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International Law and Marine Ecosystem Governance

The Climate Change Nexus

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Introduction

The governance of marine ecosystems under international law sits at a crucial nexus for climate change. This chapter explores legal measures related to climate change and the governance of aquatic ecosystems, including watercourses, wetlands, and biodiversity, to highlight interactions and identify areas of mutual supportive implementation. First, a summary is provided of key legal provisions of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement on climate change. Second, an overview is provided of the substantive and procedural obligations found in international instruments governing watercourses, wetlands, and biodiversity. Specifically, emphasis is on provisions of the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (1997) (the New York Convention), the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992) (Helsinki Convention), the Convention on Wetlands of International Importance especially as Waterfowl Habitat (1971) (the Ramsar Convention), and the Convention on Biological Diversity (CBD, 1992). Third, key synergies across regimes are identified, thereby illustrating legal and policy intersections. Finally, modalities to further strengthen marine governance are discussed in the climate context to illustrate mutually supportive legal measures which assist in the achievement of Sustainable Development Goals (SDGs) related to water (SDG 6), oceans (SDG 14), climate (SDG 13), and biodiversity (SDG 15). Holistic governance of marine ecosystems allows for informed policy trade-offs, supports carbon sequestration and climate resilience, and facilitates effective mitigation and adaptation practices.

Legal Measures Under the UNFCCC and the Paris Agreement

International efforts to address climate change were initially catalyzed with the passage in 1992 of the UNFCCC at the United Nations Conference on Environment and Development in Rio de Janeiro (the so-called Earth Summit). Marine ecosystems were recognized under the UNFCCC both as valuable sinks for greenhouse gas (GHG) emissions and as particularly exposed to changes in global climate

(UNFCCC, 1992: Preamble). Article 4.1(d) and (e) recognize the importance of promoting sustainable management of both terrestrial and marine sinks and fostering cooperation in strategic planning relating to climate change adaptation, preparation of coastal zone and water management, and ecosystem restoration (UNFCCC, 1992, Article 4.1[d–e]). Parties are obliged to protect GHG sinks, as well as to monitor and report emission reductions as a result of national sinks and reservoirs (UNFCCC, 1992: Article 4.2[a–c], 12.1–2). Oceans and coastal zones are estimated to have sequestered 40,000 gigatons ($GtCO_2$), or 93 percent of total historical emissions (Nellemann et al., 2009: 11). Aquatic ecosystems have been shown to be significantly more efficient as carbon sinks than terrestrial ecosystems (Duarte et al., 2010; Lavery et al. 2013; Chmura 2014: 25–31), with wetlands, tidal salt marshes, mangroves, and seagrass meadows covering only 9 percent of comparable territory yet providing, at minimum, 27 to 100 times more sequestration potential (Laffoley and Grimsditch, 2009: 48).

Like the UNFCCC, the 1997 Kyoto Protocol emphasized the importance of preservation and enhancement of GHG sinks in line with obligations under relevant international instruments (Kyoto Protocol, 1997: Article 2.1[a][ii]). The carbon sinks resulting from direct human-induced land-use changes and forestry activities that were identified as needing verification in national-emissions stock taking were afforestation, reforestation, and deforestation (Kyoto Protocol, 1997: Article 3.3). Parties to the Kyoto Protocol are required to implement a system for the estimation of emissions and to report annually, including on removal of emissions by sinks (Kyoto Protocol, 1997: Article 5.1, 7.1). Those parties listed in Annex I (i.e., developed states) may use the Clean Development Mechanism (CDM) to transfer credits generated from the restoration of carbon sinks in non-Annex I jurisdictions to offset or reduce their national emissions (Kyoto Protocol, 1997, Article 6.1(b), 12.3). Regardless of the strides made by the Kyoto Protocol, in 2015 global emissions exceeded 36.2 $GtCO_2$, with the Intergovernmental Panel on Climate Change (IPCC) projecting continued increases in sea level, surface temperature, and ocean acidification (IPCC, 2014: 10–13).

The Paris Agreement, which was adopted in 2015 and entered into force on November 4, 2016, acknowledges in its preamble that climate change is a common concern of mankind, emphasizing the importance of protecting biodiversity and maintaining ecosystem integrity in particular oceans (Paris Agreement, 2015: Preamble). Key objectives are established, including holding global temperature rise well below 2°C in pursuit of only a 1.5°C rise (Paris Agreement, 2015: Article 2.1[a]), fostering resilience to climate-related impacts, and mobilizing finance flows as a pathway to low emission and climate resilient development (Paris Agreement, 2015: Article 2.1[b–c]). Enhancing adaptive capacity is identified as a global goal, with parties acknowledging that adaptation should follow a country-driven, gender-responsive, and participatory approach that considers vulnerable groups, communities, and ecosystems, and is grounded in the best available scientific information and, where appropriate, traditional knowledge (Paris Agreement, 2015: Article 7.5). National commitments are made under the Paris Agreement by way of nonbinding, nationally determined contributions (NDCs) (Paris Agreement, Article 4.3).

Reviewed every five years, a total of 157 NDCs have been communicated to the secretariat from 197 jurisdictions (Paris Agreement, 2015: Article 4.9; NDC Registry, 2017).

Measures to achieve the Paris goals are enshrined in Article 6 and are aimed at promoting adaptation and mitigation actions, fostering sustainable development, and generating transferable mitigation outcomes toward domestic NDCs (Paris Agreement, 2015: Article 6.1–3). Article 6.4 provides a market-based mechanism to support sustainable development by positively incentivizing emission reductions, while Article 6.8 offers an alternative holistic and balanced nonmarket mechanism aimed at fostering mitigation and adaptation actions, enhancing public–private partnerships, and enabling institutional coordination across relevant international instruments (Paris Agreement, 2015, Article 6.4, 6.8). A commitment is made by the parties to strengthen cooperation to enhance technology development and transfer, capacity building, climate change education, and public participation, with implementation of the agreement to be conducted in accordance with the principle of common but differentiated responsibilities (Paris Agreement, 2015, Article 2.2, 10–12).

Parties to the agreement further emphasize the need to cooperate to avert, minimize, and address climate change loss and damage, including actions relating to early warning systems; risk assessments; and resilience of communities, livelihoods, and ecosystems (Paris Agreement, 2015: Article 8.4[a], 8.4[e], 8.4[h]). An enhanced transparency and accountability reporting framework is established to provide flexibility domestically and internationally a clear picture of climate change actions which contribute to achievement of the NDCs (Paris Agreement, 2015: Article 13). The significance of the marine/climate nexus is exemplified by specific references to wetland and coastal ecosystems across 28 and 59 NDCs, respectively, without taking into consideration references to the broader Land Use and Land Use Changes and Forestry (LULUCF) (Herr and Landis, 2016: 8–9; Martin et al., 2016). Global climate efforts are encapsulated in SDG 13 on climate change, which encourages action under the UNFCCC process.

Legal Measures Governing Watercourses, Wetlands, and Biodiversity

United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (New York Convention)

The New York Convention, adopted May 21, 1997, and entered into force August 17, 2014, currently has 36 parties (UNTS No. 52106). The convention principally aims to harmonize key terms and provisions of watercourse agreements; promote cooperation among riparian states in support of conservation, protection, and management efforts; and provide a constructive avenue for dispute settlement (New York Convention, 1997: Preamble, Article 3.2, 6.2, 33). The convention has an operative scope inclusive of international watercourses for the purposes of protection, preservation, and management, with "watercourse" broadly defined to include

the water system as well as surface and groundwater as a unitary whole (New York Convention, 1997: Article 1–2). Using an ecosystem approach to governance, general principles include (1) equitable and reasonable utilization, (2) prevention of significant harm being caused to another state, (3) good faith cooperation through joint commissions or mechanisms, and (4) regular sharing of data (hydrological, meteorological, hydrogeological, and ecological) with other watercourse states (New York Convention, 1997: Article 5, 7–9).

Aiming to foster environmental protection of the watercourse, states are individually or jointly obliged to preserve and protect ecosystems in multiple ways. These include through prevention and control of pollution (New York Convention, 1997: Article 20, 21.2), prevention of alien species introduction (New York Convention, 1997: Article 22), preservation of the marine environment as a contiguous whole and inclusive of estuaries (New York Convention, 1997: Article 23), utilization of consultations relating to ecosystem management (New York Convention, 1997: Article 24–25), and utilization of best available efforts to maintain the integrity of installations on the watercourse (New York Convention, 1997: Article 26.1). Parties must take reasonable efforts to prevent and mitigate conditions harmful to the watercourse from both human and natural causes, with a duty of consultation in place where there is a reasonable belief that a work may result in significant adverse effects (New York Convention, 1997: Article 11–12, 26.2, 27). Disputes arising under the convention may be resolved through special arbitration procedures, or if the parties elect otherwise they may utilize third-party arbitration or submit the dispute to the International Court of Justice (ICJ) or other applicable arbitral forums (New York Convention, 1997: Article 33, Annex).

Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki Convention)

The Helsinki Convention, adopted on March 17, 1992, and entered into force October 6, 1996, currently has 41 parties (UNTS No. 33207). Originally agreed by the senior advisors to the Economic Commission for European Governments on Environmental and Water Problems as a regional instrument, on February 6 2013, the convention was opened for accession by all UN member states, thus making the convention a global water governance instrument (UNECE, 2004). The convention aims to foster cooperation for the prevention and mitigation of transboundary pollution of watercourses, to provide for ecologically sound and rational utilization, and to encourage conservation and restoration actions (Helsinki Convention, 1992: Article 2.1–2). Currently, the convention encompasses a variety of transboundary bodies of water, including 140 rivers, 25 lakes, 200 groundwater aquifers, and 25 wetlands of international importance identified list as "Ramsar sites" under the Ramsar Convention (on Ramsar, see later) (UNECE 2011). Two key definitions are provided by the convention: first, "transboundary waters" are defined to include both surface and groundwaters that mark, cross, or are located on boundaries with at least one other jurisdiction; and second, "transboundary impact" is defined as a

significant adverse environmental effect caused by human activity that changes the conditions of the transboundary waters and has impacts on human health, biodiversity, climate, historical and cultural structures, cultural heritage, and socioeconomic conditions (Helsinki Convention, 1992: Article 1.1–2).

The convention is grounded in the precautionary principle, the polluter pays principle, and the principle that water resources should be managed for both present and future generations (Helsinki Convention, 1992: Article 2.5). Measures are established to prevent, control, and reduce the introduction of pollution into transboundary waters, including (1) utilization of low and nonwaste technology; (2) prior licensing and discharge limits for point-of-source wastewater discharge; (3) strict requirements or prohibition where ecosystem water quality is declining; (4) at a minimum, biological treatment for municipal wastewater; (5) application of best available technology to reduce nutrient concentrations in discharges from industrial, municipal, and agricultural sources; (6) application of environmental impact assessments and sustainable water resource management grounded in the ecosystem approach; (7) development of contingency planning; (8) implementation of measures to prevent pollution in groundwater; and (9) use of precautionary measures to minimize risks associated with accidental pollution (Helsinki Convention, 1992: Article 3.1). Emission limits are to be established at the domestic level to prevent, control, and reduce pollution discharge from industrial sectors based on defined water quality limits (Helsinki Convention, 1992: Article 3.2). Development of legal and policy measures on a domestic or multilateral basis is encouraged to facilitate pollution prevention, research, and development based on available technologies and techniques, data evaluation and joint monitoring, and exchange of information relating to changes in ecological character among riparian parties (Helsinki Convention, 1992: Article 5–6, 9, 11, 13). Settlement of disputes is provided for through submission to the ICJ or arbitration in accordance with procedures established in a specialized annex (Helsinki Convention, 1992: Article 22, Annex IV).

Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)

An early multilateral environmental agreement, the Ramsar Convention was adopted February 2, 1971, entered into force February 17, 1976, and has 169 Parties (UNTS No 14583; Ramsar Convention, 2013). The convention aims to promote conservation, management, and "wise use" of wetlands, defining "wetland" broadly to include natural, artificial, permanent, or temporary marsh, fen, or peatlands, as well as marine water not exceeding six meters in depth at low tide (Ramsar Convention, 1971: Article 1.1, 3.1). Wetlands of ecological significance are selected for inclusion on the List of Wetlands of International Importance, with parties required to establish domestic planning measures to promote the conservation and wise use of wetlands, monitor for likely or existing human-induced changes in ecological character, and provide notification to the secretariat where changes are

observed (Ramsar Convention, 1971: Article 3.2, 8.2). Key terms under Article 3.2, notably "ecological character" and "change in ecological character," were defined by the Conference of the Parties (COP) at COP VI (1996), with the former term referring to "the structure and interrelationships between the biological, chemical, and physical components of the wetland [which] derive from the interactions of individual processes, functions, attributes, and values of the ecosystem(s)," and the latter term defined as "the impairment or imbalance in any of those processes and functions which maintain the wetland and its products, attributes and values" (Ramsar COP Resolution VI.1: para 1.1–1.2).

Article 8.2 establishes the organizational modalities of the secretariat in relation to party reporting obligations under the convention. The responsibilities of the Ramsar secretariat comprise the organization of the meetings of the COP (Ramsar Convention, 1971: Article 8.2[a]); maintenance of "the list," including extensions, deletions, or restrictions made by parties (Ramsar Convention, 1971: Article 8.2[b]); and acting as a focal point for contact from parties, including receiving notifications regarding changes in ecological character (Ramsar Convention, 1971: Article 8.2[c]). The secretariat, upon notification by a party or a third party (party, nonparty, or civil society organization), subsequently informs the COP of all notifications received relating to alterations to the list and changes in ecological character (Ramsar Convention, 1971: Article 8.2[d]) to establish recommendations regarding the sites (Ramsar Convention, 1971: Article 8.2[e]). Options include mobilization of a Ramsar Advisory Mission (RAM) to bring international expertise to assist in identifying appropriate actions (Ramsar COP Resolution VIII.8: para 19) and inclusion of the site on the Montreux Record indicating significant adverse change "has occurred, is occurring or is likely to occur," so as to guide implementation of available technical and financial resources (Ramsar COP Resolution VI:1: para 3.1; Ramsar COP Resolution V.4).

Convention on Biological Diversity

A second of the three "Rio Treaties" put forward at the Rio Earth Summit, the CBD is the principal international instrument governing biodiversity (Cordonier Segger and Khalfan, 2004: 15–18). Entering into force December 29, 1993, and currently with 196 parties, the CBD objectives are the conservation and sustainable use of biodiversity and the fair and equitable sharing of benefits resulting from its utilization (CBD, 1992: Article 1). Two key definitions are of note, "biological diversity," which includes all living organisms, as well as terrestrial, marine, and other aquatic ecosystems, and "ecosystem" inclusive of the dynamic interrelationships of plant, animal, and microorganism communities as a functional unit (CBD, 1992: Article 2). While holding sovereign rights over exploitation of biological resources, parties are obliged to ensure activities under their jurisdiction do not cause adverse environmental damage extraterritorially or to areas beyond national jurisdiction (CBD, 1992: Article 3). Additionally, parties are to develop National Biodiversity Strategies and Action Plans (NBSAP) as

a mechanism to progressively integrate and monitor biodiversity indicators in policy planning (CBD, 1992: Article 7).

Under the CBD, in situ conservation is to be fostered through (1) establishment of a system of protected areas; (2) development of management guidelines; (3) conservation and sustainable use of biodiversity both inside and outside of protected areas; (4) promotion of protective measures for species, ecosystems, and natural habitats; (5) environmentally sound and sustainable development adjacent to protected areas; (6) ecosystem restoration and rehabilitation; (7) control of risks related to the use of living modified organisms; (8) prevention of the introduction of alien invasive species; (9) nurturing of conditions conducive to conservation and sustainable use; (10) preservation, protection, and respect for traditional knowledge (TK) relating to biodiversity; (11) development of legislation for the protection of threatened species; (12) regulation of relevant activities that cause significant adverse effect on biodiversity; and (13) cooperation relating to financial and technical support (CBD, 1992: Article 8).

Additionally, parties are required to establish measures that promote and incentivize conservation and sustainable use of biodiversity ex situ, delivery of biodiversity-related education and public mainstreaming, development of appropriate environmental impact assessment mechanisms, access and benefit sharing (ABS) relating to the utilization of genetic resources (GRs) and TK based on fair and equitable terms, and fostering of technology transfer and information relating to biodiversity conservation (CBD, 1992: Article 9–17). The ABS provisions of the CBD were further developed in the Nagoya Protocol, with the core components of prior informed consent (PIC) and mutually agreed terms (MAT) acting as the bedrock for engagement with Indigenous Peoples and Local Communities (ILCs) pertaining to the utilization of biological resources (Nagoya Protocol, 2010: Article 1, 3, 5–7, 12).

The Marine and Climate Change Nexus: Legal and Policy Intersections

International legal obligations relating to watercourses, wetlands, and biodiversity have significant legal and policy intersections at the nexus of the United Nations Convention on the Law of the Sea (UNCLOS) and the global climate framework. First, the scope of environmental protection obligations under UNCLOS is influenced and informed by obligations under other multilateral environment agreements (MEAs). In the South China Sea dispute, the tribunal noted that the general obligation for environmental protection found in Article 192 of UNCLOS was informed through reference to specific obligations relating to prevention of pollution found in Article 194(1) and protection of fragile ecosystems in Article 194(5) (UNCLOS, 1982: Article 192, 194[1], 194[5]), legal obligations established in relevant international conventions, and the "general corpus of international law" (South-China Sea PCA Case No 2013–19, Award: para 914–44, 959). Such a broad interpretation by the tribunal has implications for the climate regime as it recognizes the practical implications of ecosystem interconnection, reinforces the integrity of obligations

found under the parallel regimes, and demonstrates the close relationship of fundamental international legal norms (Phillips and Maciunas, 2017). Obligations relating to "rational use" under international law, "wise use" under the Ramsar Convention, "optimal utilization" and "rational management" under UNCLOS, "sustainable use" under the CBD, "ecologically sound and rational water management" under the Helsinki Convention, "protection, preservation and management" under the New York Convention, and "conservation and enhancement" of GHG sinks under the Paris Agreement work synergistically, rather than in isolation, to inform the marine climate nexus. Obligations relating to upstream or transboundary pollution prevention, conservation and sustainable use of biodiversity, and protection of wetlands are all functionally encompassed under the core environmental provisions of UNCLOS.

Second, prevention of anthropogenic emissions, while the principal subject matter of the UNFCCC, is nonetheless substantively referenced under UNCLOS. Implicitly included under the scope of Article 192, prevention of atmospheric emissions is explicitly addressed in Article 212, which requires parties to prevent, reduce, and control pollution of the marine environment from or through the atmosphere and work through competent international organizations to establish global rules, standards, and practices (UNCLOS, 1982; Article 212). Additionally, Article 237 requires parties to implement obligations developed under special instruments relating to the protection and preservation of the marine environment in a consistent and mutually supportive manner with the obligations under UNCLOS (UNCLOS, 1982; Article 237). Together, these obligations create an interconnected system that reinforces the importance of applying legal and policy tools, both domestically and internationally. Forums such as the COP and intersessional meetings of each respective instrument, and the United Nations Environment Assembly (UNEA) of the United Nations Environment Programme (UNEP) provide valuable modalities for harmonization of broad climate priorities to achieve domestic NDCs in accordance with obligations under parallel instruments. Strategic planning tools, such as the NBSAP under the CBD, or technical assistance provided through RAM under the Ramsar Convention, inform domestic management of marine and climate drivers. Furthermore, funding mechanisms such as the Green Climate Fund (GCF) and the Global Environment Facility (GEF) support establishment of appropriate legal and governance frameworks at the domestic level. Ecosystem-based management practices support informed trade-offs in pursuance of sustainable development, mutually supportive implementations of international legal obligations related to the aquatic environment, and achievement of domestic NDCs.

Third, the responsibility and liability standard under UNCLOS has potential implications influencing global climate efforts. Article 235 of UNCLOS provides that states are responsible for the fulfilment of international obligations to preserve and protect the marine environment and subsequently hold liability under international law (UNCLOS, 1982; Article 235[1]). States are obliged under international law to exercise due diligence, including "use all means at [their] disposal" to ensure domestic activities under their authority do not cause transboundary environmental

damage (*Pulp Mills on the River Uruguay,* 2010 ICJ Reports 14: para 101). The 2011 Advisory Opinion on Activities in the Area delivered by the Seabed Dispute Chamber of the International Tribunal for the Law of the Sea (ITLOS) noted and elaborated upon this due diligence standard (*Activities in the Area,* 2011 Case No. 17, ITLOS Dispute Chamber: para 111, 114–115). Recognizing that the standard is variable and must be proportionate to the associated risk, the tribunal notes that due diligence encompasses both procedural and direct obligations (*Activities in the Area,* 2011: para 117, 121; Freestone and Phillips, 2017: 328–30). Due diligence is identified as placing on states requirements of both a conduct-based approach – "a duty to ensure" – and direct responsibilities to implement the precautionary approach, application of best environmental practices, availability of specialized protective measures in case of emergency, utilization of environmental impact assessment (EIA), and availability of resources to compensate for environmental pollution (*Activities in the Area,* 2011: para 117, 121–23, 127–35).

In 2015, ITLOS again interpreted and applied the due diligence standard to obligations of marine environmental protection in their decision Request for an Advisory Opinion Submitted by the Sub-regional Fisheries Commission (SRFC) (*Sub-regional Fisheries,* 2015 Case No.21 ITLOS: para 120, 125–33, 146; Freestone and Phillips, 2017: 333–34). Referencing the standard defined in Activities in the Area, the tribunal recognizes that a state would only be freed of liability where it has taken "all necessary and appropriate measures" to effectively discharge the due diligence obligation (*Sub-regional Fisheries,* 2015: para 148–49, 168). Additionally, the tribunal notes that obligations to cooperate, investigate impacts, and take remedial action as necessary are aspects of due diligence (*Sub-regional Fisheries,* 2015: 61). The conduct-based elements of the due diligence standard are effectively supported through the cooperative, collaborative, and reporting mechanisms found in the CBD and the New York, Helsinki, and Ramsar Conventions. Esteemed legal scholar Philippe Sands suggests that the international landscape is ripe for an advisory opinion relating to the scope of marine ecosystem obligations in light of continued anthropogenic pollution, with ITLOS being the ideal forum (Sands, 2016: 19–35). Where a state fails to use best available efforts to prevent continued emissions growth through achievement of their domestic NDC, it is *prima facie* plausible that this could be considered a breach of the environmental protection obligations under UNCLOS, resulting in exposure to potential liability for emissions damage.

Lastly, marine ecosystem protection in light of continued climate change implicates a range of intersections across the SDGs, including food (SDG 2), water (SDG 6), sustainable consumption and production (SDG 12), climate (SDG 13), oceans (SDG 14), and biodiversity (SDG 15). Relating to oceans, SDG 14.1 on prevention of marine pollution from land-based sources has broad implications on SDG 2.3 and 2.4 related to increasing agricultural productivity and food production, SDG 6.3 on pollution reduction in water, SDG 8.4 related to resources efficiency in consumption and production, and SDG 12.4 addressing environmentally sound management of chemicals (2030 Agenda, 2015: SDG 2.3–2.4, 6.3, 8.4, 12.4). SDG 14

broadly, specifically SDG 14.2 on marine ecosystem protection, SDG 14.3 on halting ocean acidification, SDG 14.5 on preservation of coastal areas, and tangentially SDG 14.7 on payment for ecosystem services all have intersections with SDG 6.6 on the protection of water-related ecosystems (2030 Agenda, 2015: SDG 14, 6.6). SDG 15 on terrestrial biodiversity, specifically SDG 15.1 on conservation and sustainable use of terrestrial and inland freshwater ecosystems, SDG 15.6 on promotion of fair and equitable benefit sharing, in particular relating to marine genetic resources, SDG 15.9 on integration of ecosystem values into strategic planning and decision-making processes have direct impact on the achievement of SDG 14 on oceans and SDG 13 on addressing climate change.

Relating to climate change, SDG 13.1 on strengthening climate resilience, SDG 13.2 on integration of climate measures into national planning, and SDG 13.3 on mainstreaming and capacity building are crucial for the achievement of SDG 14 on oceans and SDG 15 on biodiversity. Modalities for payment for ecosystem services, creation of marine protected areas, broadening of access and benefit sharing, and strategic planning through an NBSAP supports synergistic achievement of SDG 13 on climate and SDG 14 on oceans (2030 Agenda, 2015: SDG 15. 13–14).

Areas of Focus for Strengthening Marine Ecosystem Governance

There are many opportunities for strengthening marine ecosystem governance, for example, through "source-to-sea" governance, incentives to promote conservation and sustainable use of resources, equitable use of traditional knowledge, and greater regulation of ocean areas outside national jurisdictions.

Adoption of Source-to-Sea Governance

Concurrent achievement of enhanced climate reliance, protection of marine resources, and economic growth in accordance with sustainable development principles requires comprehensive national resource governance that fosters synergistic and mutually supportive objectives. Evolving from the "ridge-to-reef concept" (UNEP, 1995), adoption of source-to-sea governance models has contributed to achieving integrated water resource management. Grounded in the ecosystem approach, source-to-sea conceptualizes governance of aquatic environments as a contiguous whole based on system flows (water, sediment, pollution, biota, material, and ecosystem services) and interconnected ecological systems (land, freshwater, estuaries, deltas, coastline, sea self, ocean) (Granit et al., 2017: 5–8). Key areas of focus are wetlands, in particular mangrove forests, which are vital for carbon sequestration but also enchased climate resilience for small-island developing states (SIDS).

Achievement of the goals established under the Paris Agreement, both in terms of reduction of emissions and preservation of carbon sinks, requires identification of domestic drivers and development of localized strategic initiatives harmonized through a source-to-sea approach. For example, Finland has established protection

plans for water management broadly, groundwater aquifers, river basins, and marine areas grounded in harmonized policy priorities established with regional partners for transboundary continuity (Laki vesienhoidon ja merenhoidon järjestämisestä, 2004: §1 §13, §10, §11, §26). All domestic climate action must be implemented in accordance with the water management framework (Laki tulvariskien hallinnasta, 2010: §2, §7–10, §12; Ilmastolaki, 2015: §2–3). Source-to-sea governance allows for informed trade-offs and comprehensive management of marine ecosystems, while also fostering mitigation and adaptation efforts that enhance climate resilience.

Positive Incentives for Conservation and Sustainable Use

Promotion of conservation and sustainable use practices through establishment of domestic incentive schemes, localized governance models, and multistakeholder participation support concurrent achievement of marine and climate priorities (TEEB, 2010: 12–18,). Since 1998, Costa Rica has employed a payment for ecosystem services (PES) program to compensate local communities or farmers for protection of biodiversity-rich regions, positively incentivizing conservation and sustainable use of biodiversity (Ley N° 7788 1998: Article 37; Cabrera et al., 2014: 18–19). Modalities are established to remunerate participants of the PES program for conservation of national priority areas, voluntary inclusion of private property as a conservation area, management of national protected areas, and preferential tax incentives (Ley N° 7788 1998: Article 37, 100). Similarly, China has developed a PES program under the Ecological Conservation Compensation (ECC) system to provide positive incentives for conservation of forests, wetlands, sea, water, desert, and grasslands through the mobilization of capital (Environmental Protection Law, 2014: Article 31; Opinions of the General Office of the State Council, 2016).

The Democratic Republic of the Congo (DRC) allows for the granting of forest concessions to eligible ILCs for sustainable management and economic exploitation (Loi n° 011/2002: Article 82, 84, 96–97, 99–100). Classified as "local community forests," specialized procedures are established for the granting of forest concessions to ILCs, including inquiry by the local government, issuance of public notice for comment, a maximum scale of 50,000 hectares (ha), development of a map of the area in consultation with neighboring communities, and the ability to structure the concession as private entity (for profit or non-for-profit), or license the concession to a third party to manage (Décret n° 14/018: Article 4–6, 8–12, 18–19, 20–21). Climate-related shifts disproportionately affect ILCs, particularly in LDCs and SIDS. Positive incentivization and localization of governance assist in operationalizing the marine climate nexus and empowering ILCs to engage in mitigation and adaptation efforts.

Equitable Use of Traditional Knowledge to Support Sustainable Development

Development of mechanisms that recognize, protect, and reinforce rights of ILCs to TK and facilitate utilization based on principles of ABS promotes sustainable

development (Phillips, 2016). Region-specific environmental techniques and expertise inherent in TK provide a gateway to sustainability practices applied by ILCs for generations (Cordonier Segger and Phillips, 2015). South Africa established a general duty of care for the environment under a system of coastal protection zones, along with modalities for cooperative management with the tribal councils of local communities (National Environmental Management Act, 1998: Article 28, 34–35; Integrated Coastal Management Act, 2008: Article 28, 34–35). This localization of governance over both marine and terrestrial protected areas is coupled with a permit regime for access and utilization of TK based on PIC and establishment of MAT (Biodiversity Act, 2004: Article 81–84; Regulations on Bioprospecting and Access and Benefit, 2008, Article 8[1]) and a requirement for users to disclose in the patent process where the invention was based on TK (Act No. 20 of 2005: Section 2), along with robust guidelines informing users of their obligations (Guidelines for Providers, Users and Regulators, 2012; Phillips, 2016: 301–02).

Global Landscape Funds (GLFs) privately develop funds that provide capital investment or risk assurance to landscape-based initiatives, while providing a medium for the application of TK aimed at providing tangible returns on investments made in developing or emerging markets. Returns may be monetary in nature or through conservation, ecosystem restoration, generation of carbon credits, or development of sustainable livelihoods for local communities. One of the many GLFs in operation, the Livelihoods Fund, developed out of a partnership with Danone, the Ramsar Convention, and IUCN. The Livelihoods Fund provided funding to the Oceanium project supporting reforestation of over 12,000 ha of mangroves in Senegal, with the project leader, Director Jean-Christophe Henry, winning a Ramsar Award in 2015 (Livelihoods Fund; Ramsar, Award for Innovation 2015). Other GLFs include the Moringa Partnership "Moringa Fund," the Terra Global Capital "Terra Bella Fund," the Conservation International Critical Ecosystem Partnership Fund, the African Development Bank "Congo Basin Forest Fund," and the African Agricultural and Trade Investment Fund. By making capital available for climate-focused, ecosystem-related initiatives that are grounded in a respect for the rights of ILCs, ecosystem-related innovation such as techniques for conservation and restoration of carbon sinks can be fostered in a fair, equitable, and inclusive manner.

Governance of Areas Beyond National Jurisdiction

Governance of marine ecosystems on the high seas, classified as Areas Beyond National Jurisdiction (ABNJ), is a crucial gap in implementation of SDG 13 and SDG 14. Under UNCLOS, ABNJ are defined as the water column adjacent to the exclusive economic zone (EEZ), including the seabed beyond the continental shelf, with the deep seabed uniquely classified as "common heritage of mankind." These account for 40 percent of the global surface area, 64 percent of the oceans' surface, and 95 percent of total ocean volume (UNCLOS, 1982: Article 86, 125, 136; FAO, 2016: 4–5). In July 2015 the UN General Assembly (UNGA), recognizing a call to foster conservation

and sustainable use of marine biodiversity beyond national jurisdictions (BBNJ) at Rio +20, decided to establish a legally binding instrument under UNCLOS (A/RES/69/292 2015: Preamble). Meetings of the Preparatory Committee (PrepCom) were held in both 2016 and 2017 (UN Division for Ocean Affairs and the Law of the Sea, 2017, Res. 69/202). Early negotiation drafts provide a broad set of inclusive definitions, a geographic and material scope, and core objectives of conservation and sustainable use of BBNJ, with implementation intended to be done in a manner mutually supportive of UNCLOS, UNFSA, and the CBD (UN Chair's Non-Paper, 2017; 5–15). In July 2017, following PrepCom 4, the committee approved areas of convergence for an international legally binding instrument and recommended that the UNGA converge an intergovernmental conference. The first session of Intergovernmental Conference on an international legally binding instrument under the UN Convention on the Law of the Sea (UNCLOS) on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ) was held in September 2018 with negotiations expected to be ongoing throughout 2019–2020. Progress, while slow, remains positive to further clarify obligations of states to conserve, protect, and sustainably use the global oceans.

Conclusion

Attainment of the global goal of holding temperature rise below 2°C as per the Paris Agreement and SDG 13 requires extensive and inclusive social, legal, and economic reform. Increased emphasis must be placed on the marine–climate nexus to promote increased climate reliance, enhanced carbon sequestration, and expanded application of source-to-sea principles. Harmonization of polices across jurisdictions allows for informed upstream/downstream developmental trade-offs, supports identification of climate-induced tipping points, and contributes to long-term strategic planning. Legal obligations under the UNFCCC are deeply interconnected with the environmental protection components of UNCLOS, the CBD, and the New York, Helsinki, and Ramsar Conventions. Under each of these instruments, modalities can be found for strategic planning, data sharing, consultation, cooperation, and mobilization of financial and technical capacity to provide a network of forums, tools, and initiatives. These modalities can help to comprehensively govern the marine environment in a way that supports continued climate change resilience and ongoing emissions reductions.

Legal and policy approaches that promote source-to-sea governance, as seen in Finland; positive incentivization of conservation efforts through payment for ecosystem services or local forest concessions, as seen in Costa Rica and the DRC, respectively; and localized governance allowing for equitable application of traditional knowledge, as seen in South Africa synergistically support protection of the marine environment and enhanced climate resilience through conservation of carbon sinks, operationalizing Sustainable Development Goals on climate and oceans. Further work to solidify an international legally binding instrument on marine biodiversity beyond national jurisdictions is needed to clarify international obligations, create institutional capacity, and mobilize technical and financial resources to assist in the preservation of oceans

globally. Achievement of the goals of the Paris Agreement requires a further strengthening of the marine–climate nexus to ensure global climate efforts are not undermined by inadequate attention to comprehensive marine ecosystem preservation.

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