United Nations A/CONF.230/2025/10

Distr.: General
29 April 2025

Original: English

2025 United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Nice, France, 9–13 June 2025
Item 9 of the provisional agenda*
Ocean Action panels

Ocean Action panel 7: Leveraging ocean, climate and biodiversity interlinkages

Concept paper prepared by the Secretariat

Summary

The present concept paper was prepared pursuant to paragraph 24 of General Assembly resolution 78/128, in which the Assembly requested the Secretary-General of the 2025 United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development to prepare concept papers on each of the themes of the Ocean Action panels, taking into account the relevant ocean-related processes of the Assembly and other possible contributions. The present paper relates to Ocean Action panel 7, on the theme "Leveraging ocean, climate and biodiversity interlinkages". In the paper, the status of and trends in ocean, climate and biodiversity, and challenges and opportunities in leveraging interlinkages between them for the achievement of relevant targets of Sustainable Development Goal 14, are set out under the overarching theme of the Conference: "Accelerating action and mobilizing all actors to conserve and sustainably use the ocean".

* A/CONF.230/2025/1.

I. Introduction

1. The ocean plays a central role in the climate system and climate solutions. It regulates the climate and absorbs 30 per cent of human-generated carbon dioxide from the atmosphere. Marine ecosystems contribute significantly to the global carbon cycle and climate stability. Coastal blue carbon habitats such as mangroves, tidal marshes and seagrass meadows not only efficiently sequester carbon but also provide essential breeding, nursery and feeding grounds for a wide range of marine species, including important fish stocks that underpin fisheries and aquaculture systems. As one of the world's major reservoirs of biodiversity, the ocean contains between 500,000 and 10 million marine species, many of which have yet to be identified. Furthermore, there is a large degree of uncertainty with regard to the number of marine species and thus with regard to marine biodiversity and its implications for key ecosystem services, including food production and coastal protection.

2. Yet the ocean and its biodiversity, on which humans depend heavily for food, livelihoods and protection, are being altered as a result of the impacts of human activities, including climate change, which is compounding other pressures. Habitats, in particular in coastal areas, are being damaged by the effects of climate change and human activities. There also remains an incomplete understanding of how species shifts driven by climate change affect the functioning of different types of marine ecosystems.

3. Rising ocean temperatures, acidification and deoxygenation, primarily driven by anthropogenic carbon dioxide emissions, can accelerate biodiversity loss and undermine marine ecosystem functioning. Indirect drivers such as economic, demographic and technological changes intensify direct pressures such as habitat destruction, overexploitation, pollution and invasive species, worsening biodiversity loss across ecosystems. Fragmented governance across ocean, biodiversity, water, food, health and climate frameworks leads to conflicting objectives and inefficiencies and exacerbates cascading environmental impacts.

4. Economic resilience measures to address the challenges of biodiversity loss and the causes and impacts of climate change, must consider the entirety of the ocean-climate-biodiversity nexus. This requires a holistic, coordinated, cross-sectoral approach that integrates marine conservation, sustainable use and resource management, and climate action.

5. The interlinkages between the ocean, climate and biodiversity and their critical role in achieving sustainable development have been increasingly mainstreamed in global processes and discussions, including under the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity, the International Maritime Organization (IMO) and the recently adopted 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. Regional seas conventions are also important frameworks for addressing these interlinkages. The second United Nation Ocean Conference in 2022 called for synergized efforts to implement Sustainable Development Goals 13, 14 and 15. This requires the development of integrated adaptation and mitigation efforts based on science, and the achievement of the Sustainable Development Goals, as well as the goals and objectives of the United Nations Framework Convention on Climate Change, the Paris Agreement, the Convention on Biological Diversity, the Kunming-Montreal Global Biodiversity Framework and the Agreement on Marine Biological Diversity of Areas beyond National Jurisdiction.

II. Status and trends

A. Trends of ocean warming, deoxygenation and acidification, and sea level rise

6. Recent reports show that ocean warming is happening at an unprecedented pace, with the rate of warming accelerating at all depths from the surface down to the abyss.[1] Ocean warming in 2024 has led to new record high ocean temperatures, with the ocean now the hottest it has ever been.[2]

7. Observers estimate an accumulated loss of about 2 per cent of the ocean's oxygen inventory over the five decades between 1960 and 2010.[3] Apart from in coastal areas where eutrophication is a major cause of anthropogenically driven loss of marine oxygen, ocean deoxygenation is primarily driven by global warming and the associated increase in stratification and reduction in ventilation.[4] Ocean models predict a continued decline in oxygen inventory of 1–7 per cent by the year 2100.

8. The absorption of carbon dioxide triggers chemical processes that decrease the pH of seawater, a process known as ocean acidification. Since the pre-industrial era, the pH of the ocean has decreased by approximately 30 per cent. In coastal areas, local factors such as upwelling, stratification, freshwater influx and eutrophication can exacerbate acidification, creating "hot spots" of rapid pH change.[5] Further decreases in pH are projected in the future;[6] specifically, it is projected that the ocean will become 150 per cent more acidic by the year 2100.

9. Increasing ocean temperatures directly account for about 40 per cent of global sea level rise.[7] Over the past 30 years, global sea levels have risen by 9 cm, the rate of sea level rise having doubled over this period,[8] driven largely by the accelerated melting of the Greenland and West Antarctica ice sheets.

B. Interconnected impacts of ocean warming, deoxygenation and acidification on marine biodiversity

10. Biodiversity loss and climate change amplify each other, weakening ecosystem resilience and reducing the ability of the ocean to sequester carbon, thereby accelerating impacts.

11. Large-scale ocean warming is resulting in shifting distributions of many species and has the potential to alter the migratory patterns, both temporal and spatial, of those species[9] that undertake large-scale movements between important habitats, with impacts on coastal communities that depend on ocean resources. These changes also have the potential to result in biological mismatches, reducing habitat connectivity and productivity and the associated provision of ecosystem services.[10] These

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[1] United Nations Educational, Scientific and Cultural Organization, *State of the Ocean Report 2024* (Paris, 2024).
[2] See https://doi.org/10.1007/s00376-025-4541-3.
[3] See https://doi.org/10.1038/nature21399.
[4] See https://doi.org/10.1038/s41561-018-0152-2.
[5] See https://doi.org/10.1146/annurev-marine-010419-011004.
[6] See https://doi.org/10.1029/2022MS003563.
[7] See https://doi.org/10.1017/9781009157896.011.
[8] World Meteorological Organization, *State of the Global Climate 2024* (Geneva, 2025).
[9] See https://doi.org/10.1146/annurev-marine-010419-010916; and https://doi.org/10.1111/gcb.15634.
[10] See https://doi.org/10.1038/nature02808; https://doi.org/10.1111/gcb.15395; and https://doi.org/10.1016/j.pocean.2021.102533.

distributional changes have also contributed to an acceleration in the spread of aquatic non-indigenous or invasive species, which has an impact on aquatic ecosystems and fisheries systems.[11]

12. The links between ocean warming, and coastal eutrophication and associated hypoxia are increasingly evident.[12] Eutrophication and hypoxia events result in "dead zones", which in turn result in mass mortality events, habitat reduction and disruptions to fisheries.

13. Ocean acidification has the potential to significantly affect marine biodiversity, from microscopic plankton to large predators.[13] Particularly likely to be affected are those organisms that form shells and skeletons, such as corals, molluscs, and certain plankton.[14] Coral reefs, often termed the "rainforests of the sea" due to their rich biodiversity, face the potential loss of structural complexity, which threatens the habitats that support numerous marine species and thus reducing ecosystem function.[15] Furthermore, laboratory-based experiments have established that reducing the pH of seawater can alter the behaviour, physiology and survival rates of non-calcifying species, including fish, potentially affecting predator-prey interactions, reproductive success and overall ecosystem stability.[16]

14. Exposure of biodiversity to risks from climate change is projected to double at global warming levels of between 1.5°C and 2°C and to double again at levels of between 2°C and 3°C. This presents a growing challenge to biodiversity and the integrity and functioning of ecosystems in terrestrial, freshwater and marine environments.[17]

15. Coastal and marine habitats offer coastal protection and shelter for coastal communities and prevent erosion and sand loss. When these ecosystems decline, the ability of coastal areas to withstand extreme events becomes severely compromised and communities become more vulnerable.

C. Status of and trends in international governance processes

16. The interlinkages between the ocean, climate and biodiversity have been increasingly integrated into global policy frameworks and multilateral processes. The General Assembly has highlighted the link between oceans, climate change and biodiversity in its resolutions on oceans and the law of the sea, including by reiterating its serious concern at the current and projected adverse effects of climate change and ocean acidification on the marine environment and marine biodiversity, and emphasizing the urgency of addressing these adverse effects, considering also the importance of preserving the role of the ocean as a carbon sink (see Assembly resolution 79/144).

[11] See https://doi.org/10.1016/j.marpol.2024.106295; and https://doi.org/10.1111/ddi.13167.
[12] See https://doi.org/10.1017/9781009325844.005; and https://doi.org/10.1016/j.biocon.2022.109595.
[13] See https://doi.org/10.5194/os-19-101-2023.
[14] See https://doi.org/10.1146/annurev-environ-012320-083019; and https://doi.org/10.1038/nature04095.
[15] See https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2017.00158.
[16] See https://doi.org/10.1111/gcb.13167.
[17] See FCCC/CP/2019/13/Add.1, decision 1/CMA.5.

1. Convention on Biological Diversity and Kunming-Montreal Global Biodiversity Framework

17. Target 8 of the Kunming-Montreal Global Biodiversity Framework, adopted by the Conference of the Parties to the Convention on Biological Diversity at its fifteenth meeting, is focused specifically on minimizing the impact of climate change and ocean acidification on biodiversity and increasing its resilience through mitigation, adaptation, and disaster risk reduction actions, including through nature-based solutions and/or ecosystem-based approaches, while minimizing negative and fostering positive impacts of climate action on biodiversity. Although the target relates to biodiversity broadly, it has specific relevance for marine ecosystems and, in it, ocean acidification is singled out as a key concern. It also has strong interlinkages with other targets of the Framework, in particular those relating to spatial planning, restoration, ecosystem services and the "30x30" target (relating to target 3). This reflects not only the cross-cutting relevance of linkages between the ocean, climate and biodiversity but also the mutual benefits that can be maximized through a synergistic and holistic approach to planning and implementation across those three areas. In its decision 16/22 on biodiversity and climate change, the Conference of the Parties to the Convention on Biological Diversity also urged Parties to identify and maximize potential synergies between biodiversity and climate actions.

2. 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

18. Once the Agreement on Marine Biological Diversity of Areas beyond National Jurisdiction enters into force, it will provide a framework for action, including by addressing the impacts of climate change on marine biological diversity in the vast areas of the ocean beyond national jurisdiction. The general objective of the Agreement is to ensure the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, for the present and in the long term, through effective implementation of the relevant provisions of the United Nations Convention on the Law of the Sea and further international cooperation and coordination (art. 2 of the Agreement). The Parties to the Agreement acknowledge the need to address, in a coherent and cooperative manner, biological diversity loss and degradation of ecosystems of the ocean, due, in particular, to climate change impacts on marine ecosystems, such as warming and ocean deoxygenation, as well as ocean acidification, pollution, including plastic pollution, and unsustainable use (preamble). In accordance with the general principles and approaches set out in the Agreement, Parties shall be guided by an approach that builds ecosystem resilience, including to adverse effects of climate change and ocean acidification, and also maintains and restores ecosystem integrity, including the carbon cycling services that underpin the role of the ocean in climate (art. 7 (h)). Part III, on measures such as area-based management tools, including marine protected areas, includes the objective of protecting, preserving, restoring and maintaining biological diversity and ecosystems and strengthening resilience to stressors, including those related to climate change, ocean acidification and marine pollution (art. 17 (c)).

3. The United Nations Framework Convention on Climate Change, ocean dialogues and the inclusion of ocean action in national climate goals, plans and strategies

19. The recognition of the ocean's critical role in climate action under the United Nations Framework Convention on Climate Change has evolved significantly, with the Conference of the Parties at its twenty-fifth session mandating the first ocean and

climate change dialogue.[18] At its twenty-sixth session, the Conference of the Parties, in the Glasgow Climate Pact, invited the Chair of the Subsidiary Body for Scientific and Technological Advice to hold an annual dialogue and further invited the relevant work programmes and constituted bodies under the Framework Convention to consider how to integrate and strengthen ocean-based action in their existing mandates. At its twenty-seventh session, the Conference of the Parties encouraged Parties to consider, as appropriate, ocean-based action in their national climate goals and in the implementation of those goals, including but not limited to nationally determined contributions, long-term strategies and adaptation communications. For the 2023 dialogue, "coastal ecosystem restoration, including blue carbon ecosystems" and "fisheries and food security" were selected as the two topics for deep-dive discussions, thereby emphasizing the need to integrate climate adaptation and mitigation action for coastal ecosystems and aquatic food systems into both national and multilateral climate processes.

20. In the outcome of the first global stocktake in 2023,[19] the Conference of the Parties to the United Nations Framework Convention on Climate Change serving as the Meeting of the Parties to the Paris Agreement noted with concern the pre-2020 gaps in both mitigation ambition and implementation by developed country Parties and that the Intergovernmental Panel on Climate Change had earlier indicated that developed countries must reduce emissions by 25–40 per cent below 1990 levels by 2020, which was not achieved. In the preamble, the Conference further underlined the urgent need to address, in a comprehensive and synergetic manner, the interlinked global crises of climate change and biodiversity loss in the broader context of achieving the Sustainable Development Goals. The Conference also invited Parties to preserve and restore the ocean and coastal ecosystems and scale up, as appropriate, ocean-based mitigation action. According to the synthesis report on nationally determined contributions[20] published by the secretariat of the Framework Convention, in which the secretariat reported on ocean ecosystems, of the Parties that included an ocean-based measure, 12 per cent included reference to human- and climate-induced ocean changes such as acidification, extreme weather events, sea level rise, storms and drought. According to the note by the secretariat on progress in the process to formulate and implement national adaptation plans,[21] in the 58 national action plans submitted by Parties as at 4 October 2024, the most commonly identified climate hazards included sea level rise. Other hazards identified in the national action plans were ocean acidification, saltwater intrusion and increased sea surface temperatures.

4. International Maritime Organization

21. Discussions are ongoing regarding the implementation of the 2023 IMO Strategy on Reduction of GHG Emissions from Ships). Building on the Initial IMO Strategy on Reduction of GHG Emissions from Ships adopted back in 2018, which was aimed at aligning international shipping with the long-term temperature goal of the Paris Agreement, the 2023 Strategy now incorporates a goal of net-zero greenhouse gas emissions to be achieved by or around 2050.

[18] See FCCC/CP/2019/13/Add.1, decision 1/CP.25.
[19] FCCC/PA/CMA/2023/16/Add.1, decision 1/CMA.5.
[20] FCCC/PA/CMA/2024/10.
[21] FCCC/SBI/2024/23.

D. The need for integrated ocean, climate and biodiversity responses

22. Inadequate climate action, together with other unmanaged anthropogenic impacts, exacerbates the deterioration of ocean health, habitat destruction and biodiversity loss and diminishes the ocean's ability to adapt to and mitigate future climate change impacts. Current approaches to managing human activities both on land and in the ocean have failed to reflect the full potential of benefits that the ocean and associated marine biodiversity provide because they have been designed and implemented in isolation, at limited scales or without adequate consideration of the interdependencies and interconnections between the ocean, marine biodiversity and the climate and amongst management responses. This deterioration in ocean health compromises the ocean's ability to provide goods and services and act as a climate change mitigator, forming a feedback loop whereby increasing climate change further exacerbates ocean degradation and biodiversity loss, creating a dangerous cycle of environmental decline.

23. However, despite science-based evidence demonstrating the interlinkages and dependencies between ocean, climate change and biodiversity, until recently policy action to address anthropogenic pressures has often remained focused on individual sectors. Synergy and alignment in ocean, climate and biodiversity actions that leverage the interlinkages between Sustainable Development Goals 14, 13 and 15, and others, are critical to break this cycle.

III. Challenges and opportunities in leveraging interlinkages between ocean, climate change and biodiversity and synergies in advancing Sustainable Development Goals 14, 13 and 15

A. Climate change mitigation

24. *Mainstreaming of ocean-based mitigation action*. While the ocean-climate-biodiversity interface has benefited from increased attention, further discussions are needed in multilateral forums to mainstream ocean-based mitigation action across sectors and share experience of implementation at the national level.

25. *Carbon dioxide removal and interlinkages with marine biodiversity*. Since net-zero greenhouse gas emissions targets have become a keystone of climate policy, there has been increasing debate about the need to actively remove carbon dioxide from the atmosphere, referred to as "carbon dioxide removal", in addition to reducing emissions.[22] In marine systems, proposed approaches to carbon dioxide removal that are currently being studied comprise biologically based approaches, such as restoration of coastal blue carbon ecosystems, large-scale seaweed cultivation and ocean fertilization to increase phytoplankton productivity, and chemically based approaches involving the manipulation of carbonate chemistry, mostly through ocean alkalinity enhancement and the electrochemical removal of carbon dioxide from seawater, with its subsequent collection and geological storage. These techniques have not yet proven to be effective at capturing carbon dioxide, while a few have proven to be counterproductive or ineffective, such as ocean fertilization. They may have negative transboundary impacts on ecosystems, climate, socioecological systems and human activities. More research is needed before consideration is given

[22] See https://doi.org/10.1017/9781009157940.004.

to small- or large-scale deployment of these techniques not to mention the restoration of natural ecosystems.

26. *Ecosystem-based approaches and nature-based solutions*. It is estimated that one third of the climate mitigation needed to meet the goals of the Paris Agreement could be provided by nature-based solutions.[23] In addition, ecosystem services from nature-based solutions focused on climate could offer promising economic prospects, with $170 billion in estimated global benefits.[24]

27. *Offshore renewable energy*. Offshore renewable energy will play a key role in decarbonizing our economies in the coming decades. To be sustainable, the expansion of renewable energy developments should be carried out in a manner consistent with commitments made to a healthy and biologically diverse marine environment. The lack of comprehensive knowledge about the impact of offshore renewable energy on the marine environment currently hampers its development.

28. *Decarbonization of the maritime sector*. Synergies between decarbonization and measures to reduce pollution from ships, such as clean air policies in shipping, could be leveraged. For instance, the development of new low-carbon fuels and new propulsion modes would benefit both climate and the marine environment.

29. *Marine-based carbon-dioxide removal*. Marine-based carbon dioxide removal is not explicitly included in mitigation scenarios for climate change. This is due to scientific uncertainties, including with regard to the carbon cycle itself, which limit assessment of the effectiveness and environmental risks of individual approaches. Models can assist in determining the effectiveness and safety of different approaches to marine-based carbon-dioxide removal. Further research could be considered, in controlled environments: laboratory experiments, with no deployment in the field. The following should be assessed: (a) carbon-related parameters (permanence, additionality and efficacy); (b) risks to and potential negative impacts on marine ecosystems and socioeconomic and human activities; (c) validation methods (measurement, monitoring and verification) and engineering parameters (scalability, costs, energy demand and resources inputs); (d) impacts on the climate system. Field experiments, even at small scale, should be considered only in accordance with the precautionary approach and within a strict regulatory framework such as the assessment framework for ocean fertilization activities developed under the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter and the Protocol thereto, which provide for only legitimate scientific research.

30. *Mitigating deoxygenation for the benefit of marine biodiversity*. Ocean deoxygenation must be recognized as one of multiple climate stressors. It is essential to reduce greenhouse gas emissions that cause atmospheric and ocean warming in order to restore the ocean's oxygen and minimize the impacts of deoxygenation. Specific steps to slow and reverse deoxygenation will vary among locations depending on the cause of the problem, co-occurring stressors and locally specific capacities and demands. Challenges remain with regard to unifying research, management and policy actions in the coastal and open ocean across the areas of biology, geochemistry and physics, across the problems of warming, acidification and deoxygenation, and across academic, industry, government and regulatory sectors. Some of the specific steps to be taken are strongly interlinked with marine biodiversity changes. They include the reduction of land-based nutrient inputs that exacerbate oxygen loss in coastal waters and semi-enclosed seas and the inclusion of climate change effects in the development of nutrient reduction strategies. Others are linked with the exploitation of marine living resources, including the adoption of

[23] See United Nations Environment Assembly resolution 5/5 (UNEP/EA.5/Res.5).

[24] See https://iucn.org/our-work/nature-based-solutions.

marine spatial planning and fisheries management strategies addressing deoxygenation vulnerabilities and the protection of affected species and habitats. These steps can also be enhanced and facilitated by promoting global awareness and the exchange of information about ocean deoxygenation through global, regional and local efforts.

31. *Food from the ocean*. Aquaculture and capture fisheries have a lower carbon footprint than many land-based animal food production systems. They still hold significant growth potential and can play an important role in climate change mitigation by providing low-carbon and high-quality nutrition to meet the needs of a growing global population.

B. Climate change adaptation

32. *Protecting the cryosphere*. The melting cryosphere has an impact on inland water cycles and leads to rising sea levels, both of which directly affect humans. Adaptation in water management and cooperation are needed, particularly in transboundary basins, based on a source-to-sea approach.

33. *Vulnerability and resilience of small island developing States and low-lying coastal areas*. For some small island developing States and low-lying coastal areas, sea level rise may make land uninhabitable, requiring planned relocation initiatives. The rise in sea levels not only leads to loss of life, threats to human security and material impacts but also poses a risk of loss of heritage, culture, tradition, statehood and dignity. Similarly, sea level rise can result in security risks for both individuals and States. Without immediate and ambitious action, sea level rise could lead to local ecosystem and biodiversity loss and force the displacement of inhabitants.

34. *Adapting fisheries and aquaculture to safeguard food security*. Aquatic food systems are highly vulnerable to climate change, facing increasing risks such as rising water temperatures, ocean acidification, oxygen depletion and more frequent or severe extreme weather events. These changes threaten the productivity, sustainability and economic viability of the aquatic food sector, with potentially far-reaching nutritional, economic and geopolitical consequences, particularly for those countries and communities most dependent on fisheries and aquaculture. Adaptation strategies are essential for achieving long-term sustainability of aquatic food production and value chains in the context of climate change.

35. *Interlinkages with other Sustainable Development Goals: example of Goal 5 (Achieve gender equality and empower all women and girls)*. Human movement is often influenced by interconnected factors, such as human security, economic opportunities and climate and environmental degradation. Response measures must take into account interlinkages across Goals. It is well established that climate change has a gender inequality dimension.[25] The major role of women and gender equality in achieving Sustainable Development Goal 14 is also well documented. Recent studies have highlighted that the climate crisis is making gender inequality worse in developing coastal communities.[26]

[25] See www.unwomen.org/en/news-stories/explainer/2022/02/explainer-how-gender-inequality-and-climate-change-are-interconnected.

[26] See https://climate.leeds.ac.uk/the-climate-crisis-is-making-gender-inequality-worse-in-developing-coastal-communities/#:~:text=Sea%2Dlevel%20rise%2C%20storm%20surges,directly%20affected%20by%20climate%20change.

C. Protecting and restoring ocean ecosystems as a win-win for ocean, climate and biodiversity

36. Habitats such as seagrasses, salt marshes and mangroves play a vital role in climate regulation and climate change mitigation by storing carbon in the seabed. Along with habitats such as reef systems, they also contribute to enhancing biodiversity, filtering water and preventing coastal erosion.[27,28,29] New approaches to forecasting and expanded modelling efforts have established that ocean-based mitigation actions could contribute 12 per cent of the emissions reductions required by 2030 to keep warming to less than 1.5ºC.[30,31]

37. Despite their ecological significance, these marine ecosystems have faced widespread decline worldwide, prompting the need for intensified conservation and restoration efforts. Achievable actions that can assist in building resilience are available and deployable and, if implemented before 2030, can substantially assist in improving the resilience of marine ecosystems.[32]

38. The United Nations Decade on Ecosystem Restoration,[33] the United Nations Decade of Ocean Science for Sustainable Development and initiatives such as the International Partnership for Blue Carbon and the International Coral Reef Initiative[34] are under way to revive the ecosystems concerned, thereby contributing to efforts to address the climate and biodiversity crisis.

39. Substantial knowledge gaps still remain in ensuring restoration efforts are effective, emphasizing the necessity to fill these gaps promptly in order to effectively contribute to rebuilding all forms of marine life and ensuring the sustainability of the ecosystem services that they provide.

D. Governance challenges and opportunities

40. *Institutional gaps and policy incoherence hinder effective actions across ocean, climate and biodiversity interlinkages*. Institutional gaps in ocean, climate change and biodiversity governance arise from fragmented approaches and overlapping but uncoordinated mandates, which hinder effective policy implementation and cohesive action. The lack of coordination among relevant institutions exacerbates these challenges, leading to inefficiencies and missed opportunities for integrated and sustainable management that meets ocean, climate change and biodiversity goals.

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[27] James W. Fourqurean and others, “Seagrass ecosystems as a globally significant carbon stock”, *Nature Geoscience*, vol. 5 (2012).

[28] Shing Yip Lee and others, “Ecological role and services of tropical mangrove ecosystems: a reassessment”, *Global Ecology and Biogeography*, vol. 23, No. 7 (2014).

[29] Tyler D. Eddy and others, “Global decline in capacity of coral reefs to provide ecosystem services”, *One Earth*, vol. 4, No. 9 (2021).

[30] Rowan Trebilco and others, “Warming world, changing ocean: mitigation and adaptation to support resilient marine systems”, *Reviews in Fish Biology and Fisheries*, vol. 32 (2022).

[31] E. Lisa F. Schipper and others, “Climate resilient development pathways”, in *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Hans-Otto Pörtner and others, eds. (Cambridge and New York, Cambridge University Press, 2022).

[32] Chen Cheng Ann and others, “Marine biodiversity and climate change: multidimensional approaches for ‘The Ocean We Want’ by 2030”, in *SDGs in the Asia and Pacific Region*, Walter Leal Filho and others, eds. (Springer Cham, 2024).

[33] Food and Agriculture Organization of the United Nations (FAO) and others, “Principles for ecosystem restoration to guide the United Nations Decade 2021–2030”, 2021.

[34] Margaux Hein and others, “Meeting 30 by 30: the role of coral reef restoration”, International Coral Reef Initiative, November 2022.

Policies and actions that reflect the interconnectedness of the ocean, climate and biodiversity are imperative. Existing policies and approaches arising from sector-specific and narrow perspectives have resulted in misaligned, duplicative and inconsistent governance and have failed to address direct and indirect drivers of change. There is an urgent need to bridge these gaps by strengthening coherence and synergies among climate, biodiversity and ocean-related frameworks. Coordinated capacity-building and technical assistance interventions can offer opportunities to strengthen human and institutional capacity, promote inclusive and integrated approaches that leverage the interlinkages between ocean, climate change and biodiversity actions, and ensure the retention and utilization of existing capacities to achieve long-term goals.

41. *Advancing integrated ocean management can help build institutional coherence and improve policy alignment*. Integrated ocean management approaches such as marine spatial planning, enabled by harmonizing policies across sectors, can help to build institutional bridges and clarify governance frameworks of sector-specific policies relevant to ocean use and conservation at the national level.

42. *Reinforcing inclusive governance frameworks is key to addressing the interlinked challenges*. Inclusive governance must recognize and incorporate the knowledge, practices and stewardship of Indigenous Peoples and local communities, small-scale fishers and fish farmers, civil society organizations and the scientific community. Their engagement is vital to achieving Sustainable Development Goals 14, 13 and 15. Strengthening inclusive governance contributes to more equitable, knowledge-informed and resilient responses to interconnected climate, ocean and biodiversity challenges.

43. *Leveraging multilateral instruments is essential to expedite cohesive global responses*. The Agreement on Marine Biological Diversity of Areas beyond National Jurisdiction marks a major opportunity to integrate ocean, climate and biodiversity interlinkages into measures to conserve and sustainably use marine biodiversity in nearly two thirds of the ocean. The Kunming-Montreal Global Biodiversity Framework has catalysed new political attention and commitment to the conservation and sustainable use of marine and coastal biodiversity and to the fair and equitable sharing of benefits from the use of genetic resources. The two instruments provide important opportunities to ensure that biodiversity actions are aligned with the implementation of the 2030 Agenda for Sustainable Development. The Conference of the Parties to the United Nations Framework Convention on Climate Change serving as the meeting of the Parties to the Paris Agreement also emphasized the importance of conserving, protecting and restoring nature and ecosystems towards achieving the Paris Agreement temperature goal, including through enhanced efforts towards halting and reversing deforestation and forest degradation by 2030, and other terrestrial and marine ecosystems acting as sinks and reservoirs of greenhouse gases and by conserving biodiversity, while ensuring social and environmental safeguards, in line with the Kunming-Montreal Global Biodiversity Framework.[35] Moreover, at the 2024 ocean dialogue under the Framework Convention, it was stressed that the next round of nationally determined contributions, which were due in February 2025, provided an opportunity for Parties to enhance their ocean-based mitigation and adaptation efforts, but that nature-based solutions should not be a substitute for rapid and sustained emissions reductions.

44. *Exploring financial incentives for maritime decarbonization is important*. Emissions trading systems or new financial mechanisms to provide incentives for compliance with the decarbonization objectives of the maritime, trade and leisure

[35] FCCC/PA/CMA/2023/16/Add.1, decision 1/CMA.5, para. 33.

sectors are opportunities to be considered, in accordance with the objectives set out in the decarbonization strategy adopted by IMO in 2023. In that regard, IMO has a key role to play in ensuring that climate action is implemented by all actors in the maritime sector.

45. *Ocean acidification continues to receive insufficient policy attention and investment*. Monitoring remains limited in many regions, and its impacts are not yet fully integrated into national biodiversity or climate strategies. Although both Sustainable Development Goal target 14.3 and target 8 of the Kunming-Montreal Global Biodiversity Framework call for action, many countries face capacity and data limitations that hinder effective implementation and progress-tracking. Failure to address ocean acidification risks undermining broader goals for marine ecosystem resilience and sustainable use. The Antigua and Barbuda Agenda for Small Island Developing States: A Renewed Declaration for Resilient Prosperity specifically highlights the need for strategies to address ocean acidification, which has severe implications for biodiversity and fisheries.

E. Financing ocean, climate and biodiversity action

46. Mobilizing finance for Sustainable Development Goal 14 and investing in sustainable ocean-based economies will be pivotal to transforming the global economy for greater sustainability while restoring ocean health. Studies suggest that nearly $175 billion per year is needed to achieve Goal 14 by 2030, but less than $10 billion was allocated to that Goal between 2015 and 2019. Compared with other Goals, Goal 14 remains the most underinvested Goal. The increase in public and private funding for ocean health and the sustainable use of ocean resources has not succeeded in closing the ocean finance gap. In some instances, the interlinkages between ocean, biodiversity and climate change directly feed funding gaps. For instance, a 2024 study by the Food and Agriculture Organization of the United Nations (FAO) revealed that the climate change adaptation finance gap specific to the aquatic food sector for developing countries is estimated at around $4.5 billion per year.[36]

47. Due to overlapping priorities and limited resources, ocean, climate and biodiversity are sometimes competing for financing. It is important to optimize the co-benefits and synergies of funding targeted at the biodiversity and climate crises in a way that also benefits the ocean.

48. On top of financing gaps, some of the financial flows are further hampering the achievement of ocean, climate and biodiversity objectives. For instance, private sector financial flows that are directly damaging to biodiversity are estimated at $5.3 trillion, and public subsidies that incentivize such activities, distort trade and increase pressure on natural resources are estimated at approximately $1.7 trillion[37] per year. Redirecting these financial flows would constitute a major opportunity to fund ocean, climate and biodiversity actions.

49. The economic impacts of biodiversity loss and climate change vary between countries and regions, with higher relative impacts in developing countries where there are also higher barriers to mobilizing sustainable financial flows. While domestic government spending remains the largest share of finance for nature conservation, international public funding can play a catalytic role, especially for least developed countries and small island developing States.

[36] FAO, “The fisheries and aquaculture adaptation finance gap”, 2024.

[37] See https://www.ipbes.net/nexus/media-release.

IV. Action-oriented solutions

A. Science-based policy making

50. Progress in marine science, research and technology plays a critical role in conserving and restoring marine ecosystems, thereby bolstering their resilience and capacity to sustain life and livelihoods as well as shield coastal communities.

51. Monitoring systems for the ocean, climate system and marine biodiversity such as the Global Ocean Acidification Observing Network, the Ocean Biodiversity Information System of the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Global Ocean Observing System and the Fisheries and Marine Ecosystem Model Intercomparison Project provide the data and information required to increase knowledge on interlinkages and ensure data-driven decision-making. These platforms also play a vital role in facilitating transdisciplinary research and ocean education and literacy. Based on the best available science developed and shared by these initiatives, organizations are able to derive series of practical tools such as voluntary guidelines, toolboxes and strategic guidance documents to assist and inform not only decision-makers but other relevant stakeholders.

52. A newly gained understanding about the ocean carbon cycle is critical to meet the societal challenges posed by climate and ocean change, as recognized in international frameworks and conventions such as the United Nations Framework Convention on Climate Change, the 2030 Agenda and the Kunming-Montreal Global Biodiversity Framework. However, the landscape of ocean carbon science at the international, regional and national levels is vast. Many research activities are addressing different parts of the carbon cycle with fewer efforts to assess the changes of the ocean carbon cycle across different ecosystems and the pools and fluxes of carbon between them. Such an integrated perspective of the ocean carbon cycle, accounting for the different and changing forms of ocean carbon and including carbon reservoirs, fluxes and transports, is crucial to achieve the objectives and goals of a multitude of scientific programmes.

53. Assessments such as the World Ocean Assessment and those prepared under the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services provide comprehensive scientific evaluations that inform policy decisions, including in relation to the interlinkages between ocean, climate change and biodiversity. Established by the General Assembly, the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, through its World Ocean Assessments, provides a synthesis of the latest science available on the state of the world's oceans and the social, economic and cultural activities that take place in relation to the ocean. The World Ocean Assessments provide key information used by decision-makers for achieving sustainable management of the ocean and are intended to provide support to ocean-related international processes. The General Assembly has noted the importance of ensuring that assessments such as the World Ocean Assessment and those prepared under the Intergovernmental Panel on Climate Change and the Platform support one another for greater synergy and complementarity. The global assessment of biodiversity and ecosystem services to be published by the Platform in 2028 will include a cross-chapter box on oceans.

54. Forecasting tools for ocean sectors are increasingly being recognized as a solution for adaptive planning and targeted mitigation actions under national and regional strategies. Marine heatwaves, harmful algal blooms and associated ocean deoxygenation, ocean acidification and ocean warming have been identified as threats

to most countries, disrupting fishery, aquaculture and tourism-based livelihoods and posing increased risks to health, food security and local economies, with estimated annual economic losses exceeding millions of dollars. Moving beyond projections based on fixed scenarios, there is a need to develop multi-hazard early warning and early action systems that facilitate the forecasting of disruptive events. A number of countries have been implementing forecasting systems for coral bleaching[38,39] and ocean acidification events,[40] and research initiatives are under way to develop deployable systems for harmful algal blooms[41] and marine heatwaves.[42]

55. Global frameworks such the United Nations Decade on Ecosystem Restoration[43] and the United Nations Decade of Ocean Science for Sustainable Development, as well as initiatives such as the International Partnership for Blue Carbon and the International Coral Reef Initiative,[44] can play a vital role in further reinforcing the science-policy interface and facilitating concrete actions based on priorities and tools developed by science.

B. Ecosystem-based approaches and nature-based solutions

56. Ecosystem-based adaptation and nature-based solutions offer promising perspectives for synergized ocean, climate and biodiversity actions. For instance, the ecosystem approach to fisheries[45] and to aquaculture[46] can be leveraged to reduce the vulnerability of aquatic food systems and boost their resilience to climate change. In addition, ecosystem-based adaptation and nature-based solutions can return significant economic benefits. For example, it is estimated that between 10 and 40 jobs are supported per $1 million invested in nature-based approaches.

57. Multilateral organizations remain the key platforms for the development and mainstreaming of ecosystem-based adaptation and nature-based solutions at different scales and across different sectors within the respective mandates. Intergovernmental consultations on nature-based solutions are undertaken by the United Nations Environment Programme (UNEP). Work is ongoing under the Convention on Biological Diversity to elaborate guidance and tools for the design, implementation and scaling-up of nature-based solutions and ecosystem-based approaches to climate change mitigation and adaptation. Initiatives such as the Small Island Developing States Coalition for Nature are also aimed at integrating nature-based solutions into climate action, enhancing resilience and promoting sustainable development. The International Union for Conservation of Nature has developed the Global Standard for Nature-based Solutions to inform the design, implementation and evaluation of such solutions and supports Governments in mainstreaming nature-based solutions in national policies and strategic plans.[47]

58. To ensure that ecosystem-based adaptation and nature-based solutions contribute to all dimensions of sustainable development by delivering not only environmental but also socioeconomic benefits, their development should ensure the integration of issues such as gender; information management and monitoring

[38] See https://doi.org/10.1002/joc.3486.
[39] See https://doi.org/10.3389/fmars.2018.00057.
[40] See https://doi.org/10.1038/s41561-024-01593-0.
[41] See https://doi.org/10.1016/j.aquaculture.2024.741351.
[42] See https://doi.org/10.1016/j.pocean.2024.103404.
[43] FAO and others, “Principles for ecosystem restoration”.
[44] Hein and others, “Meeting 30 by 30”.
[45] See www.fao.org/3/Y4470E/y4470e00.htm#Contents.
[46] See www.fao.org/3/a-i1750e.pdf.
[47] See https://portals.iucn.org/library/node/49070.

capacities; national policies and existing legal frameworks; and diversified livelihoods.

C. Governance and integrated ocean management

59. Integrated approaches incorporating planning and governance for use of coastal landscapes and seascapes are effective for addressing complex sustainability challenges for ocean, biodiversity and climate change. Inter-agency coordination at all levels, including through regular dialogue and by co-developing projects, is required to achieve coherent results that maximize impacts and avoid resource competition. It is also important that ocean, climate and biodiversity issues are mainstreamed into relevant decisions, initiatives or agreements so as to avoid silos.

60. Efforts to address interlinkages would gain from being co-designed by a variety of actors and institutions using processes and approaches that acknowledge and address trade-offs and facilitate and strengthen enabling conditions and synergies. The public and private sectors are cooperating within IMO on the establishment and entry into force of a robust regulatory framework that would drive a globally effective and equitable progressive green transition in the shipping sector from 2027 onwards,[48] with positive impacts expected for both climate and biodiversity.

61. A concrete way to address ocean, climate and biodiversity interlinkages would be to integrate biodiversity knowledge, nature values and climate action into overarching policy frameworks such as marine spatial planning, sustainable ocean plans and other integrated ocean management approaches.

62. Approaches supporting integrated ocean management are researched, developed and mainstreamed at the global, regional, national and local levels. MSPglobal 2.0,[49] a marine spatial planning initiative supported by the Intergovernmental Oceanographic Commission and the European Commission, has engaged in creating and sharing expert knowledge in the integration of climate change considerations into climate-smart maritime spatial plans. In 2023, the International Council for the Exploration of the Sea held a virtual workshop on the theme "Climate change considerations in marine spatial planning" and its Annual Science Conference 2024 featured a session on the theme "Accounting for climate change in marine spatial planning: experiences and lessons learnt". The academic community has also extensively engaged with the challenge of integrating climate change in ocean planning.[50] Together with UNEP and the European Commission, the Intergovernmental Oceanographic Commission is also developing a guideline on biodiversity-inclusive marine spatial planning. The academic community has further explored how marine spatial planning and other area-based conservation measures could support biodiversity objectives.[51,52]

63. Sustainable Development Goal target 14.c, on implementation and enforcement of the international law of the sea, can also contribute to actions leveraging the ocean-climate-biodiversity nexus. For example, as recognized by the International Tribunal for the Law of the Sea in its advisory opinion concerning the obligations of States Parties to the United Nations Convention on the Law of the Sea with regard to climate

[48] See www.gov.uk/government/publications/cop-26-clydebank-declaration-for-green-shipping-corridors/cop-26-clydebank-declaration-for-green-shipping-corridors.
[49] See www.mspglobal2030.org/climate-smart-msp/.
[50] See www.researchgate.net/profile/Charles-Ehler/publication/341138653_Integrating_climate_change_in_ocean_planning/links/5ebd503f92851c11a867a355/Integrating-climate-change-in-ocean-planning.pdf.
[51] See www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2023.1271397/full.
[52] See www.sciencedirect.com/science/article/pii/S0308597X23001823.

change, States have the obligation to take all necessary measures to prevent, reduce and control pollution from anthropogenic greenhouse gas emissions and excess energy stored in the atmosphere and absorbed by the ocean. The Tribunal also recognized that States have the general obligation to protect and preserve the marine environment, including from climate change impacts and ocean acidification. Where the marine environment has been degraded due to anthropogenic greenhouse gas emissions and excess energy, this obligation may entail measures to restore marine habitats and ecosystems, both to maintain the mitigation function of ocean ecosystems as carbon sinks and to build ecosystem resilience, a form of adaptation.

64. In addition, the implementation of the Agreement on Marine Biological Diversity of Areas beyond National Jurisdiction will provide a framework for action, including by addressing the impacts of climate change on marine biological diversity in the vast areas of the ocean beyond national jurisdiction.[53]

65. At the first United Nations Ocean Conference, held at United Nations Headquarters in New York in June 2017, almost 1,400 voluntary commitments for concrete action to advance the implementation of Sustainable Development Goal 14 were made by Governments, the United Nations system, civil society organizations, academia, the scientific community and the private sector. Through a number of voluntary commitments, contributions were made to both Sustainable Development Goal 14 and Sustainable Development Goal 13. which relates to climate action. The registry of the ocean commitments managed by the Department of Economic and Social Affairs offers a pool of solutions to address ocean challenges and leverage the crucial interlinkages between Sustainable Development Goals 14, 13 and 15. Effective implementation of these voluntary commitments at the local, subregional, regional and global levels through partnerships and capacity-building is therefore vital. The nine thematic multi-stakeholder Communities of Ocean Action launched by the United Nations continue to mobilize new voluntary commitments and collaborate with each other on bringing together different actors working on coral reefs, ocean acidification, marine ecosystem conservation, ocean science and a sustainable blue economy to amplify the impacts of their initiatives. Strengthening the Communities of Ocean Action offers effective avenues to catalyse future actions addressing ocean-climate-biodiversity interlinkages.

66. Initiatives and platforms that support experience-sharing catalyse action. For instance, since its inception, the ocean dialogue under the United Nations Framework Convention on Climate Change has become a vital forum in the Framework Convention process for Parties and observers to share experiences and exchange good practices on ocean-based mitigation and adaptation solutions.[54] For the 2023 dialogue, “coastal ecosystem restoration, including blue carbon ecosystems” and “fisheries and food security” were selected as the two topics for deep-dive discussions based on a wide consultation, and during the dialogue more than 250 case studies were highlighted by participants.[55] The United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, a subsidiary body of the General Assembly, has also provided a forum for exchanging experiences on topics relevant to ocean and climate change by focusing its discussions over the years on marine renewable energies; the impacts of ocean acidification on the marine environment; the effects of climate change on oceans; and sea level rise and its impacts.

[53] See www.sciencedirect.com/science/article/abs/pii/S0308597X24004299#:~:text=The%20BBNJ%20Agreement%20is%20the,protection%20and%20climate%20change%20governance.

[54] See https://unfccc.int/topics/ocean#Case-studies.

[55] See https://unfccc.int/documents/631689.

D. Resource mobilization and capacity-building

67. Financial and economic policy reform is required to meet the needs of finance systems that are already being reshaped to respond to climate change and biodiversity loss. It is also critical for enhancing understanding of, and the ability to leverage and mobilize, equitable financial flows that support multiple co-benefits for the ocean, climate change and biodiversity.

68. Innovative financial and economic mechanisms should be encouraged. In the field of climate, financial enabling mechanisms designed to promote decarbonization of energy systems include financial and economic instruments such as reporting and disclosure frameworks that identify the risks of climate change to financial systems and businesses and provide for more accurate calculation of greenhouse gas emissions.[56] Such frameworks are now not simply applied on a voluntary basis at the national level but are integrated into reporting mechanisms under multilateral agreements, including nationally determined contributions under the Paris Agreement. Similar approaches are being developed for biodiversity[57] and integrated into nature-positive frameworks at the national level. The benefits of concepts valuing the contribution of the environment to the economy and the impact of the economy on the environment have also been recognized. They include frameworks such as natural capital accounting, implemented through the System of Environmental-Economic Accounting coordinated by the United Nations.

69. To address financial gaps at the ocean-climate-biodiversity nexus, international public financial institutions and development banks play a critical role. However, public funding alone is not sufficient. Mobilizing private sector finance is essential to achieve the scale of investment required. Innovative public-private and multilateral funding mechanisms such as the Global Environment Facility and the Green Climate Fund can bridge this gap. Instruments such as blended finance and catalytic contributions from the public sector can help unlock significant private investment.

70. In the face of complex, interlinked challenges, it is vital to mobilize and channel resources for capacity-building actions. Strengthening capacity-building efforts with a focus on specific technical and institutional capacities is essential to supporting governance approaches that address the ocean-climate-biodiversity nexus.

71. Investing in scientific knowledge for coastal resilience and in capacity-building is essential for addressing immediate risks and strengthening community resilience against ocean-related hazards, including those that impact aquatic food production and livelihoods. This requires a comprehensive approach that integrates disaster risk reduction with climate change adaptation. Loss and damage can come from extreme events such as increasingly frequent floods and hurricanes due to human-driven climate change, as well as from slow-onset events such as sea level rise and ocean acidification, largely caused by climate change and the increase in atmospheric carbon dioxide levels, respectively. Providing countries with support through capacity-building, financial resources, data and technology, and partnerships, is essential for strengthening institutional and community resilience against ocean-related hazards and preventing, reducing and managing the impacts of climate-related loss and damage.

[56] See www.fsb-tcfd.org/publications/.

[57] See https://tnfd.global/publication/recommendations-of-the-taskforce-on-nature-related-financial-disclosures/.

V. Conclusion

72. Ensuring the conservation and sustainable use of the ocean and its resources and the achievement of Sustainable Development Goal 14 requires the identification of trade-offs and synergies with Goals 13 and 15. Scientific knowledge should be used to propose evidence-based policy options. Harnessing financial and technological resources through multi-stakeholder and cross-sectoral partnerships will help address the challenges in leveraging the interlinkages.

73. Improved governance approaches to the ocean, climate and biodiversity can help to respond to interlinked and compounding challenges through a focus on policies, institutions, actors and actions that promote integration, inclusion, equity and accountability, and coordinated and adaptive approaches.[58]

74. Synergies between the ocean, climate and biodiversity offer significant opportunities to further advance Sustainable Development Goal 14, and Goals 13 and 15 and sustainable development in general. Co-benefits between climate, biodiversity and ocean actions should be encouraged across all sectors concerned. Integrated actions benefiting all three Goals are being researched, tested, implemented and promoted across sectors and levels. However, further leveraging these interlinkages will also require addressing significant remaining obstacles, including knowledge and capacity gaps, financial shortcomings and continued policy and governance fragmentation.

75. Upcoming international events and forums, including the thirtieth Conference of the Parties to the United Nations Framework Convention on Climate Change, the seventeenth meeting of the Conference of the Parties to the Convention on Biological Diversity and the Fourth International Conference on Financing for Development present major opportunities to reinforce or further develop synergetic ocean-climate-biodiversity actions.

VI. Guiding questions

76. The following guiding questions may be used to inform the panel:

(a) What is needed to further strengthen the role of the ocean and biodiversity in climate change mitigation and adaptation through United Nations processes, including nationally determined contributions, national adaptation plans and national biodiversity strategies and action plans?

(b) How can climate and biodiversity goals and targets be included in discussions at ocean-related international forums and organizations such as IMO, FAO, the International Labour Organization and the World Trade Organization, and how can the targets under Sustainable Development Goal 14 be further integrated into climate and biodiversity discussions?

(c) What is needed to increase the recognition of coastal ecosystems as assets, increase investments and improve processes to protect and restore them?

(d) What is needed to facilitate the use and application of multiple knowledge systems to fill gaps in understanding and to design and implement inclusive, equitable and sustainable practices and management frameworks?

(e) How can we empower and unlock the full potential of vulnerable coastal communities, including small-scale fishers and fish farmers, in scaling up climate adaptation and mitigation actions and serving as stewards of biodiversity? What are

[58] See IPBES/11/12/Add.1.

their most pressing adaptation needs, and what key barriers must be addressed to enable the implementation of available ocean-based climate solutions at a larger scale across sectors and regions that leverage the full potential of the natural systems they depend upon?

(f) How can the thematic panel support Parties in the inclusion of ocean-based measures in their nationally determined contributions to enhance climate ambition?

(g) How can the dialogue at United Nations Ocean Conferences be further strengthened to lead to more concrete actions for addressing ocean stressors, including climate change?

(h) How can the discussions and outcomes of the third United Nations Ocean Conference on ocean-climate-biodiversity interlinkages be effectively carried forward to drive synergies and impactful action at upcoming major global events and forums, including the thirtieth Conference of the Parties to the United Nations Framework Convention on Climate Change, the thirty-seventh session of the FAO Committee on Fisheries, the seventeenth meeting of the Conference of the Parties to the Convention on Biological Diversity, the Preparatory Commission for the Entry into Force of the Agreement on Marine Biological Diversity of Areas beyond National Jurisdiction and the sessions of the IMO Marine Environment Protection Committee?