Paris Agreement. Through both regimes, the 'ocean-and-climate nexus' is governed by the rule of law. Its effectiveness in addressing the challenges of climate change, however, depends on how well these two regimes 'speak to each other'.

2.3 A WAY FORWARD?

The IPCC offers a number of strong suggestions for responses to the current and projected scenarios. Foremost among them are deep and rapid GHG emission

¹¹ Ibid.

¹² Ibid., at A 2.7.

¹³ IPCC, *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (n 1).

reductions in the coming decades¹⁴ and ambitious adaptation of low-lying and other vulnerable or exposed areas. A central aspect, reiterated in all the latest IPCC reports, as well as the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report on biodiversity, is that such rapid and deep reductions in emissions are unprecedented and require transformative governance changes.¹⁵ The temporal scales of climate change impacts exceed the time horizons of most governance arrangements, which lack the ability to prepare for and respond to long-term changes. Governance arrangements such as marine protected areas, spatial plans and coastal management systems are largely ineffective to address such long-term challenges, as they are too fragmented across administrative boundaries and sectors to provide integrated responses to the cascading risks from climate change.¹⁶

However, these reports stress that such transformation requires the fundamental system-wide reorganization of all sectors and across economic, social and technological factors, including paradigms, goals and values. Both reports call for strengthening the global response and enhancing international cooperation. Climate change, global biodiversity loss and ocean impacts as collective action problems can only be effectively addressed through a system of international cooperation, management and implementation support, and through comprehensive and synergetic legislation. In other words, a crucial role exists for international law, and the rule of law, not only in creating a global level playing field that avoids free riding but also in creating the legal structure for a coordinated response commensurate with these global challenges.

2.4 CLIMATE CHANGE AND THE LAW OF THE SEA (UNCLOS)

In ocean governance, what is needed is a profound economic and institutional transformative change to enable climate-resilient development pathways for the oceans. The IPCC calls for intensifying cooperation and coordination among governing authorities across scales, jurisdictions, sectors, policy domains and

¹⁴ IPCC, 2021, Summary for Policymakers. In: V. Masson-Delmotte et al. (eds.), *Climate Change 2021: The Physical Science Basis*.

Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

¹⁵ IPCC, 2018, Summary for Policymakers. In: *Global Warming of 1.5°C*. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development and efforts to eradicate poverty (Report, October 2018), 3–24; and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services IPBES (n 3).

¹⁶ Froukje Platjouw, *Environmental Law and the Ecosystem Approach: Maintaining Ecological Integrity through Consistency in Law* (London: Routledge 2016).

planning horizons in order to enable effective responses to ocean changes.¹⁷ This requires compatible and coherent legal frameworks.

Climate change impacts will affect marine life and biodiversity, fisheries, shipping routes and maritime zones. It is, therefore, opportune to assess to what extent climate change has been addressed within the legal framework of the law of the sea, or could be brought within its embrace. It might not have been the intention at the time of developing the UNCLOS, but climate change issues could be addressed through contemporary and dynamic interpretation.

The UN General Assembly has successively reiterated its serious concern over the current and projected adverse effects of climate change on the marine environment and marine biodiversity, including coral reefs as well as the vulnerability of the environment and the fragile ecosystems of the polar regions, emphasizing the urgency of addressing this issue.¹⁸ However, UNCLOS was negotiated during a period where concerns about climate change were not known or barely known. Consequently, despite the importance the Convention gave in Part XII to protection and preservation of the marine environment, understandably it does not explicitly refer to the adverse impacts of climate change on the ocean and the marine environment or the role that ocean governance could play in addressing climate change.

This situation does not mean that UNCLOS is not of relevance with respect to climate change. Under Article 192, States have the obligation to protect and preserve the marine environment. This applies to all areas of the oceans and to all impacts on the oceans. This obligation arguably also includes the duty to protect against climate change impacts. The Permanent Court of Arbitration, in the South China Sea Arbitration, stated clearly that the obligation to ‘protect’ the marine environment under UNCLOS includes protection from any future damage, while ‘preserve’ means to maintain or improve the existing condition of the marine environment. The Tribunal stated that these two elements included the obligation to take active measures and to prevent degradation of the existing marine environment.¹⁹

Such an approach would, at the very least, be applicable to the increased uptake of anthropogenic CO₂ leading to ocean acidification. Pollution, as widely defined in Article 1(1)(4) of UNCLOS, is ‘the introduction by man, directly or indirectly, of

¹⁷ IPCC, *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (n 1), 41. In addition to regulation under UNCLOS, regional cooperation, including through regional treaties and conventions, can support effective action. Institutional arrangements that provide strong multiscale linkages would be beneficial in this situation. Coordination between national and transboundary regional policies and measures can address risks to resource security and management, such as for fisheries.

¹⁸ UN A/RES/64/71 (<https://undocs.org/en/A/RES/64/71>); A/RES/66/231 (<https://undocs.org/A/RES/66/231>); A/RES/71/257 (<https://undocs.org/en/A/RES/71/257>).

¹⁹ The South China Sea Arbitration (*Philippines v. China*) (Award of 12 July 2016) PCA Case no. 2013-19, para 941.

substances or energy into the marine environment, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health'. Anthropogenic CO₂ fits the definition in UNCLOS and therefore would come within its scope of application.

Further, Article 194 sets out the duty to adopt necessary measures to prevent, reduce and control pollution from any source, including transboundary pollution. This is a duty on all States to adopt measures to prevent transboundary pollution from sources or activities under their jurisdiction or control. Furthermore, Article 194(5) includes the duty to protect rare or fragile ecosystems and habitat or depleted, threatened or endangered species and other forms of marine life. This would also include a duty to protect against the impacts of climate change. In sum, the argument is that anthropogenic CO₂ is a transboundary source of pollution and that Articles 192 and 194 include the duty to protect the marine environment against climate change impacts.

The standard of conduct under Article 194 was elaborated by the International Tribunal for the Law of the Sea (ITLOS), which recognized that use of the language 'to ensure' creates an obligation of due diligence.²⁰ Such standard means that States need to adopt appropriate rules and measures, exercise vigilance in their enforcement and monitor the activities of private and public operators. It is an obligation to 'take all appropriate measures to enforce its relevant regulations on a public or private operator under its jurisdiction'²¹ and to 'deploy adequate means, to exercise best possible efforts, to do the utmost, to obtain [the required result]'.²²

It remains, however, somewhat uncertain how far such duty imposes an obligation. For example, do States have a general due diligence obligation under Article 194 to regulate and control activities such as permitting GHG-emitting installations, for example, oil or gas-based power plants, oil extraction industries or coal mining, if such activities are carried out under their jurisdiction or control? Articles 207 and 212 focus, in particular, on pollution of the marine environment from land-based sources and through the atmosphere, respectively, requiring parties to 'prevent, reduce, and control' marine pollution from these sources. Again, the same pertinent questions arise here.

In sum, while UNCLOS contains no reference to the adverse impacts of climate change on the ocean and the marine environment, it is a matter of interpretation of

²⁰ International Tribunal for the Law of the Sea (ITLOS), Advisory Opinion of 2 April 2015 (Request for an Advisory Opinion submitted by the sub-regional fisheries commission (SRFC)) (Request for Advisory Opinion submitted to the Tribunal) Case no. 21 (2015) ITLOS Reports p. 1.

²¹ *Ibid.*, para. 131.

²² ITLOS Seabed Disputes Chamber, Advisory opinion on the responsibilities and obligations of states sponsoring persons and entities with respect to activities in the Area, 1 February 2011 (2001) ITLOS Report 10, at 41, paras. 110–112.

the Convention to clarify the scope of existing duties.²³ While further normative clarification (or dynamic development) could be obtained through jurisprudence, for example, by an Advisory Opinion from the ITLOS, it is also a possibility to work on an implementing agreement, which could focus in particular on climate change-relevant aspects of the Convention, if member States so wanted.

Finally, the recent development of a new implementing agreement under UNCLOS to protect and conserve biological diversity beyond national jurisdiction (BBNJ) does (still) foresee a particular role of area-based management and environmental impact assessment in addressing climate change. The current draft negotiating text sets out as one of the guiding principles an approach that builds ecosystem resilience to the adverse effects of climate change and ocean acidification and restores ecosystem integrity.²⁴ In this context, area-based management tools, such as marine protected areas, should be established, inter alia, in order to rehabilitate and restore biodiversity and ecosystems. This might enhance their productivity and health and build resilience to stressors, such as those related to climate change, ocean acidification and marine pollution.²⁵ Climate impacts might also be considered part of ‘cumulative impacts’ on the same ecosystem and could fall under the scope of environmental impact assessments. Still, it remains to be seen to what extent parties will be willing to integrate adequate responses to climate change and its impacts in the BBNJ agreement.

2.5 UN CLIMATE CHANGE REGIME AND THE OCEANS

The UNFCCC establishes as its ultimate objective the stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system.²⁶ In general, this includes the role of oceans in stabilizing atmospheric GHG concentrations. Accordingly, Article 4, paragraph 1 (d) sets out the commitment of UNFCCC parties to ‘promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of . . . greenhouse gases . . . including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems’. However, while the scope of the UNFCCC is arguably not limited to territorial emission, the rather general obligations of member States set out in Article 4 apply only to activities under their jurisdiction or control. While States could include ocean-based emissions or removals in their

²³ See D. Bodansky, *The Ocean and Climate Change Law: Exploring the Relationships*. In: Richard Barnes and Ronan Long (eds.), *Frontiers in International Law: Oceans and Climate Challenges, Essays in Honor of David Freestone* (Boston: Brill 2020).

²⁴ Art. 5.(h) Revised draft text of an agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, 27 November 2019 (www.un.org/bbnj/sites/www.un.org/bbnj/files/revised_draft_text_a.conf_232.2020.11_advance_unedited_version.pdf).

²⁵ *Ibid.*, Art. 14.(e).

²⁶ Art. 2 UNFCCC.

national plans, programs, policies or measures, the reality is that so far very few, have done so.

The Paris Agreement, adopted under the UNFCCC, recognizes in its preamble the importance of conservation and enhancement, as appropriate, of sinks and reservoirs of the greenhouse gases referred to in the UNFCCC, and explicitly notes the importance of ensuring the integrity of all ecosystems, *including oceans*, and protection of biodiversity. Its main goal is set out in Article 2, according to which, inter alia, the increase in the global average temperature should be limited to well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to 1.5°C.²⁷ Oceans play a significant part in the global climate system, as described previously. However, the measures that parties include in their Nationally Determined Contributions (NDCs) under the agreement, and will be accounted for and reported on, remain within parties' territorial jurisdiction. The National GHG Inventory of each party only contains territorial GHG emissions and removals. It is therefore unclear how oceans – especially the high seas – fit into the scope of measures under the Paris Agreement.

However, as an exception to the territorial focus, inter-party tradable emission units can either increase or decrease the national volume of GHG emissions. Including cross-border carbon trading in NDCs, therefore, adds an 'extra-national jurisdictional element' to the scope of NDCs. Similarly, some of those parties that include REDD+ in their NDC also allow for cross-border transactions, thereby widening territorial capture to elements that lie outside the strict territorial jurisdiction of each party. Along the same lines, it is possible for a party to include ocean-based mitigation activities within its own jurisdiction or control, or implement activities jointly with other parties with respect to ocean-based climate change mitigation, for example, ocean fertilization or vessel-based direct air capture of CO₂, or certain CCS activities.

The Paris Agreement further encourages parties, in Article 5, paragraph 1, 'to take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1(d), of the Convention, including forests'. Article 4, paragraph 1(d) of the UNFCCC refers to conservation and enhancement of sinks and reservoirs, including oceans, and coastal and marine ecosystems. Accordingly, there is a recognition of the important role of oceans as carbon sinks and reservoirs, but the challenge, as mentioned previously, is how to link the extra-jurisdictional scope of oceans to the NDCs by parties and to the atmospheric levels of GHG concentrations or temperature increases, as recognized in the context of the Convention and the Paris Agreement, respectively.

To sum up, it could be argued that the degree of consistency and synergy between the climate and ocean regimes is dynamic and invites further elaboration and rule development. For the ocean rule of law, this means that a dynamic interpretation of

²⁷ Art. 2 Paris Agreement.

the existing rules is necessary in order to comprehensively address the role of ocean governance in addressing climate change. For the climate change regime, in turn, this means that the scope and potential for ocean-based solutions to climate change, their inclusion in NDCs as well as their robust and accurate reporting and accounting requires further consideration. Still, significant potential exists for synergies that could both improve the effectiveness of ocean governance as well as enhance the scope for climate change mitigation measures. The following section presents three implementation measures that could reinforce this synergy and provides some suggestions on how to recognize the role of oceans more effectively in climate change mitigation.

2.6 THE OCEANS AS A SOLUTION TO CLIMATE CHANGE: SOME SUGGESTIONS

Several suggestions have been made as to how the oceans can contribute to solving the climate challenge. Several options have recently been put forth by civil society,²⁸ which together could save the world 4Gt CO₂ emissions yearly from 2030, and more than 11Gt in 2050. In the following sections, three examples are discussed in more detail.

2.6.1 *Ocean-Based Renewable Energy*

While recognizing that most emission reductions must happen from deep decarbonization of terrestrial activities, ocean-based activities can and should be included in the NDCs of parties to the Paris Agreement. While some parties have already included some marine activities and policies, more could follow suit with the next round of NDCs in 2025.

NDCs can play a critical role in supporting acceleration of renewable energy by sending clear, consistent signals to the private sector. Importantly, however, NDCs are to be implemented through effective domestic planning and regulatory as well as enforcement measures. By including ocean-based solutions in NDCs, greater legal and regulatory machinery will be set in motion. Also, reporting on the implementation and achievement of NDCs is mandatory under the Paris Agreement,²⁹ and all reports are subject to an independent technical expert review. NDCs can further help to stimulate further investment, research and development for less mature technologies such as tidal, current and geothermal energy.

²⁸ World Resources Institute, *The Ocean as a Solution to Climate Change*, Hoegh-Guldberg et al. (WRI Report 2019) (http://oceanpanel.org/sites/default/files/2019-10/HLP_Report_Ocean_Solution_Climate_Change_final.pdf).

²⁹ Paris Agreement (n 9), Art. 13, para. 7 b.

A recent report by the World Research Institute suggests several options for including ocean-based renewable energy in new or updated NDCs, such as:

- Expanding and increasing the ambition of existing economy-wide GHG targets by including emission reductions from ocean-based renewable energy production.
- Defining capacity and generation targets for ocean-based renewable energy (e.g., offshore wind within Exclusive Economic Zones (EEZ), and tidal and wave energy). Such targets could be expressed as absolute quantities, as a percentage increase from current levels or as a share of the total energy or electricity mix.
- Committing to developing inclusive national marine spatial planning frameworks and integrated ocean management to map ocean-based activities and area-based management tools. This will help identify opportunities for expanding offshore renewable energy that balances the needs of other ocean users and sustainability of coastal and marine ecosystems.
- Committing to research and development to explore opportunities to align ocean-based renewable energy with efforts to decarbonize marine transport and aquaculture and support coastal and marine ecosystems.³⁰

Further examples might also include fixed and floating offshore wind and solar installations and ocean thermal energy conversion installations. This would help in addressing the significant gap between the aggregate effect of parties' mitigation efforts and the emissions pathway needed to hold temperature increases to well below 2°C above pre-industrial levels and in pursuing efforts to limit temperature increases to 1.5°C.³¹ Moreover, parties to the Paris Agreement are expected to reflect their highest possible ambition in their NDC³² – a due diligence requirement, which means taking all appropriate measures, which for many coastal states would include ocean-based activities.

2.6.2 Decarbonizing Ocean-Based Transport

Decarbonization of ocean transport is another way by which ocean-related aspects might contribute to climate solutions. Ocean transport currently makes up about

³⁰ E. Northrop and M. Finch, 4 *Ocean-Based Solutions to Advance Climate Action through NDCs* (2021) (www.wri.org/blog/2021/01/4-ocean-based-solutions-advance-climate-action-through-ndcs)

³¹ UNFCCC secretariat, Nationally Determined Contributions under the Paris Agreement, Synthesis Report, FCCC/PA/CMA/2021/8, 17 September 2021.

³² Art. 4, para. 3 Paris Agreement (n 9); see also Decision 1/CMA.2, paras. 6 and 7. See: Christina Voigt and Felipe Ferreira (2016) "Dynamic Differentiation": The Principles of CBDR-RC, Progression and Highest Possible Ambition in the Paris Agreement, 5 *Transnational Environmental Law* 2, 285–303.

3 per cent of global GHG emissions, with a rising trend.³³ Increased energy efficiency, maximizing the overall operational efficiency of new and existing ships and promoting or prescribing low and zero carbon fuels could mitigate this contribution. International work through the International Maritime Organization and regional organizations might be necessary, which should also increase possibilities for enforcement of norms.

Additionally, the inclusion of ocean transport in parties' NDCs could be an effective way forward. This might involve, for example, setting a specific GHG target for domestic shipping and domestic fleets; aiming to phase out GHG emissions from coastal passenger transport through technology transfer and research and development in battery- and wind-powered ferries; developing cross-sectoral decarbonization plans that link strategies to transition land-based energy sources and supply chains with ports and marine fleets; or financing technology transfer and research and development for the transition to zero-emission passenger and freight transport.³⁴

2.6.3 Coastal and Marine Ecosystem Protection

Protecting coastal and marine ecosystems is necessary to maintain and enhance the CO₂ and reservoir capacities of oceans. This might include enhancing protection measures for mangroves, kelp forests, seaweed beds under the CBD and other legal instruments, and inclusion of such 'marine-based natural solutions' as a nature-based solution in parties' NDCs.³⁵

Moreover, providing incentives for 'blue carbon' similar to 'green carbon' under REDD+ could be a necessary tool to engage more States in ocean-based natural protection for climate purposes. This might require enhancing carbon accounting for mangroves, sea grass and seaweed or kelp forests and other ocean sinks within national GHG Inventories, and the improvement of monitoring technologies and capacities for 'blue carbon' (under the UNFCCC and Paris Agreement).³⁶

National and global mapping of blue carbon ecosystems (especially seaweed) and development of legal mechanisms for long-term preservation of blue carbon are significant steps that are necessary in order to include the conservation and enhancement of ocean sinks and reservoirs in the scope of nature-based solutions in NDCs.

³³ S. Widjaja, T. Long, H. Wirajuda et al., *Illegal, Unreported and Unregulated Fishing and Associated Drivers* (Washington, DC: World Resources Institute 2019, 38).

³⁴ Northrop and Finch (n 30).

³⁵ 151 parties to the Paris Agreement have already included addressed some aspects of ocean carbon in their NDCs. See: The Blue Carbon Initiative (www.thebluecarboninitiative.org/policy-guidance).

³⁶ See also: Martin R. Stuchtey, Adrien Vincent, Andreas Merkl and Maximilian Bucher, *Ocean Solutions That Benefit People, Nature and the Economy* (Washington, DC: World Resources Institute (oceanpanel.org) 2020).

2.6.4 *Management of Fisheries and Aquaculture*

Another important aspect is elimination of harmful subsidies³⁷ and strengthening of tools to eliminate illegal, unreported and unregulated (IUU) fishing.³⁸ The climate challenge is significant and the role of oceans as the real 'lungs of the Earth' is crucial in maintaining a carbon balance. This understanding, while backed up by science, is only slowly moving into political decisions and appropriate legal responses.

One principal way in which ocean-based foods can contribute significantly to climate change mitigation is in reduction of the carbon footprint of ocean-derived food production, especially fisheries. For example, changing fuel sources in vessels and technological advances in production techniques can alter the emissions associated with seafood from both fisheries and ocean-based aquaculture. However, reducing emissions by improving fish catch efficiency as well as increasing fishery yields will require significant governance changes, including design of appropriate international and regional legal frameworks. In this context, existing tools within the international framework to address IUU fishing should be strengthened and streamlined into a global framework.³⁹

2.7 CONCLUSIONS

Oceans are under threat from climate change, and the question is whether the interrelated ocean and climate change dynamics have been sufficiently recognized in UNCLOS and UN climate change law. So far, there is no clear legal regime under international law addressing both climate change and the oceans in a comprehensive manner. The UN climate change regime is severely limited in its capacity to address ocean issues because of its terrestrial and atmospheric focus. The UN regime for the Law of the Sea already has certain components and established obligations for its parties, including for land-based source activities that cause ocean pollution. The relatively weak legal synergy between the two regimes

³⁷ SDG14.6, www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (page 23).

³⁸ SDG14.5, www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (page 23).

³⁹ Currently, this framework consists of both binding agreements and voluntary instruments that facilitate the management of fisheries at the global, regional and national levels.

Within this framework, a number of provisions and requirements specifically address IUU fishing, with provisions and guidance relating to port State measures, flag State performance, coastal State responsibilities, market State measures or a combination of all or some of these (e.g., UNCLOS, FAO Compliance Agreement, UN Fish Stocks Agreement, Code of Conduct for Responsible Fisheries, IPOA-IUU, Agreement on Port State Measures (PSMA), Voluntary Guidelines for Flag State Performance, Voluntary Guidelines for Catch Documentation Schemes, and the Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels). For an overview, see: www.fao.org/iuu-fishing/international-framework/en/.

could pose a challenge to the rule of law for protection of oceans and the climate system; if not improved.

As this chapter has shown, ample possibility exists for parties to include ocean-related mitigation aspects in their NDCs under the Paris Agreement. The advantage of such inclusion would not only be that oceans would become part and parcel of parties' climate strategies. In addition, the inclusion of ocean transport, blue carbon, fishery regulation and/or ocean-based renewable energy and other ocean-based climate mitigation activities in NDCs would also require parties to adopt effective domestic implementation measures, such as regulations, laws, acts and other implementation instruments as well as ensure their compliance and enforcement.⁴⁰ Furthermore, parties would also be under the legal obligation to provide a biennial transparency report on the implementation and achievement of their NDCs, which would be public and accessible to everyone.⁴¹ In this report, parties need to provide information on legal, institutional, administrative and procedural arrangements for domestic implementation, monitoring, reporting and achievement as well as stakeholder engagement.⁴² In other words, inclusion of ocean-based mitigation measures in an NDC would draw ocean governance under the transparency requirements of the Paris Agreement, enhancing their visibility, legitimacy and, potentially, coordination.

However, further legal developments in international law (i.e., law-making, jurisprudence) might be necessary to adequately reflect the important role of oceans in the global governance framework, in order to address climate change and its impacts. The current BBNJ negotiations could provide a part of this framework by setting out criteria for identifying areas for area-based management, criteria that consider the carbon density and climate relevance of certain marine and coastal ecosystems, such as kelp forests and seaweed beds.

An alternative avenue is dynamic development and interpretation of UNCLOS provisions with relevance to climate change or consideration of a new implementing agreement under UNCLOS, which provides for clarification and specification of States' duties with respect to climate change and its impact on oceans. In the absence of such development, or in addition to it, it is possible to seek an advisory opinion from, for example, ITLOS on the obligation of States with respect to climate change impacts on the oceans.

The solutions offered by the oceans should, and most likely must, play a more prominent role in climate policy and regulation. In order to achieve the global goal of climate neutrality around 2050 and global net-negative emissions thereafter until the end of this century,⁴³ oceans form an indispensable part of the solution. While more and more States are currently adopting climate neutrality targets, their reliance

⁴⁰ Paris Agreement (n 9) Art. 4, para. 2, sentence 2.

⁴¹ Paris Agreement (n 9) Art. 13, para. 7(b).

⁴² Decision 18/CMA, 1, annex, para. 62, https://unfccc.int/sites/default/files/resource/cma2018_3_add2_new_advance.pdf (page 28).

⁴³ IPCC, *Climate Change 2021: The Physical Science Basis* (n 14).

on ocean-based measures is expected to rise. However, ocean-based solutions are not the whole solution. They must happen alongside, but not replace, rapid, deep and sustained emission reductions in terrestrial energy sectors and from land-based sources, as well as protection of natural terrestrial sinks.

Holding temperature increases to well below 2°C requires unprecedented action in scope and scale. This is a call for innovation and change – including how to integrate two-thirds of this planet into the solution.