

Strengthening the Ocean Carbon Sink under the UNCLOS: A Preliminary Assessment on the ITLOS Climate Change Advisory Opinion*

Xuan Zhu** & Wei Shen***

This article examines the Advisory Opinion on climate change put forth by the International Tribunal for the law of the sea and its implications for the future integration of ocean and climate governances at both international and national levels. Although the Climate Change Advisory Opinion cannot definitively resolve all questions regarding the relationship between the law of the sea and climate change, it establishes a flexible and scalable framework for clarifying the application and interpretation of the law of the sea, particularly the United Nations Convention on the Law of the Sea in the context of climate change. The International Tribunal for the Law of the Sea recognizes the role of ocean carbon protection as a means of addressing climate change through both adaptation and mitigation. This recognition can enhance legal and

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** Associated Professor at the Research Center of Pacific Island Countries, Liaocheng University-Liaocheng, China. B.A. (Nanjing Agric. U.), M.A./Ph.D. (Renmin U.). ORCID: <https://orcid.org/0009-0002-4745-8580>. She may be contacted at: zh_uxuan@126.com / Address: 1 Hunan Street, Shandong, Liaocheng 252000 China.

*** Corresponding author. KoGuan Distinguished Professor of Law at Shanghai Jiao Tong University KoGuan School of Law, China. LL.B./LL.M. (EUPCL), LL.M. (Michigan), LL.M. (Cantab), Ph.D. (LSE). ORCID: <http://orcid.org/0000-0002-6935-1365>. He may be contacted at: shenwei@sjtu.edu.cn / Address: No. 1954 Huashan Road, Shanghai 200030, China.

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financial certainties regarding blue carbon in international cooperation and domestic policy.

Keywords

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I. Introduction

Oceans are estimated to remove about 31% of atmospheric carbon dioxide emissions each year.¹ Ocean carbon sinks refer to the processes, actions, and systems through which marine ecosystems absorb greenhouse gases (GHGs), particularly carbon dioxide, from the atmosphere.² The enhancement of ocean carbon sinks can markedly reduce global GHG emissions by 3%³ and is increasingly recognized as a nature-based solution for lowering the drivers and impacts of climate change.⁴

Typical vegetated coastal ecosystems – mainly mangroves, seagrasses, and salt marshes – exhibit high carbon sequestration rates⁵ and are widely recognized as blue carbon ecosystems. The term “blue carbon” refers to the carbon captured and stored by such coastal and marine ecosystems.⁶ The value of blue carbon ecosystems is widely acknowledged in scientific community and policy forums, not only for their role as important carbon reservoirs in the global carbon cycle, but also for their capacity to reduce climate-related disaster risks and to support

1 Nicolas Gruber et al., *The oceanic sink for anthropogenic CO₂ from 1994 to 2007*, 363 (6432) *SCI.* 1193-99 (2019), <https://www.science.org/doi/10.1126/science.aau5153>.

2 Qiang Wang et al., *Uncovering the world's largest carbon sink—a profile of ocean carbon sinks research*, 31 *ENV'T SCI. & POLLUTION RES.* 20362-82 (2024), <https://link.springer.com/article/10.1007/s11356-024-32161-z>.

3 Peter Macreadie et al., *Blue carbon as a natural climate solution*, 2(12) *NATURE REV. EARTH & ENV'T* 826-39 (2021), <https://www.nature.com/articles/s43017-021-00224-1>.

4 Brita Jessen & Katie Hill, *Sea Grant at the Blue Carbon Frontier: Integrating Law, Science, Community Values, and Economics*, 37(1) *OCEANOGRAPHY* 84-90 (2024), <https://tos.org/oceanography/article/sea-grant-at-the-blue-carbon-frontier-integrating-law-science-community-values-and-economics>.

5 Pierre Taillardat et al., *Mangrove blue carbon strategies for climate change mitigation are most effective at the national scale*, 14(10) *BIO. LETTERS* 20180251 (2018), <https://royalsocietypublishing.org/rsbl/article/14/10/20180251/34635/Mangrove-blue-carbon-strategies-for-climate-change>; Kerry Lee Rogers et al., *Wetland carbon storage controlled by millennial-scale variation in relative sea-level rise*, 567 *NATURE* 91-5 (2019), <https://www.nature.com/articles/s41586-019-0951-7>.

6 Peter Macreadie et al., *Operationalizing marketable blue carbon*, 5(5) *ONE EARTH* 485-92 (2022), <https://www.sciencedirect.com/science/article/pii/S259033222002068>.

vulnerable communities in sustaining fisheries and livelihoods.⁷ The protection and management of blue carbon ecosystems involved in enhancing carbon storage are commonly referred to as blue carbon actions or projects.

In recent years, the ocean–climate nexus has increasingly become a focus of governance discussions in both academia and the policy community.⁸ International initiatives such as the United Nations Decade of Ocean Science for Sustainable Development,⁹ Sustainable Ocean Management,¹⁰ and the Blue Carbon Initiative¹¹ call for the exploration of innovative approaches to ocean conservation and management to maintain healthy climate systems. At regional level, recognition of the ocean–climate nexus is reflected in policy frameworks such as the “2050 Strategy for the Blue Pacific” adopted by the Pacific Islands Forum.¹² However, owing to delayed and insufficient responses to the climate crisis within ocean-related policy forums, scholars have criticized global ocean governance and climate governance for remaining largely siloed processes. Ocean governance has often overlooked the implications of climate change.¹³

On May 21, 2024, the International Tribunal for the Law of the Sea (ITLOS) issued an Advisory Opinion (hereinafter “Climate Change Advisory Opinion”)¹⁴ in response to a request submitted by the Commission of Small Island States on climate change and international law (COSIS). The request sought clarification of the specific obligations of states parties under the United Nations Convention on the Law of the Sea (UNCLOS) to control marine environmental pollution resulting from climate change and to protect and preserve the marine

7 Intergovernmental Panel on Climate Change (IPCC), *The Ocean and Cryosphere in a Changing Climate-special Report of the Intergovernmental Panel on Climate Change* (2019), at 523-4, <https://www.ipcc.ch/srocc/>; Yoseop Lee & Jae-Seong Lee, *Blue carbon ecosystems for hypoxia solution: how to maximize their carbon sequestration potential*, 209 MARINE ENV'T RES. 710546 (2025), <https://www.sciencedirect.com/science/article/abs/pii/S0141113625002594>.

8 Leah Fusco et al., *Blueing business as usual in the ocean: Blue economies, oil, and climate justice*, 98 POL. GEOGRAPHY 102670 (2022), <https://www.sciencedirect.com/science/article/pii/S0962629822000841>.

9 IOC-UNESCO, *The United Nations Decade of Ocean Science for Sustainable Development* (2021-2030): Implementation Plan (2021), at 18 & 22, <https://unesdoc.unesco.org/ark:/48223/pf0000377082>.

10 Ocean Panel, *Ocean Panel Calls for Nations to Adopt 100% Sustainable Ocean Management Target* (Dec. 4, 2023), <https://oceanpanel.org/ocean-panel-calls-for-nations-to-adopt-100-sustainable-ocean-management-target>.

11 Jill Hamilton et al., *Guidelines for Blue Carbon and Nationally Determined Contributions* (2023), at 2-50, <https://www.thebluecarboninitiative.org/policy-guidance>.

12 Pacific Islands Forum, *2050 Strategy for the Blue Pacific Continent*, <https://forumsec.org/2050>.

13 Fusco et al., *supra* note 8. See also Jack Daly et al., *Changing climates in a blue economy: Assessing the climate-responsiveness of Canadian fisheries and oceans policy*, 131 MARINE POL'Y 229-30 (2021), <https://doi.org/10.1016/j.marpol.2021.104623>.

14 Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law, Advisory Opinion, ITLOS Case No. 31, ¶¶ 1-44 (Int'l Trib. L. Sea, May 21, 2024) [hereinafter ITLOS Advisory Opinion 2024], https://www.itlos.org/fileadmin/itlos/documents/cases/31/Advisory_Opinion/C31_Adv_Op_21.05.2024_orig.pdf.

environment in light of such impacts.¹⁵ By bringing together previously separate legal obligations relevant to climate change mitigation and adaptation under international climate law as well as obligations to prevent marine environment pollution under the law of the sea, the Climate Change Advisory Opinion signals a new phase of interconnected ocean–climate governance. It can support broader ocean transformation in alignment with climate goals and associated benefits. Furthermore, the ITLOS’s integration of blue carbon within the framework of ocean–climate governance can increase the legal certainty of blue carbon actions and thereby promote global efforts in blue carbon conservation and management.

This article will review of the Climate Change Advisory Opinion in the context of climate change and provide its potential implications for the integration of ocean carbon sinks into the law of the sea in the future. Part two will examine the legal background and key elements of the Climate Change Advisory Opinion, including scholarly and policy responses regarding its “landmark” importance and perceived limitations. Part III will analyze the potential effects of the Climate Change Advisory Opinion on clarifying the interface between the UNCLOS and climate change obligations, with particular attention to the legal and governance implications for blue carbon management and actions. Part four will conclude that although governmental responses can introduce some uncertainties, the Climate Change Advisory Opinion establishes a foundation for leveraging the law of the sea to effectively support global climate action.

II. The Climate Change Advisory Opinion: Is it a Cautious Step Forward?

The ITLOS completed its review of the COSIS application at remarkable speed, taking into account the complex nature of the issues involved, and delivered a firm response. Overall, the Tribunal reaffirmed the relevance of the UNCLOS -particularly Part XII - in addressing the impacts of climate change and emphasized that states parties are required to fulfill their obligations with due diligence. This response immediately sparked a robust debate among scholars, with some commentators characterizing the ITLOS’s approach as relatively cautious.¹⁶

¹⁵ *Id.* at ¶¶ 1-8.

¹⁶ Officials from several countries, including China and the Netherlands, have also publicly expressed their positions on the issue.

A. Key Elements of the Climate Change Advisory Opinion

1. Scientific and Legal Background

Before the Climate Change Advisory Opinion was issued, a key concern centered on the way the ITLOS would address the complex scientific aspects associated with climate change. Acknowledging this challenge, the ITLOS addressed the question at the outset of its Advisory Opinion.¹⁷ In addition to referencing United Nations General Assembly resolutions on climate change,¹⁸ the Tribunal drew extensively on the intergovernmental panel on climate change (IPCC) assessment reports,¹⁹ which are regarded as authoritative assessments of the scientific knowledge on climate change.²⁰

By adopting the IPCC's definition of climate change, ITLOS acknowledged the role of anthropogenic GHG emissions in driving global warming and the important impacts of climate change, including harm to oceans such as rise in sea-level, ocean warming, deoxygenation, and acidification.²¹ Such changes were recognized as posing considerable threat to marine ecosystems,²² human welfare, planetary health, and vulnerable communities.²³ At the same time, ITLOS drew on the IPCC reports to highlight the crucial role of oceans in mitigating climate change and its consequences. The Tribunal emphasized on the importance of achieving net-zero carbon dioxide (CO₂) emissions to meet the 1.5°C target set out in the Paris Agreement.²⁴

With respect to the legal framework, ITLOS reaffirmed the United Nations Framework Convention on Climate Change (UNFCCC) as the “core” framework among the various international agreements that address climate change.²⁵ The Tribunal reviewed the objectives, key mandates, mechanisms, corresponding

¹⁷ ITLOS Advisory Opinion 2024, at ¶¶ 55-56.

¹⁸ ITLOS referred to UNGA resolution 43/53 of 6 December 1988, resolution 67/210 of 21 December 2012, and resolution 76/296 of 25 July 2022 to demonstrate the wide international concerns on climate change and its environmental and social-economic impacts.

¹⁹ IPCC, Climate Change 2021: The Physical Science Basis, <https://www.ipcc.ch/report/ar6/wg1/>; IPCC, Climate Change 2022: Impacts, Adaptation and Vulnerability, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>; AR6 Synthesis Report: Climate Change 2023, <https://www.ipcc.ch/report/ar6/syr/>; IPCC, Special Report on the Ocean and Cryosphere in a Changing Climate, <https://www.ipcc.ch/srocc/>; and Global Warming of 1.5 °C, <https://www.ipcc.ch/sr15/>.

²⁰ ITLOS Advisory Opinion 2024, at ¶ 51.

²¹ *Id.* at ¶¶ 52-54 & 57-62.

²² *Id.* at ¶¶ 57-62.

²³ *Id.* at ¶ 66.

²⁴ *Id.* ¶¶ 62-65.

²⁵ *Id.* at ¶ 67.

obligations set out in the UNFCCC,²⁶ the provisions of Annex I of the Kyoto Protocol regarding GHG emission reductions,²⁷ and the temperature and emission targets under the Paris Agreement, including the 1.5°C goal, and the path toward carbon peaking and carbon neutrality.²⁸

2. Jurisdiction and Discretion

During proceedings, the following question was put forward: whether the full tribunal of the ITLOS was entitled to general advisory jurisdiction under UNCLOS and the Tribunal's Statute resurfaced, provided that neither instruments explicitly provide for such a jurisdiction.²⁹ China and India objected the advisory jurisdiction of the full ITLOS tribunal.³⁰ In the Climate Change Advisory Opinion, ITLOS did not provide a point-to-point response to each state's concerns. Instead, it reiterated Article 21 of its Statute and its rulings in the *Sub-Regional Fisheries Commission* (SRFC) case, stating that "its jurisdiction comprises three elements."³¹

For ITLOS, the COSIS Agreement provides the substantive basis for conferring jurisdiction in this case, as it authorizes the submission of requests for advisory opinions to the Tribunal.³² ITLOS noted the support of states parties for the Tribunal to respond to the questions submitted under the COSIS framework.³³ In addition, the agreement under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ Agreement) further provides the Tribunal with jurisdiction to issue an Advisory Opinion under certain circumstances.³⁴

Furthermore, ITLOS outlined three prerequisites that must be satisfied before it can exercise its advisory jurisdiction.³⁵ In its assessment, ITLOS found that the COSIS Agreement constitutes an international agreement relevant to the objectives of UNCLOS and raises questions "of a legal nature."³⁶ Regarding

26 *Id.* at ¶¶ 68-69.

27 *Id.* at ¶¶ 70-71.

28 *Id.* at ¶¶ 72-76. ITLOS referred to relevant decisions adopted by the Conference of the parties to the UNFCCC and to international instruments adopted under the frameworks of the IWO, ICAO, and the Montreal Protocol.

29 *E.g.*, PRC Ministry of Foreign Affairs, Written Statement of the PRC, https://www.itlos.org/fileadmin/itlos/documents/cases/31/written_statements/1/C31-WS-1-8-China_transmission_ltr_.pdf.

30 *Id.*

31 ITLOS Advisory Opinion 2024, at ¶¶ 84-85; Request for an Advisory Opinion Submitted by the Sub-Regional Fisheries Commission (SRFC), Advisory Opinion, ITLOS Case No. 21, ITLOS Rep. 2015, ¶ 54 (Apr. 2).

32 ITLOS Advisory Opinion 2024, at ¶¶ 88-89.

33 *Id.* at ¶¶ 90-91.

34 *Id.* at ¶ 92.

35 *Id.* at ¶¶ 93-95.

36 *Id.* at ¶¶ 94-104.

the Tribunal's discretion to issue an Advisory Opinion, ITLOS indicated that it should generally not decline to do so unless there are "compelling reasons."³⁷ The Tribunal emphasized that the absence of consent from nonparties to the COSIS Agreement does not constitute grounds to "refuse to issue an Advisory Opinion."³⁸ Moreover, the Climate Change Advisory Opinion is understood not to affect the rights and obligations of third states, as there is no legal dispute "known between the members of the Commission and any other states relating to the subject matter."³⁹

3. Obligations on Marine Pollution

Before addressing the two questions submitted by COSIS, ITLOS clarified the scope of the applicable law⁴⁰ and emphasized "the need for consistency and mutual supportiveness" between UNCLOS and external rules,⁴¹ with special references to Articles 237 and 293 of UNCLOS.⁴²

While addressing the question (a) posed by COSIS, the Tribunal highlighted that the central issue is whether anthropogenic GHG emissions fall within the scope of "pollution of the marine environment" as defined in Article 1.1(4) of UNCLOS. ITLOS reasoned that GHG emissions generated "by man" introduce thermal energy and gases into the marine environment, a concept that should be interpreted "broadly."⁴³ Drawing on established perspectives from international organizations and climate treaties, ITLOS concluded that anthropogenic GHG emissions significantly contribute to ocean warming, sea-level rise, ocean acidification, and other adverse impacts on the marine environment.⁴⁴ Accordingly, ITLOS determined that anthropogenic GHG emissions constitute "pollution of the marine environment" under UNCLOS.⁴⁵

Given that Part XII of UNCLOS primarily addresses the prevention of marine pollution, the identification of anthropogenic GHG emissions as a form of marine pollution naturally led the Climate Change Advisory Opinion to elaborate on "the

³⁷ *Id.* at ¶ 111.

³⁸ *Id.* at ¶¶ 112-114.

³⁹ *Id.* at ¶ 116.

⁴⁰ *Id.* at ¶¶ 123-127.

⁴¹ According to the Climate Change Advisory Opinion, the relevant external rules may be found in international instruments, including "the UNFCCC, the Kyoto Protocol, the Paris Agreement, Annex VI to MARPOL, Annex 16 to the Chicago Convention, and the Montreal Protocol, including the Kigali Amendment".

⁴² ITLOS Advisory Opinion 2024, at ¶¶ 128-137.

⁴³ *Id.* at ¶¶ 159-173.

⁴⁴ *Id.* at ¶¶ 174-78.

⁴⁵ *Id.* at ¶ 179.

specific obligations of states parties to the Convention in preventing, mitigating, and managing such pollution.”⁴⁶ In this context, the Tribunal emphasized that states’ environmental obligations extend to measures “to prevent, reduce and control pollution of the marine environment arising from anthropogenic GHG emissions,”⁴⁷ while fully taking into account relevant international rules and standards set out in climate agreements such as the UNFCCC and the Paris Agreement as well as the overarching objective of limiting global warming to 1.5°C.

Specifically, Article 194, para. 1, of UNCLOS obligates states to take all necessary measures, individually or collectively, to “reduce and control existing marine pollution caused by such emissions” and ultimately to prevent its occurrence, although there is no immediate compliance requirement.⁴⁸ The Climate Change Advisory Opinion suggests that the term “necessary” should be interpreted broadly, while respecting states’ rights under UNCLOS, particularly as articulated in Article 194, para. 4.⁴⁹ Although UNCLOS does not explicitly define what constitutes necessary measures,⁵⁰ the Tribunal emphasized the importance of science, especially the best available scientific evidence, in guiding states’ actions.⁵¹

To assess whether the protection and management of blue carbon ecosystems can be integrated into the legal framework of UNCLOS, the central question is whether such measures can be considered “necessary measures” that states should undertake to control anthropogenic GHG emissions. The IPCC assessments, which reflect the scientific consensus on climate-related risks and mitigation strategies, provide the best available scientific evidence for ITLOS’s consideration. The IPCC strongly supports recognizing the protection and management of blue carbon ecosystem as measures for climate change mitigation. It has highlighted that mangroves, salt marshes, and seagrasses store considerable amounts of organic carbon in their soils and sediments and that disturbances of such ecosystems can release stored carbon back into the atmosphere⁵². Given that 25%–50% of vegetated coastal ecosystems have already been lost or degraded, the IPCC further confirmed that climate change can be slowed via “habitat protection, to

46 *Id.* at ¶ 180.

47 *Id.* at ¶ 220.

48 *Id.* at ¶¶ 198-199.

49 *Id.* at ¶¶ 203-204.

50 *Id.* at ¶ 205.

51 *Id.* at ¶¶ 207-208.

52 IPCC, *supra* note 7, at 454 & 522.

greatly reduce or end the human-driven loss” of such ecosystems.⁵³

Although the concept of “mitigation of climate change” is not explicitly reflected in the original language of UNCLOS, the nature of mitigation measures under climate law closely aligns with the objectives of measures aimed at preventing marine pollution under Article 194 of UNCLOS. As the primary focus of mitigation measures is the reduction of anthropogenic GHG emissions that cause deleterious effects on the marine environment, ITLOS compared such measures to a specific obligation in Article 194 - namely, the measures to minimize the release of toxic, harmful, or noxious substances.⁵⁴ Through this comparison, ITLOS sought to integrate the external concept of “mitigation” into the UNCLOS framework as a form of action to prevent, reduce, and control pollution.

The nature of the obligation to reduce and control existing marine pollution has been widely debated in prior proceedings. In the Climate Change Advisory Opinion, the Tribunal unequivocally confirmed that it constitutes “an obligation of conduct” rather than “an obligation of result.”⁵⁵ The obligation of result is closely linked to the principle of “due diligence,” the standard of which varies according to the specific context in which it is applied.⁵⁶ Given the probability and severity of marine pollution resulting from anthropogenic GHG emissions, the Tribunal concluded that the standard of due diligence should be “stringent.”⁵⁷

The Climate Change Advisory Opinion affirms that Article 194, para. 2, of UNCLOS applies to transboundary pollution resulting from anthropogenic GHG emissions, thereby imposing a due diligence obligation on states.⁵⁸ The Tribunal noted that the standard of this obligation is “even more stringent than that under Article 194, para. 1, because of the nature of transboundary pollution.”⁵⁹ Moreover, the Tribunal acknowledged the argument presented by certain participants that states should, at least, strive to limit the increase in global average temperature to no more than 1.5°C, while recognizing that compliance with this target is not the sole measure of fulfillment of their obligations.⁶⁰ In light of the stringent due diligence standard imposed on states⁶¹ and the wide recognition of blue carbon

53 *Id.* at 522.

54 ITLOS Advisory Opinion 2024, at ¶ 205.

55 *Id.* at ¶ 233.

56 *Id.* at ¶ 234 & 239.

57 *Id.* at ¶ 241.

58 *Id.* at ¶¶ 252-253.

59 *Id.* at ¶ 258.

60 *Id.* at ¶ 250.

61 Shiqi Liang, *Reflections on the interpretation and application of the due diligence obligation in international climate litigation: a comparative study of Daniel Billy et al. v. Australia and the COSIS advisory opinion*, (11) FRONT. MAR.

protection as an effective climate change mitigation measure,⁶² it can be argued that the protection of blue carbon ecosystems, widely recognized as an effective climate change mitigation measure, could reasonably be incorporated into states' obligations on safeguard the marine environment from the impacts of GHG emissions.

Moreover, the Tribunal emphasized that the measures envisaged under Article 194 are not only limited to pollution control, but also encompass the protection and preservation of rare or fragile ecosystems.⁶³ In this context, the protection of blue carbon ecosystems, which helps prevent the degradation of rare coastal ecosystems, can be understood as a measure to maintain the integrity of the marine environment under UNCLOS. Although UNCLOS does not explicitly mandate or obligate the use of blue carbon ecosystems, ITLOS recognized their utility for restoring the marine environment and enhancing carbon sequestration.⁶⁴

At a more detailed level, the Climate Change Advisory Opinion confirms the applicability of, and clarifies the meaning of, a series of obligations under Part XII of UNCLOS in the context of anthropogenic GHG emissions,⁶⁵ including:

- ① obligations to prevent and control pollution from land-based sources and atmospheric emissions under Articles 207, 212 and 213, and 222;
- ② obligations to prevent and control pollution caused by GHG emissions from ships under Articles 213 and 217;
- ③ obligations to cooperate, conduct research, and develop standards in support of these goals under Articles 197, 200 and 201;
- ④ obligations to assist developing countries, particularly vulnerable states, in addressing marine pollution from anthropogenic GHG emissions through financial resources, technical assistance, and specialized services under Articles 202 and 203; and
- ⑤ obligations to enforce monitoring, publish reports, and carry out environmental impact assessments under Articles 204–206.

Sci. 1483677 (2024).

62 IPCC, *supra* note 7, at 522. See also Nianzhi Jiao et al., *Blue carbon on the rise: challenges and opportunities*, 5(4) NAT'L SCI. REV. 464-8(2018), <https://academic.oup.com/nsr/article/5/4/464/4862478>.

63 ITLOS Advisory Opinion 2024, at ¶¶ 195-6.

64 *Id.* at ¶ 390.

65 *Id.* at ¶¶ 292-376.

4. Obligations to Protect and Preserve the Marine Environment

Regarding question (b) posed by the COSIS, ITLOS observed that it was broader in scope than question (a), encompassing a comprehensive obligation that includes Article 194, relevant provisions in Part XII, and other applicable parts of UNCLOS.⁶⁶ The Tribunal further noted that, although the term “impact” is neutral in itself, in the context of the case, it clearly refers to negative effects.⁶⁷ The Climate Change Advisory Opinion highlights that Article 192, which is directly pertinent to this issue, does not prescribe specific measures; rather, other provisions of UNCLOS, along with external rules in turn flesh out elaborate on and operationalize the obligations under Article 192.⁶⁸

According to ITLOS, states have a general obligation of due diligence under Article 192 of UNCLOS, applicable to all maritime areas, to address any adverse effects of climate change.⁶⁹ The Tribunal acknowledges that measures to fulfill this obligation include climate change mitigation as well as the implementation of resilience and adaptation activities.⁷⁰ Moreover, ITLOS interprets Article 194, Para. 5 as clarifying Article 192, specifying that states parties bear specific obligations to protect and preserve ecosystems, species, and habitats.⁷¹

According to the IPCC, adaptation is “the process of adjustment to actual or expected climate and its effects.”⁷² Ecosystem-based adaptation that relies on biodiversity and ecosystem services, forms an integral component of broader adaptation strategies.⁷³ Blue carbon ecosystems play a crucial role in maintaining marine environmental health and balance, providing ecosystem-based services that reduce disaster-related economic risks to human communities.⁷⁴ For instance, mangroves protect coastal settlements by mitigating damage from extreme storm events, stabilizing shorelines, and sustaining local artisanal fisheries by serving as crucial nurseries for fish and crustaceans.⁷⁵ Expanding the spatial coverage

66 *Id.* at ¶ 370.

67 *Id.* at ¶ 375.

68 *Id.* at ¶ 388.

69 *Id.* at ¶ 400.

70 *Id.* at ¶¶ 391-394.

71 *Id.* at ¶¶ 401-406.

72 IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, at 5, <https://www.ipcc.ch/report/ar6/wg2>.

73 IPCC, *supra* note 7, at 525.

74 Nesar Ahmed & Marion Glaser, *Coastal aquaculture, mangrove deforestation and blue carbon emissions: Is REDD+ a solution?*, 66(2) *MARINE POL'Y* 58-66 (2016), <https://www.sciencedirect.com/science/article/abs/pii/S0308597X16000166>; Jean Brodeur et al., *NOAA Blue Carbon White Paper* (2022), at 2, <https://repository.library.noaa.gov/view/noaa/40456>.

75 IPCC, *supra* note 7, at 530; Mauricio Carrasquilla-Henao et al., *The mangrove-fishery relationship: A local ecological knowledge perspective*, 108 *MARINE POL'Y* 103656 (2019), <https://www.sciencedirect.com/science/article/>

and improving the management of blue carbon ecosystems enhances their carbon sequestration potential and strengthens natural adaptation capacity to climate-related risks.⁷⁶

In elaborating on state measures under Article 192, ITLOS refers to provisions of UNFCCC and the Paris Agreement concerning adaptation measures.⁷⁷ For instance, Article 2 of UNFCCC identifies the goal to “allow ecosystems to adapt naturally to climate change” among the ultimate objectives of the Convention, while Article 7 of the Paris Agreement urges states to “enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change.” To clarify the scope of states measures, ITLOS emphasizes that such measures should be as comprehensive as possible to prevent the effects of climate change, in accordance with the “due diligence” nature of the obligation.⁷⁸

Taking all aspects into account, the protection of blue carbon ecosystems – which is widely recognized by the scientific community as a form of climate change adaptation – can be understood as a state measure under Article 192 of UNCLOS, consistent with the provisions of relevant climate law, for example, the Cancun Adaptation Framework which integrates protection of marine and coastal ecosystems into states’ adaptation measures.⁷⁹ Furthermore, as ITLOS recognizes that ecosystem restoration is necessary where the marine environment has been degraded, the replanting of blue carbon ecosystems may also be regarded as a measure to protect and preserve the marine environment. In addition, the obligations of states under UNCLOS for the protection and preservation of the marine environment⁸⁰ are as follows:

- ① Applying the precautionary and ecosystem-based approaches, and cooperating as appropriate, to fulfill environmental protection obligations under the Convention in the Exclusive Economic Zone and on the high seas, and to safeguard living marine resources threatened by climate change and ocean acidification,⁸¹ and

abs/pii/S0308597X19302374.

76 IPCC, *supra* note 7, at 523.

77 ITLOS Advisory Opinion 2024, at ¶¶ 392-393.

78 *Id.* at ¶ 394.

79 UNFCCC, 30 Years of Adaptation under the Convention and the Paris Agreement (2024), at 22, https://unfccc.int/sites/default/files/resource/AC_2024_30YearsOfAdaptation.pdf.

80 ITLOS Advisory Opinion 2024, at ¶¶ 407-436.

81 *Id.* at ¶¶ 61, 117 & 119.

- ② Cooperating, either directly or through appropriate international organizations, in the implementation of measures for the conservation and management of marine species and other living resources,⁸² and in combating pollution resulting from the introduction of non-native species due to climate change and ocean acidification.⁸³

B. Initial Responses to the Climate Change Advisory Opinion

The Climate Change Advisory Opinion immediately attracted scholarly attention, not only from the law of the sea community but also from experts in international environmental law, change climate law, and related fields. On the one hand, many scholars regard the Climate Change Advisory Opinion as a landmark decision and “a strong pronouncement,” confirming that climate change and its impacts fall squarely within the purview of UNCLOS.⁸⁴ The Advisory Opinion introduced numerous noteworthy legal and interpretative developments concerning climate change and international law.⁸⁵ It has been particularly valued for stimulating discussion on legal principles and concepts such as the precautionary approach and due diligence in relation to states’ obligations to mitigate climate change.⁸⁶ ITLOS was also commended for its extensive use of external rules, including climate agreements and general international law, in interpreting UNCLOS to clarify and adapt its provisions to address climate change issues.⁸⁷

The Climate Change Advisory Opinion is widely regarded as having advanced “environmental jurisprudence” within international judicial forums. ITLOS’s recognition of the relationship between UNCLOS and relevant external rules has clarified their complementary interactions, effectively ensuring that UNCLOS

82 UNCLOS arts. 63-64 & 118.

83 *Id.* art. 196.

84 Constantinos Yiallourides & Surya Deva, A Commentary on ITLOS’ Advisory Opinion on Climate Change, British Institute of International and Comparative Law Blog (May 24, 2024), <https://www.biicl.org/blog/77/a-commentary-on-itlos-advisory-opinion-on-climate-change>.

85 Diane Desierto, “Stringent Due Diligence”, Duties of Cooperation and Assistance to Climate Vulnerable States, and the Selective Integration of External Rules in the ITLOS Advisory Opinion on Climate Change and International Law, EJIL Talk! (June 3, 2024), <https://www.ejiltalk.org/stringent-due-diligence-duties-of-cooperation-and-assistance-to-climate-vulnerable-states-and-the-selective-integration-of-external-rules-in-the-itlos-advisory-opinion-on-climate-change-and-inte>.

86 Kristin Bartenstein, *The “Integrative Approach” in the ITLOS Climate Change Advisory Opinion: An Essay in Honor of Aldo Chircop*, 39(1) OCEAN Y.B. 1-26 (2025).

87 Joshua Paine, The ITLOS Advisory Opinion on Climate Change: Selected Issues of Treaty Interpretation, EJIL Talk! (June 3, 2024), <https://www.ejiltalk.org/the-itlos-advisory-opinion-on-climate-change-selected-issues-of-treaty-interpretation>.

continues to function as “a living document.”⁸⁸ By interpreting obligations in a contextual and systematic manner, ITLOS has enabled UNCLOS to address emerging global challenges, including the pressing issue of climate change, in a coherent and effective way.⁸⁹

The Climate Change Advisory Opinion is widely believed to have strengthened the application of UNCLOS to climate change. In this regard, ITLOS’s conclusions are expected to contribute to ongoing and future efforts to address this global challenge.⁹⁰ ITLOS’s prompt response allows national and international jurisdictions to refer to and build upon these findings, including the climate advisory procedures of the International Court of Justice (ICJ) and the Inter-America Commission on Human Rights. Notably, the ICJ’s Advisory Opinion on states’ obligations with respect to climate change, released in July 2025, supported and reiterated ITLOS’s position regarding climate change obligations under UNCLOS.⁹¹ It has been suggested that the Climate Change Advisory Opinion can position ITLOS as a public forum for providing legal guidance on climate change, or even as “a public interest litigation device”, owing to the special arrangements of its advisory jurisdiction.⁹² At the same time, this potentially underscores the prudence for ITLOS to exercise its discretion carefully to safeguard its legitimacy as a judicial body.⁹³

On the other hand, initial reactions to the ITLOS Climate Change Advisory Opinion have not been uniformly positive. A prevailing view is that the Advisory Opinion on the relationship between climate change and oceans is not a panacea and cannot definitely resolve all the challenges posed by climate change.⁹⁴ The actual impact of the Climate Change Advisory Opinion remains uncertain, largely depending on the extent to which ITLOS and other international courts and tribunals exercising jurisdiction under UNCLOS are willing or prepared to assess and review the compatibility of climate-related decisions and policies adopted by states with their environmental obligations under UNCLOS.⁹⁵

88 Bartenstein, *supra* note 86.

89 *Id.*

90 Yiallourides & Deva, *supra* note 84.

91 Obligations of States in Respect of Climate Change, Advisory Opinion, 2025 I.C.J. (July 23), General List No. 187, <https://www.icj-cij.org/sites/default/files/case-related/187/187-20250723-adv-01-00-en.pdf>.

92 Carlos Carillo, *ITLOS Advisory Opinion on Climate Change and Oceans: Possibilities and Benefits*, *OPINIO JURIS* (July 21, 2021), <https://opiniojuris.org/2021/07/21/itlos-advisory-opinion-on-climate-change-and-oceans-possibilities-and-benefits>.

93 *Id.*

94 *Id.*

95 Yiallourides & Deva, *supra* note 84.

In some instances, the Climate Change Advisory Opinion has been characterized as relatively conservative, as it did not provide sufficient indications of specific measures that states should undertake, often reiterating the general provisions of UNCLOS and climate change treaties.⁹⁶ Some commentators have expressed disappointment that ITLOS did not hold major GHG emitters accountable for climate change impacts on the oceans and missed opportunities to clarify obligations related to financial cooperation and assistance.⁹⁷ Nonetheless, these limitations do not preclude future environmental litigation on the basis of the opinion, particularly litigation based on the UNCLOS.⁹⁸ In addition, it has been argued that ITLOS's limited engagement with climate change-related human rights treaties reflects a deficiency in its application of "external rules."⁹⁹

As a preliminary observation, the Climate Change Advisory Opinion has been widely recognized in the legal academy for its value and potentially positive implications in invoking international law to address climate change impacts. It has transformed climate change into a law of the sea issue in its own right, bridging the fields of climate change law, international environmental law, and the law of the sea.¹⁰⁰ Nonetheless, ITLOS's approach has been somewhat disappointing for those anticipating a landmark decision, as the Tribunal adopted a relatively cautious approach on issues of legal interpretation and application, avoiding some of the most challenging matters, such as state responsibility, the question of causation, and the relationship between climate change and human rights.¹⁰¹

96 See Expanding Horizons: The ITLOS Advisory Opinion on Climate Change, <https://www.columbia.edu/content/events/expanding-horizons-itlos-advisory-opinion-climate-change>.

97 Luciana Maulida, *Vague Cooperation and Financial Obligations for Climate Actions: ITLOS's Missed Opportunity*, OPINIO JURIS (June 20, 2024), <https://opiniojuris.org/2024/06/20/vague-cooperation-and-financial-obligations-for-climate-actions-itloss-missed-opportunity>.

98 Yiallourides & Deva, *supra* note 84.

99 Desierto, *supra* note 85.

100 Bastiaan Klerk, *The ITLOS advisory opinion on climate change: Revisiting the relationship between the United Nations Convention on the Law of the Sea and the Paris Agreement*, 34(1) REV. EUR. COMPAR. & INT'L ENV'T L. 181-93 (2025), <https://onlinelibrary.wiley.com/doi/10.1111/reel.12588>.

101 See, e.g., Sebastián Rioseco, *The ITLOS Advisory Opinion on Climate Change and International Law: A Deep Dive into External Rules and Materials*, 74(S1) INT'L & COMPAR. L. Q. 206-13 (2025), <https://doi.org/10.1017/S0020589325101206>; Dimitrios Dimitrakos, *The ITLOS Advisory Opinion on Climate Change: A Brief Review*, 29(5) AM. SOC'Y INT'L L. 1-9 (2025), https://asil.org/wp-content/uploads/2025/10/ASIL_Insights_2025_V29_15.pdf.

III. Legal and Governance Implications of the Climate Change Advisory Opinion: An Evaluation

Although the Climate Change Advisory Opinion does not provide exhaustive guidance on specific “necessary measures” to address the adverse impacts of climate change on the oceans, its significance lies in its potential influence on future climate action within the sphere of international law and interstate relations.¹⁰² It has been suggested that the opinion is likely to strengthen states’ willingness to undertake legal and policy measures and to bolster the position of “specially affected states” including small island developing states, in climate negotiations.¹⁰³

A. The Climate Change Advisory Opinion and Enhanced Legal Actions

Although it does not resolve all concerns, the Climate Change Advisory Opinion is expected to catalyze legal action aimed at achieving climate justice among states. This development has significant implications for the interpretation and enforcement of UNCLOS by states parties, as well as for the broader evolution of the law of the sea.¹⁰⁴

The opinion systematically integrates environmental obligations under the law of the sea into the discourse on climate change. It links the environmental responsibilities delineated in UNCLOS - especially those in Part XII on environmental protection and preservation - to prevent and mitigate marine pollution and the adverse impacts of climate change. As a result, virtually all prevailing climate-related issues that are likely to instigate “effects” on the oceans such including ocean warming, sea-level rise, and ocean acidification, are framed as matters within the scope of the law of the sea, thereby enabling the application of UNCLOS’s comprehensive, legally binding provisions.¹⁰⁵

Second, ITLOS affirms that the due diligence obligations of states under UNCLOS in the context of climate change are elevated in scope and stringency.

102 Jiangtao Qian et al., *The impact of the ITLOS climate change advisory opinion on the development of international law*, 170 MARINE POL’Y 106406 (2024), <https://www.sciencedirect.com/science/article/abs/pii/S0308597X24004044>.

103 Jianping Guo et al., *The climate advisory opinion: A medicine with side-effects?*, 156 MARINE POL’Y 105817 (2023), <https://www.sciencedirect.com/science/article/abs/pii/S0308597X23003500>.

104 Qian et al., *supra* note 102.

105 ITLOS Advisory Opinion 2024, at ¶ 179.

Although the Tribunal confirmed that the obligation to address climate change constitutes an obligation of diligence (obligation of conduct) rather than an obligation of result contingent on achieving specific outcomes, it emphasized a heightened standard of due diligence by characterizing it as “stringent”¹⁰⁶ and by expanding the content and scope of this duty.¹⁰⁷ States are required to act in accordance with the standards and norms established by competent international bodies and relevant international instruments and to adopt a precautionary approach.¹⁰⁸ Nonetheless, the interpretive ambiguity surrounding these directives can present challenges for their consistent and effective implementation.

Simultaneously, the Climate Change Advisory Opinion creates a pathway for further reinforcement of states’ environmental obligations through climate governance. It integrates all relevant rules of international law - including climate treaties and customary law - that do not conflict with UNCLOS. The Advisory Opinion also draws on international consensus, standards, and norms established by competent international bodies, interstate negotiations, and international conferences. This framework suggests that both specially affected states and others can raise the standards for fulfilling environmental obligations over time through international or regional negotiations, thereby generating progressively greater responsibilities for states Parties.

Furthermore, the Climate Change Advisory Opinion can prompt changes in both external and internal state policies, including shifts in legal interpretation. ITLOS’s favorable stance could encourage the use of the law of the sea to address climate change through advisory procedures in international tribunals and other judicial or quasi-judicial bodies.¹⁰⁹ The emphasis on consistency - and the possibility of building on ITLOS’s reasoning - has become a clamour or consensus of many international lawyers.¹¹⁰

The Climate Change Advisory Opinion presents a compelling opening for interstate climate change litigation grounded in the law of the sea. It creates a potential avenue to hold states primarily responsible for anthropogenic GHG emissions, including the claims for assistance, compensation, and reparation,

106 Eugene Cheigh, *Understanding stringent due diligence in the ITLOS advisory opinion on climate change*, 54(11) ENVTL L REV. 10924 (2024), <https://www.elr.info/sites/default/files/files-general/54.10924.pdf>.

107 Qian et al., *supra* note 102.

108 ITLOS Advisory Opinion 2024, at ¶¶ 418 & 434.

109 Monica Feria-Tinta, *On the request for an advisory opinion on climate change under UNCLOS before the International Tribunal for the Law of the Sea*, 14(3) J. INT’L DISP. SETTLEMENT 391-406 (2023), <https://academic.oup.com/jids/article-abstract/14/3/391/7194698>; ITLOS Advisory Opinion 2024, at ¶ 441.

110 Yiallourides & Deva, *supra* note 84.

particularly through the contentious procedures under Part XV of UNCLOS. Although ITLOS refrained from addressing issues of responsibility and legal consequences directly, it implied that a claim could arise when states fail to fulfill their obligations according to the requisite “due diligence” standard.¹¹¹

Specifically, ITLOS noted that noncompliance with due diligence obligations under Articles 192 and 194, pertaining to GHG emission control and marine environmental protection, can engage a state’s international responsibility.¹¹² The Tribunal’s broad treatment of the question underscores the importance of further elaborating the state’s environmental obligations concerning climate change under UNCLOS, particularly in the context of contentious proceedings.¹¹³

Furthermore, the Climate Change Advisory Opinion can support domestic climate litigation, enabling challenges against governments or domestic authorities for failing to implement necessary measures under the law of the sea or for seeking compensation where appropriate.¹¹⁴

Arguably, the most notable implication of the Climate Change Advisory Opinion is that states should adapt to or more effectively enforce their domestic laws in order to meet their climate obligations under UNCLOS concerning the marine environment.¹¹⁵ This includes developing contingency plans to address pollution; enhancing transparency in the reporting of marine pollution; formulating rules, standards, and guidelines to prevent and mitigate pollution; and adopting a precautionary approach.¹¹⁶ States that fail or refuse to undertake these measures risk being in breach of their international obligations under UNCLOS and may thus face challenges in dispute settlement proceedings, particularly in light of the “stringent” standard of due diligence established by the Advisory Opinion.¹¹⁷

The Climate Change Advisory Opinion is poised to inject new momentum into interstate climate negotiations from a perspective of the law of the sea, although

111 Cheigh, *supra* note 106.

112 ITLOS Advisory Opinion 2024, at ¶ 223.

113 Armando Rocha, A Small but Important Step: A Bird’s-Eye View of the ITLOS’ Advisory Opinion on Climate Change and International Law, Sabin Center for Climate Change Law (May 27, 2024), <https://blogs.law.columbia.edu/climatechange/2024/05/27/a-small-but-important-step-a-birds-eye-view-of-the-itlos-advisory-opinion-on-climate-change-and-international-law>.

114 Wanning Zeng & Guihua Wang, *On the obligations of states to respond to climate change and China’s legal consequences: based on the advisory opinion in case no. 31 of the international tribunal for the law of the sea*, 11 FRONT. MAR. SCI. 1468210 (2025), <https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2024.1468210/full>.

115 ITLOS Advisory Opinion 2024, at ¶ 405.

116 *Id.* at ¶¶ 292-376.

117 *See, e.g.*, Klerk, *supra* note 100; Cheigh, *supra* note 106.

certain challenges warrant careful attention. The potential use of UNCLOS, particularly its dispute settlement mechanisms, to hold states accountable for climate change obligations can prompt some states parties - especially major emitters - to reassess their engagement with key law of the sea instrument.

Meanwhile, concerns arise when states with marked climate change responsibility remain outside UNCLOS, raising questions about the feasibility of achieving climate justice and equitable burden sharing. Furthermore, the issues of causation and the determination of specific consequences, which the Climate Change Advisory Opinion deliberately sidestepped, will need to be addressed in future cases and are likely to remain points of contention.¹¹⁸

B. The Climate Change Advisory Opinion and Integrated Ocean-climate Governance

The Climate Change Advisory Opinion holds promise for advancing the coordination of climate action and ocean governance at the global level. The ocean has become a central focus of governance owing to both the impacts of climate change and its potential role in solutions.¹¹⁹ In regard of ocean conservation and management, linking ocean and climate governance may be an effective way to address the fragmentation and structural limitations of existing international ocean governance frameworks.¹²⁰ ITLOS plays a crucial “governance function” by providing normative guidance to states for the implementation of UNCLOS.¹²¹ Through the Climate Change Advisory Opinion, ITLOS has effectively integrated states’ obligations under international climate law into the law of the sea.¹²² This opinion establishes a legal foundation for the development of international principles, rules, and standards aimed at optimizing ocean and coastal management. It encourages international cooperation to advance scientific research, inclusive financing, and an integrated approach to responding to the evolving ocean-climate environment.

118 Qian et al., *supra* note 102.

119 Fusco et al., *supra* note 8; Erika Techera, *The intersection of marine and coastal conservation and nature-based solutions to climate change: Governance insights from Indian Ocean small island States*, 239(4) OCEAN & COASTAL MGMT. 106579 (2023), <https://www.sciencedirect.com/science/article/pii/S0964569123001047>.

120 Ana Spalding & Ricardo de Ycaza, *Navigating shifting regimes of ocean governance from UNCLOS to sustainable development goal 14*, 11(1) ENVTL & SOC’Y 5-26 (2020), <https://www.berghahnjournals.com/view/journals/environment-and-society/11/1/ares110102.xml>; Amanda Lombard et al., *Principles for transformative ocean governance*, 6 NATURE SUSTAINABILITY 1587-99 (2023), <https://www.nature.com/articles/s41893-023-01210-9>.

121 NGUYEN LAN, *THE DEVELOPMENT OF THE LAW OF THE SEA BY UNCLOS DISPUTE SETTLEMENT BODIES* 247-300 (2023).

122 Klerk, *supra* note 100.

1. Optimizing Ocean–climate Governance

Traditionally, ocean governance has been largely disconnected from environmental governance issues, such as biodiversity and climate change, which are primarily addressed via multilateral environmental agreements.¹²³ International negotiations on climate change and ocean governance typically occur in separate political forums,¹²⁴ limiting cross-sectoral integration. Although recent IPCC reports and decisions from the UNFCCC Conference of Parties (COP) have recognized ocean carbon sinks as crucial climate regulators, these acknowledgments have not yet translated into effective legal or policy outcomes that leverage ocean-based solutions for climate change. Such tools as marine protected areas (MPAs), marine spatial planning (MSP), and marine environmental impact assessment (EIA) have intrinsic potential to embed climate considerations into their management frameworks.¹²⁵ For instance, MPAs can enhance carbon sequestration by safeguarding marine and coastal ecosystems.¹²⁶ At both international and domestic levels, however, practical integration of climate mitigation, adaptation, and resilience into ocean management remains limited.¹²⁷ Climate-responsible management of ocean-related activities largely remains limited to academic or policy discussions, rather than being implemented in operational practice. Existing ocean-based solutions for climate change continue to face challenges in delivering reliable climate benefits in a cost-effective and economically viable manner.¹²⁸

In the Climate Change Advisory Opinion, the questions posed to ITLOS reflect the fragmentation of environmental obligations across climate change law, the law of the sea, and more broadly international environmental law. To promote consistency among these regimes, ITLOS applied an integrated approach, largely relying on “external rules” in interpreting UNCLOS - in both

123 Ana Barros-Platiau et al., *Ocean Governance in the Anthropocene: A New Approach in the Era of Climate Emergency*, in *ECO-POLITICS AND GLOBAL CLIMATE CHANGE* 59-72 (Sachchidanand Tripathi et al. eds., 2023).

124 Simone Borg, *Ocean Governance in an era of climate change*, in *RESEARCH HANDBOOK ON OCEAN GOVERNANCE LAW* 179-80 (Simone Borg et al. eds., 2023).

125 Chuanliang Wang & Min Wu, *On the provisions of the BBNJ Agreement addressing the impacts of climate change*, 171 *MARINE POL'Y* 106429 (2025), <https://www.sciencedirect.com/science/article/pii/S0308597X24004299>.

126 William Cheung, *Projecting global marine biodiversity impacts under climate change scenarios*, 10(3) *FISH & FISHERIES* 235-51 (2009).

127 Catarina Santos et al., *Integrating climate change in ocean planning*, 3 *NATURE SUSTAINABILITY* 505-16 (2020), <https://www.nature.com/articles/s41893-020-0513-x>; H. Calado et al., *Forging ahead: Climate-smart maritime spatial planning for the future*, 171 *MARINE POL'Y* 106503 (2025), <https://doi.org/10.1016/j.marpol.2024.106503>.

128 Tiffany Morrison et al., *Governing novel climate interventions in rapidly changing oceans*, 389(6759) *Sci.*(2025), <https://www.science.org/doi/10.1126/science.adq0174>.

clarifying specific obligations and delineating the treaty's scope.¹²⁹ Using this method, ITLOS has made notable efforts to situate UNCLOS within the wider framework of international environmental law, demonstrating the Convention's adaptability to evolving natural and social contexts more than four decades after its negotiation.¹³⁰

Blue carbon is an emerging concept that has gained attention in scholarship and policy forums since 2010. At present, the term "blue carbon" is not reflected in the legal language of either the law of the sea or climate change law. Nevertheless, a range of international initiatives - including the Blue Carbon Initiative (2010), the Blue Carbon Policy Framework (2012), and the High-Quality Blue Carbon Principles and Guidance (2023) - demonstrate growing efforts to integrate blue carbon into the international ocean governance framework.¹³¹ At an intervention-specific level, blue carbon is recognized for its role in advancing marine and coastal management tools such as enhancing the carbon sequestration potential of MPAs, while delivering socioeconomic benefits¹³² and strengthening climate outcomes in MSP.¹³³

The Climate Change Advisory Opinion is likely to be a strong impetus for internalizing climate goals into the ocean governance framework. First, ITLOS placed an unprecedented emphasis on science-informed legal decision-making,¹³⁴ which is expected to stimulate further scientific studies on ocean-climate governance which can better address the complicated challenges posed by climate change on ocean ecosystems.¹³⁵ Second, the integration of UNCLOS with international climate law is poised to inspire both international and domestic policies that advance climate-neutral ocean plans, while creating new opportunities for the research, development, and implementation of climate-

129 Bartenstein, *supra* note 86.

130 *Id.*

131 Hamilton et al., *supra* note 11. *See also* World Economic Forum, High-quality blue carbon principles and guidance, at 24-6, https://www3.weforum.org/docs/WEF_HC_Blue_Carbon_2022.pdf; Dorothée Herr et al., Blue carbon policy framework (2012), at 7-35, https://iucn.org/sites/default/files/import/downloads/blue_carbon_policy_framework_2_0.pdf.

132 Emilia Jankowska et al., *Climate benefits from establishing marine protected areas targeted at blue carbon solutions*, 119(23) *PROC. NAT'L ACAD. SCI.* e2121705119 (2022).

133 Narissa Bax et al., *Towards Incorporation of Blue Carbon in Falkland Islands Marine Spatial Planning: A Multi-Tiered Approach*, 9 *FRONT. MAR. SCI.* 872727 (2022), <https://doi.org/10.3389/fmars.2022.872727>.

134 Rioseco, *supra* note 101.

135 Min Wang et al., *Advisory opinion of the ITLOS on climate change and International Law on the Request of Small Island Developing States (SIDS): A Sustainable Development Goal - 14 (SDG 14) perspective*, 13 *FRONT. MAR. SCI.* 1733628 (2026).

smart ocean management tools.¹³⁶ In the political sphere, the Climate Change Advisory Opinion creates new avenues for climate-centered debates to enter international ocean processes, such as the COP to UNCLOS, the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, and the United Nations Ocean Conference, among others. Therefore, it provides a solid basis for states and environmental nongovernmental organizations to advance climate goals within multilateral ocean negotiations.

2. Increasing legal and finance certainty of blue carbon projects

Blue carbon projects worldwide are constrained by uncertainties in economic returns and the policy and legislative frameworks governing them.¹³⁷ Currently, legal systems that commodify, monetize, or otherwise formalize carbon sequestration from marine and coastal ecosystems have not completely emerged at the international level and remain largely absent domestically in most countries. Notably, blue carbon is absent in compliance-oriented carbon markets under the Kyoto Protocol framework.¹³⁸ Early mechanisms for internationally transferred carbon credits, such as the Clean Development Mechanism and “Land Use, Land Use Change, and Forestry,” focused exclusively on terrestrial forests and did not extend to coastal and marine ecosystems. Subsequently, the voluntary carbon market has gradually expanded to incorporate blue carbon activities, with international standards developed for quantifying carbon sequestration in coastal wetlands, including VM0024 (methodology for coastal wetland creation) and VM0033 (methodology for tidal wetland and seagrass restoration).¹³⁹ However, these methodologies have faced criticism for potential overestimation¹⁴⁰ and technical limitations in accurately measuring, tracking, and parameterizing carbon sequestration, posing ongoing challenges for the operationalization of blue carbon credits.¹⁴¹

Under the Paris Agreement, many countries include blue carbon in their Nationally Determined Contributions (NDCs) as part of mitigation and adaptation strategies.¹⁴² However, insufficient financial support for developing

136 Sakib Omweoal & Sabrina Hasan, *Navigating state obligations: A critical analysis of the ITLOS advisory opinion on climate change and the UNCLOS*, 187 MARINE POL’Y 107054 (2026); Wang et al., *supra* note 135.

137 Macreadie et al., *supra* note 6. *See also* Adam Orford, *Blue Carbon Law*, 13(1) SEA GRANT L. & POL’Y 19-36 (2024), 138 *Id.*

139 *Id.*

140 Sophia Johannessen & Robie Macdonald, *Geoengineering with seagrasses: is credit due where credit is given?*, 11 ENVTL RES. LETTERS 1-11 (2016).

141 Macreadie et al., *supra* note 6.

142 Herr et al., *supra* note 131. *See also* Amrit Dencer-Brown et al., *Integrating blue: How do we make nationally*

countries in implementing NDCs¹⁴³ constrains the effectiveness of blue carbon commitments. Although government and private sector interest in blue carbon is growing, uncertain financing prospects combined with an unclear legal status hinder the scaling-up of blue carbon projects as a concrete pillar of states' climate policies.¹⁴⁴

The future of blue carbon is closely linked to the ongoing development of the voluntary carbon market under Article 6 of the Paris Agreement - the Paris Agreement Credit Mechanism.¹⁴⁵ The 29th COP of the UNFCCC marked a significant milestone in operationalizing this mechanism by finalizing rules governing cooperative approaches and the crediting mechanism.¹⁴⁶ Once fully operational, the voluntary carbon market under the Paris Agreement could provide a robust end-market for blue carbon credits and enable the global scaling of blue carbon projects.

From a legal and political perspective, the Climate Change Advisory Opinion could help promote international consensus on states' climate responsibilities and foster the development of blue carbon. First, under the high legal expectations on states' due-diligence acts to prevent harm to the marine environment, states potentially take stronger regulation actions to achieve the global and national climate goals.¹⁴⁷ Consequently, in light of the Climate Change Advisory Opinion, blue carbon activities as an 'sink-option' to global climate mitigation, may receive increasing legal backing and government support when states enhance their climate commitments.

Second, the Climate Change Advisory Opinion has heightened the pressure on states to mitigate GHG emissions by introducing climate-related obligation into UNCLOS.¹⁴⁸ In the voluntary carbon mitigation framework created by the Paris Agreement, some states incorporated blue carbon activities as Nature-based Solutions in their National Determined Commitments (NDCs) and displayed

determined contributions work for both blue carbon and local coastal communities?, 51(9) *AMBIO* 1978-93 (2022).

143 See generally Preeya Mohan, *Financing needs to achieve Nationally Determined Contributions under the Paris Agreement in Caribbean Small Island Developing States*, 28(5) *MITIGATION & ADAPTATION STRATEGIES GLOB. CHANGE* (2023), <https://doi.org/10.1007/s11027-023-10062-9>.

144 Macreadie et al., *supra* note 6.

145 Adam Orford, *Blue carbon, red states, and Paris Agreement Article 6*, 6 *FRON. CLIMATE* 1355224 (2024); Jessen & Hill, *supra* note 4.

146 Anna Kovács et al., *The Paris Agreement Crediting Mechanism after COP 29: fundamentals in place, substance in progress* (2025), at 7, https://climatefocus.com/wp-content/uploads/2025/05/The-Paris-Agreement-Crediting-Mechanism-After-COP29_FINAL.pdf.

147 Omweol & Hasan, *supra* note 136.

148 Rioseco, *supra* note 101.

willingness to use the emerging carbon market to fulfill their NDCs.¹⁴⁹ For example, Korea government has announced its intention to use Paris Agreement Article 6 to support its NDCs.¹⁵⁰ Given that ITLOS has highlighted states' due-diligence obligation on mitigating GHG emission under UNCLOS, states and carbon-intensive sectors are likely to take more interest in transferred mitigation outcomes through voluntary carbon markets, complementing their direct carbon reduction efforts. This dynamic can foster broader political willingness to advance the operationalization of the Paris Agreement Credit Mechanism, thereby creating more reliable revenue streams for supporting the development and scaling of blue carbon projects.

IV. Conclusion

The Climate Change Advisory Opinion has marked the first formal recognition of the law of the sea as a legal instrument to address climate change within the international legal framework. Although the Tribunal adopted a cautious approach - avoiding specific pronouncements on state obligations and the complex issues of causation and responsibility allocation - it unequivocally acknowledged that anthropogenic GHG emissions constitute "pollution of the marine environment." It implies that states parties to UNCLOS should undertake environmental obligations to address both current and potential adverse impacts of climate change on the oceans. The Climate Change Advisory Opinion represents a landmark milestone in invoking international law to advance climate action and strengthen the legal basis for integrating ocean governance with global climate objectives.

Although this Advisory Opinion cannot resolve all the questions regarding the interplay between the law of the sea and climate change, it establishes a flexible and scalable framework for interpreting and applying UNCLOS in the climate context. Furthermore, ITLOS, along with other international and national jurisdictions, has the opportunity to refine this framework further by applying the law of the sea principles to specific issues or disputes in future cases.

ITLOS recognized the growing importance of scaling up global blue carbon initiatives by linking the protection of blue carbon ecosystems to state parties' obligations of to safeguard and preserve the marine environment. This

¹⁴⁹ Jessen & Hill, *supra* note 4.

¹⁵⁰ Orford, *supra* note 145.

recognition enhances the legal certainty of blue carbon within the law of the sea framework and opens pathway for incorporating blue carbon into transferable carbon credits in maritime sectors. Consequently, the prospects for blue carbon projects will be strengthened by their increasing appeal to both investors and domestic policymakers.

The “governance function” of UNCLOS is further supported by the Climate Change Advisory Opinion, as it promotes coordination between climate action and ocean governance by aligning goals, standards, and rules across these domains. At the policy level, this newly established ocean-climate nexus can facilitate the integration of climate objectives into key intervention tools, such as MPA, MSP, and EIAs, as well as the incorporation of blue carbon into ocean planning and management. Therefore, blue carbon is reinforced as both a key criterion and an integral component of ocean governance.

Nevertheless, the effectiveness of international law ultimately depends on the actions and responses of states. It would be unrealistic to rely solely on the optimistic outlook presented in the Climate Change Advisory Opinion. Achieving the intended outcomes will require sustained interstate negotiations, alongside the enactment and rigorous enforcement of relevant domestic legislation by individual states.

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