CHAPTER 3

Interdisciplinary Considerations for Closing the High Seas to Fishing

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1 Introduction

After the Earth's atmosphere and outer space, the ocean beyond the jurisdiction of coastal and island States, the high seas, represents humanity's largest commons, extending across 46% of the planet's surface. According to various United Nations (UN) agencies, biodiversity in the high seas, and the ocean more generally, is in crisis.[1] Marine biodiversity loss is widely recognised as a threat to planetary health and has long been on the agenda of the international community. Of the 169 Targets agreed upon during the 2015 *UN Summit for the Adoption of the 2030 Agenda*, Target 4 under Sustainable Development Goal (SDG) 14 was established to explicitly end overfishing and restore fish stocks[2] to sustainable levels.[3] In 2015, when the agenda was adopted, 33.1% of global fish stocks were classified as overfished, tripling the rate reported by the United Nations Food and Agriculture Organization (FAO) in 1974.[4] However, instead of improving, the situation has since deteriorated. The 2024 State of the World Fisheries and Aquaculture report by the FAO, which published the 2021 fishing rates, reported a global overfishing rate of 37.7%, an increase of 4.6% since 2015, undermining SDG 14.4, which had a time-bound target date

1 H. O. Pörtner et al (eds), *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (CUP 2019); FAO, "The State of World Fisheries and Aquaculture 2024 – Blue Transformation in action" (2024), available at <https://openknowledge.fao.org/server/api/core/bitstreams/131ab804-f871-4562-bd0d-2457ebad0e47/content/cd0683en.html> accessed 15 August 2024; UNEP-WCMC, "State of the World's Migratory Species" (2024), available at <https://www.cms.int/sites/default/files/publication/State%20of%20the%20Worlds%20Migratory%20Species%20report_E.pdf> accessed 15 August 2024.

2 A stock is a term primarily used in fisheries and wildlife management, referring to a population or a subpopulation of a species that is managed as a unit.

3 UNGA Res 70/1 (2015) GAOR 70th Session Supp 49, 24.

4 FAO, "The State of World Fisheries and Aquaculture 2018 – Meeting the sustainable development goals" (2018), available at <https://openknowledge.fao.org/server/api/core/bitstreams/6fb91ab9-6cb2-4d43-8a34-a680f65e82bd/content> accessed 15 August 2024.

set to 2020.[5] In their 2018 report, the FAO already stated that "it seems unlikely that the world's fisheries can rebuild the 33.1 percent of stocks that are currently overfished in the very near future"; however, the FAO did not foresee that overfishing would worsen. In addition to this crisis for targeted fish species, the rest of marine biodiversity does not seem to fare any better. For example, according to the latest International Union for Conservation of Nature (IUCN) Red List, six of the seven species of sea turtle in the world are threatened with extinction, while the seventh is data deficient,[6] and a 71% decline in the abundance of oceanic sharks has been noted in just five decades due to commercial fishing.[7] One is warranted to ask if the situation might even be worse for the many other species which are not monitored.

A legal framework exists, that is supposed to enable the long-term sustainable use of global marine fisheries and conservation of the marine environment and its biodiversity, both within and beyond national jurisdiction. The United Nations Convention on the Law of the Sea (UNCLOS)[8] lays out a set of obligations, rights and freedoms to guide the conservation and sustainable management of the ocean and its resources. Under Part VII, UNCLOS provides for freedom of fishing in the high seas,[9] but calls for the cooperation of States in the conservation and management of living resources through the establishment of subregional or regional fisheries organisations.[10] The mandate of these organisations – to ensure the sustainable use of straddling and migratory fish stocks, as well as associated species and species belonging to the same ecosystem – was further enshrined in the second implementing agreement of UNCLOS, the 1995 UN Fish Stocks Agreement (UNFSA).[11] These organisations have come to be known as regional fisheries management organisations (RFMOs). In 2023, a third implementing agreement that may impact certain fishing activities was adopted to further the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction (ABNJ), what came

5 FAO (n 1).
6 UNEP-WCMC (n 1).
7 N. Pacoureau et al, "Half a century of global decline in oceanic sharks and rays" (2021) 589 *Nature* 567–571.
8 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 396.
9 UNCLOS, art 87(1)(e).
10 UNCLOS, art 118.
11 United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (adopted 4 August 1995, entered into force 11 December 2001) 2167 UNTS 3.

to be known as the biodiversity beyond national jurisdiction Agreement (BBNJ Agreement).[12] While the new BBNJ Agreement has the authority to establish non-use measures in the high seas that could potentially restrict fishing, how it might do so while respecting the competences of existing regional or global management bodies, including RFMOs, is yet to be deciphered.

High seas fisheries are generally managed by restricted-use measures adopted by these RFMOs, such as fisheries catch quotas, fishing gear restrictions and gear modifications and some non-use measures, such as spatial or temporal closures (discussed by Urrutia in chapter 5), including marine protected areas (discussed by Klerk in chapter 4 and by Guggisberg in chapter 13). About a century after the establishment of the first RFMO, commercial fishing remains the largest driver of marine biodiversity loss on the high seas,[13] the state of marine straddling and migratory biodiversity is more perilous than ever before,[14] illegal, unreported and unregulated (IUU) fishing on the high seas remains a problem[15] and fisheries access and benefits continue to be inequitable.[16] In light of the ongoing ecological crisis in the ocean, it is clear that the current framework is inadequate or at least insufficient to maintain the abundance of target and impacted non-target biodiversity which inhabit or transit the high seas. It is therefore necessary to explore other options beyond the frameworks and instruments that have been agreed upon until now. These measures may include the adoption of what some may consider a radical measure: the closure of the high seas to commercial fishing. One could indeed argue that only an ambitious non-use measure could bend the global overfishing and biodiversity loss curves, which threaten the functionality of the global ocean.

This case study around fisheries in shared international waters addresses an environmental challenge affecting the global commons in which a small subset of States, which are exercising their international freedoms, are responsible for the vast majority of in-situ and transboundary environmental impacts that affect a much broader set of stakeholders. In this context, fisheries are understood as an activity aimed at the extraction of biotic resources for the purposes

12 Agreement under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, Document A/CONF.232/2023/4 (30 June 2023).

13 G. O. Crespo and D. C. Dunn, "A review of the impacts of fisheries on open-ocean ecosystems" (2017) 74(9) *ICES Journal of Marine Science* 2283–2297.

14 UNEP-WCMC (n 1).

15 J. Park et al, "Tracking elusive and shifting identities of the global fishing fleet" (2023) 9(3) *Science advances*.

16 U. R. Sumaila et al, "Winners and losers in a world where the high seas is closed to fishing" (2015) 5(1) *Scientific reports* 8481.

of direct or indirect (ie feed production) human consumption or sport, and which may result in the bycatch or impacting of other portions of the marine environment that were not targeted. Targeted non-fish species such as cephalopods, mollusks or marine mammals are encapsulated under this definition. Non-commercial modalities of fishing such as fishing for research purposes are not included. The case study explores the reasons justifying the closure of the high seas to fishing activities. It expands on the potential rationale for closing the high seas by presenting the relevant ecological and environmental (section 2), knowledge, management, and control (section 3), and socio-economic and equity (section 4) arguments underpinning such a non-use measure. It does so by synthesising – and building upon – the published literature which alludes to the closure of the high seas to fishing as a necessary non-use measure in order to ensure the environmental and socioeconomic sustainability of ocean activities and its resources both beyond and within national jurisdiction.

2 Ecological and Environmental Considerations

As is explained here below, the status of marine biodiversity of many targeted high seas fish stocks is poor, and so is that of other taxonomic groups in ABNJ (2.1), which causes impacts not only on species, but also on ecosystems (2.2). Moreover, high seas fisheries contribute towards anthropogenic climate change (2.3).

2.1 *Status of High Seas Biodiversity*

Almost 20 years ago, a FAO report summarised the state of highly migratory, straddling, and other high seas fishery resources and associated species.[17] The report covered various ecological levels, from stock and population levels to taxonomic families, and concluded that about one-third of highly migratory tuna and tuna-like species, over half of highly migratory sharks and rays, and nearly two-thirds of straddling and high seas stocks were overexploited or depleted.[18] Although updating the FAO report is beyond the scope of this chapter, the latest IUCN Red List statuses provide a concerning picture of species

17 J. J. Maguire et al, "The state of world highly migratory, straddling and other high seas fishery resources and associated species" (2006) *FAO Fisheries Technical Paper. No. 495*, available at <https://www.fao.org/4/a0653e/a0653e00.htm> accessed 15 August 2024.

18 ibid.

health.[19] Of the 224 species assessed, including additional oceanic sharks,[20] albatross and petrel species,[21] as well as sea turtles,[22] 34% were classified as vulnerable, endangered, or critically endangered, 26% were data deficient or lacked an IUCN assessment, and 40% were not classified as threatened. In terms of population trends, that is how populations evolve over time, 37% were decreasing, 45% had unknown trends or lacked an IUCN Red List assessment, and only 17% were stable or increasing. Although direct comparison to the 2006 FAO report is challenging, these recent findings derived from the latest IUCN Red List assessments highlight ongoing concerns about the health of migratory, straddling, and high seas species.

Global overfishing has been increasing for decades, with 37.7% of all monitored fish stocks currently overfished.[23] Marine migratory and straddling species experience overfishing rates nearly double those of species managed within national jurisdictions.[24] A 2010 assessment of the 48 fish stocks managed by the world's 18 RFMOs concluded that 67% were either overfished or depleted.[25]

The 2014 report of the United Nations Environment Programme and the Convention on Migratory Species highlighted the vulnerability of highly mobile sharks and rays, noting that over one-third of the 153 migratory or potentially migratory sharks or rays were threatened with extinction, while an additional 27% of these species were classified as data deficient.[26] Nearly a decade later, studies confirmed the continued decline of oceanic shark species worldwide.[27]

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19 ibid.

20 Pacoureau et al (n 7).

21 Agreement on the Conservation of Albatrosses and Petrels (adopted 19 June 2001, entered into force 1 February 2004) 2258 UNTS 257.

22 IUCN, "Red List Assessments", available at <https://www.iucn-mtsg.org/statuses> accessed 15 August 2024.

23 FAO, "The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation" (2022), available at <https://openknowledge.fao.org/items/11a4abd8-4e09-4bef-9c12-900fb4605a02> accessed 15 August 2024.

24 FAO, "The State of World Fisheries and Aquaculture" (2014), available at <https://www.fao.org/in-action/globefish/publications/details-publication/en/c/338355/> accessed 15 August 2024.

25 S. Cullis-Suzuki and D. Pauly, "Failing the High Seas: a global evaluation of regional fisheries management organizations" (2010) 34(5) *Marine Policy* 1036–1042.

26 S. Fowler, "The Conservation Status of Migratory Sharks" (2014) *UNEP/CMS Secretariat*, available at <https://www.cms.int/en/publication/conservation-status-migratory-sharks> accessed 15 August 2024.

27 Pacoureau et al (n 7).

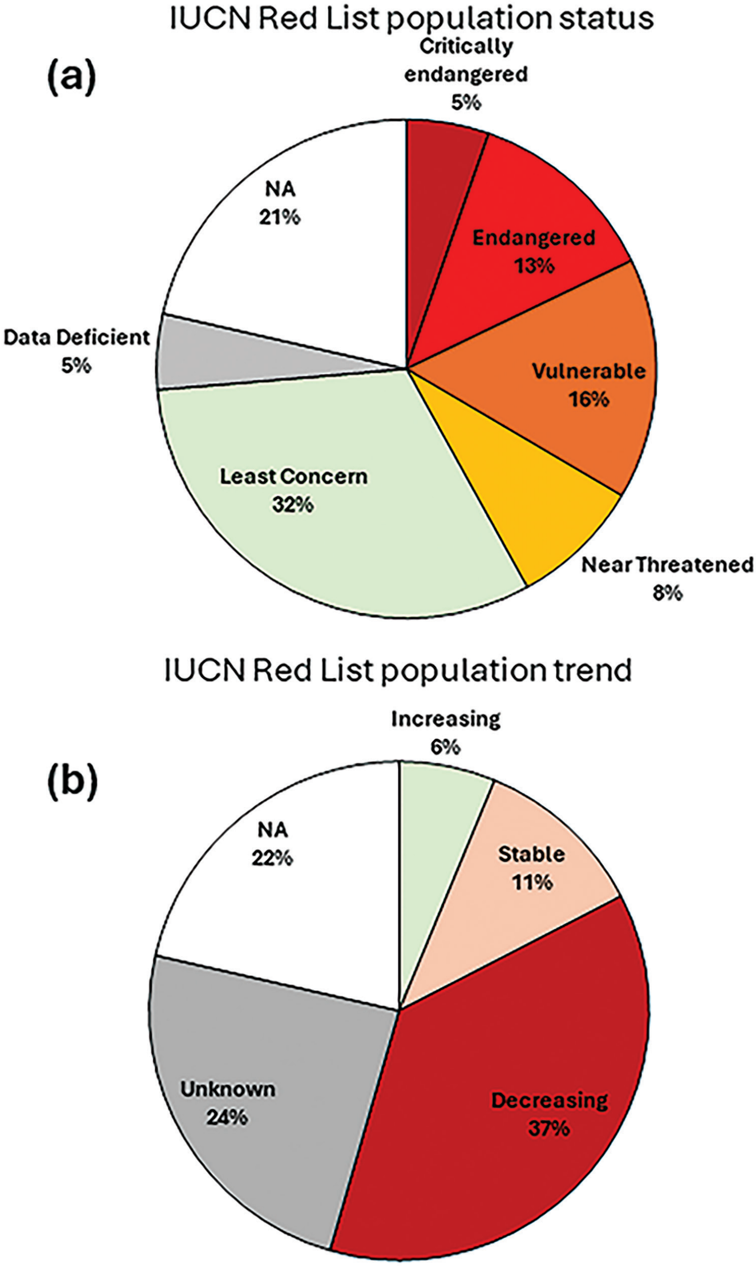

FIGURE 3.1 Ecological status (a) and population trend (b) of 224 marine migratory, straddling or high seas species
PREPARED BY THE AUTHOR

2.2 *Impacts on Ecosystems*

Excessive fishing has led to reductions in the abundance and range of various pelagic species,[28] a decrease in the average body size of individuals,[29] truncation in the age structure of populations,[30] and reduced genetic diversity, making them less adaptable to environmental change.[31] These impacts have been observed across many high seas species, many of which are not actively managed by RFMOs.

Research over the past twenty years has shown that predators play a significant role in shaping marine ecosystems.[32] Knock-on effects triggered by the declines of these predators, known as trophic cascades, have been observed in coastal areas like coral reefs,[33] rocky shores,[34] and kelp forests.[35] However, detecting these changes in the open ocean is challenging due to limited data and the existence of few open ocean ecosystem models.[36] Despite these challenges, ecosystem models have revealed community-level impacts caused by declines in higher trophic level species, also in the open ocean.[37] For example, a 2004 study showed that increased tuna catches in the Eastern Tropical Pacific and Central North Pacific led to reduced top predators and increased

28 B. Worm and D. P. Tittensor, "Range contraction in large pelagic predators" (2011) 108 *Proceedings of the National Academy of Science of the United States of America* 11942–11947.

29 G. Woodward et al, "Body size in ecological networks" (2005) 20 *Trends in Ecology & Evolution* 402–409.

30 C. H. Hsieh et al, "Fishing elevates variability in the abundance of exploited species" (2006) 443 *Nature* 859–862.

31 Crespo and Dunn (n 13).

32 B. Worm and R. A. Myers, "Meta-analysis of cod-shrimp interactions reveals top-down control in oceanic food webs" (2003) 84 *Ecology* 162–173; D. Ainley et al, "Paradigm lost, or is top-down forcing no longer significant in the Antarctic marine ecosystem?" (2007) 19 *Antarctic Science* 283–290; S. Nicol et al, "Paradigm misplaced? Antarctic marine ecosystems are affected by climate change as well as biological processes and harvesting" (2007) 19 *Antarctic Science* 291–295; J. J. Polovina and P. A. Woodworth-Jefcoats, "Fishery-induced changes in the subtropical Pacific pelagic ecosystem size structure: observations and theory" (2013) 8 *PLOS ONE*.

33 D. R. Bellwood, T. P. Hughes, C. Folke and M. Nyström, "Confronting the coral reef crisis" (2004) 429 *Nature* 827–833.

34 B. A. Menge, "Top-down and bottom-up community regulation in marine rocky intertidal habitats" (2000) 250 *Journal of Experimental Marine Biology and Ecology* 257–289.

35 J. A. Estes and J. F. Palmisano, "Sea otters: their role in structuring nearshore communities" (1974) 185 *Science* 1058–1060.

36 M. Colléter et al, "Global overview of the applications of the Ecopath with Ecosim modeling approach using the EcoBase models repository" (2015) 302 *Ecological Modelling* 42–53; T. J. Webb, E. Vanden Berghe and R. O'Dor, "Biodiversity's big wet secret: the global distribution of marine biological records reveals chronic under-exploration of the deep pelagic ocean" (2010) 5(8) *PLOS ONE*.

37 J. F. Kitchell et al, "Billfishes in an ecosystem context" (2006) 79 *Bulletin of Marine Science* 669–682; Polovina and Woodworth-Jefcoats (n 32).

biomass of lower trophic levels.[38] Evidence of the number of smaller predators (eg small tuna) increasing due to declines in apex predators (eg oceanic sharks) is also growing,[39] although some studies report limited or no evidence of trophic cascades.[40] The decline in marine top predators is therefore a potential driver in ecosystem-wide changes.

2.3 *Climate Change Considerations*

As the global population grows and its appetite for seafood increases,[41] we must adjust our food production systems to increase their productivity, while not increasing their environmental footprint.[42] The contribution of high seas fisheries towards anthropogenic climate change can be explored through two primary lenses: the greenhouse gas footprint of the vessel during transit and fishing operations, and the profile of species harvested in ABNJ.

First, the vast majority of species targeted by the high seas fishing fleet can also be found in areas within national jurisdiction, making their catch in the high seas inefficient from a fuel consumption standpoint.[43] Satellite tracking of distant water fishing nations (DWFN) operating across RFMOs shows that some vessels traverse thousands of miles between ocean basins just to reach their target fishing ground.[44] One could ask whether it would not be more efficient for domestic fleets to target those species within exclusive economic zones (EEZs) using the same fishing gear, thereby avoiding the fuel consumption associated with traveling thousands of nautical miles. Such a change could have a non-negligible impact in terms of climate change, since it is estimated that fuel consumption in marine capture fisheries results in the emission of about 130 million tonnes of CO_2 equivalent per year, which represents about 4% of the total emissions from the global food production sector.[45]

38 J. T. Hinke et al, "Visualizing the food-web effects of fishing for tunas in the Pacific Ocean" (2004) 9 *Ecology and Society* 10.

39 P. Ward and R. A. Myers, "Shifts in open-ocean fish communities coinciding with the commencement of commercial fishing" (2005) 86 *Ecology* 835–847.

40 M. L. Pace, J. G. Cole, S. R. Carpenter and J. F. Kitchell, "Trophic cascades revealed in diverse ecosystems" (1999) 14 *Trends in Ecology & Evolution* 483–488.

41 FAO (n 1).

42 M. Crippa et al, "Food systems are responsible for a third of global anthropogenic GHG emissions" (2021) 2(3) *Nature food* 198–209.

43 L. Schiller, M. Bailey, J. Jacquet and E. Sala, "High seas fisheries play a negligible role in addressing global food security" (2018) 4(8) *Science Advances*.

44 D. C. Dunn et al, "Empowering high seas governance with satellite vessel tracking data" (2018) 19(4) *Fish and Fisheries* 729–739.

45 R. W. Parker et al, "Fuel use and greenhouse gas emissions of world fisheries" (2018) 8(4) *Nature Climate Change* 333–337.

Second the climate services provided by the ocean include both the physical carbon pump, as well as the biological carbon pump, which is in part driven by the vertical movements of biodiversity, including those of commercial interest.[46] When they die, fish sink and hence contribute to carbon sequestration in the ocean.[47] This process is prevented by fishing, since fish are removed from the seas and hence the carbon that is not sequestrated in the ocean is ultimately released into the atmosphere. The amounts of carbon at play are not marginal: from 1950–2014, fisheries extracted an amount of blue carbon[48] globally equivalent to 318.4 million metric tons of large fish.[49] This extraction resulted in the release of 37.5 (± 7.4) million metric tons of carbon into the atmosphere, consequently preventing the sequestration of 21.6 (± 4.4) million metric tons of carbon that would have occurred through the sinking of fish carcasses into the deep ocean.[50] High seas fishing's contribution to this problem is important due to the type of fish caught in ABNJ. Indeed, large pelagic fish (>90 cm total length), when they die, sink a larger amount of carbon into the ocean depths per individual than smaller fish, and up to 68.6% of the catch volume by the high seas fishing fleet between 2010–2019 consisted of such larger type of fish.[51]

In conclusion, the status of many highly migratory, straddling, and other high seas fishery resources and associated species is dire and generally worse than those in EEZs. Population trends show that only few species' status is improving, confirming that the fisheries management system currently in place is insufficient. The effects of excessive fishing are serious, ranging from impacts on the targeted species' health to the trophic chains and even ecosystems. These ecological considerations give credence to the argument that closing the high seas might be necessary to ensure the sustainable management of marine biodiversity, particularly straddling and migratory biodiversity. Furthermore, fishing on the high seas is not only less efficient in terms of fuel consumption – and hence carbon emissions – than fishing in EEZs, but it also mostly leads to the harvesting of larger individuals, which are hence

46 S. Honjo et al, "Understanding the role of the biological pump in the global carbon cycle: an imperative for ocean science" (2014) 27(3) *Oceanography* 10–16.

47 G. Mariani et al, "Let more big fish sink: Fisheries prevent blue carbon sequestration – half in unprofitable areas" (2020) 6(44) *Science advances*.

48 Carbon captured and stored by coastal and marine species and ecosystems, such as fish populations, mangroves, seagrasses, and salt marshes.

49 Mariani et al (n 47).

50 ibid.

51 D. Pauly, D. Zeller and M. L. D. Palomares (eds), "Concepts, Design and Data" (2020) *Sea Around Us*, available at <www.seaaroundus.org> accessed 15 August 2024.

removed from vertical carbon sequestration. Closing the high seas to fishing would consequently have a doubly positive impact on the environment in terms of anthropogenic climate change, by both reducing emissions and increasing sequestration of carbon.

3 Knowledge, Management and Control Considerations

Closing the high seas to fishing can also be advocated for because of insufficient and/or inadequate management, as well as on the basis of the precautionary principle. Indeed, gaps in the data available about many components of marine biodiversity mean that many exploitative activities are taking place in the absence of sufficient information to assess their impacts and take the appropriate management actions (3.1). Moreover, due to some practical management challenges and gaps, little is, or can be, done to ensure the long-term conservation of many species (3.2). Finally, some specificities of the high seas – vast areas far away from any coastal State – means that monitoring challenges abound (3.3).

3.1 *Data and Knowledge Gaps*

Vast data and knowledge gaps remain on the composition of high seas biodiversity, the extinction risk status of these species, as well as their functional relationships within the ecosystem.[52] The implementation of ecosystem-based management[53] or ecosystem-based fisheries management[54] hinges on having a sufficient understanding of the species composition of a given system, what their ecological status is, and how these species relate to one another and their environment. Yet, our understanding of the composition of ocean biodiversity declines notoriously the further and deeper we venture from the coastline.[55]

52 Webb, Vanden Berghe and O'Dor (n 36); G. O. Crespo et al, "Policy brief on High Seas biodiversity knowledge" (2022) *IUCN*, available at <https://iucn.org/sites/default/files/2022-11/policy_brief_on_high_seas_biodiversity_knowledge_0.pdf> accessed 15 August 2024.

53 Ecosystem-based management is an integrated approach that considers the entire marine ecosystem, including human activities, to maintain healthy, productive, and resilient ocean environments. It aims to balance ecological, social, and economic objectives by managing human activities in a way that protects ecosystem health and biodiversity, supports sustainable use of marine resources, and ensures the well-being of communities that depend on the ocean.

54 Ecosystem-based fisheries management is a holistic approach that takes into account the complex interrelationships within an ecosystem, including the impacts of fishing on non-target species, habitats, and the broader marine environment.

55 Webb, Vanden Berghe and O'Dor (n 36).

In fact, the biodiversity of vast areas of the high seas remain poorly studied (Figure 3.2(a) and (b)). The Ocean Biodiversity Information System (OBIS) is the most comprehensive repository of spatial information on biodiversity in ABNJ. A 2018 summary of our knowledge regarding the composition and distribution of biodiversity information in ABNJ highlighted that most of the over 20,000 species documented in international waters have fewer than 10 historical

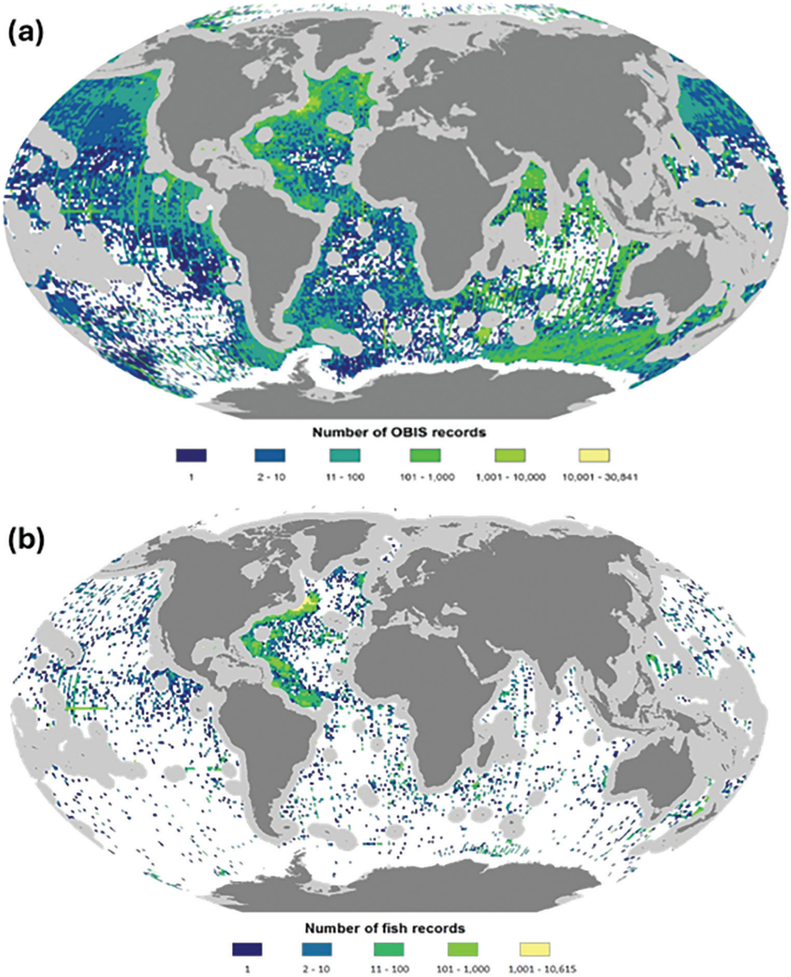

FIGURE 3.2 Distribution of biodiversity records in ABNJ (a) and global information of fish biodiversity in ABNJ (b)
FIGURE PREPARED BY THE AUTHOR ON THE BASIS OF RECORDS AND DATA FOUND IN THE OCEAN BIODIVERSITY INFORMATION SYSTEM (OBIS), AVAILABLE AT <HTTPS://OBIS.ORG> ACCESSED 25 AUGUST 2024

records, and about half have only a single documented record in the OBIS.[56] Vast areas of ABNJ have little to no biodiversity information (eg the central Indian Ocean, southeast Pacific Ocean or central south Atlantic Ocean; Figure 3.2(a)). The gaps in biodiversity information are perhaps best reflected when mapping what is known about specific taxonomic groups. Figure 3.2(b) shows the known distribution of fish biodiversity in ABNJ. The fish taxonomic group (ie *pices*) has the most documented species in ABNJ under OBIS (>4,000). Yet, even for this group and except for the concentration of information in the North and Western Atlantic Ocean, the majority of ABNJ are data deficient (Figure 3.2(b)).[57]

In addition to the need of understanding the composition and distribution of biodiversity in ABNJ in order to inform management, it is important to also have knowledge about the ecological status of said species. There are significant knowledge gaps regarding the ecological status of most recorded species in ABNJ. Of the approximately 18,000 marine species assessed by the IUCN Red List (a small proportion of the estimated number of species in the ocean), the majority are found within national jurisdictions, leaving substantial gaps in our understanding of the status of high seas species.[58] As illustrated in Figure 3.1, the population trends for half of the marine migratory and straddling species listed by the FAO that also use the high seas remain unknown.

There is growing evidence that the impacts of industrial fishing in the open ocean extend across multiple ecological scales, from the population to the biological community levels.[59] However, the improvement of our understanding of high seas ecosystems and our impacts on them are limited by our notable knowledge gaps in the diversity[60] and abundance of thousands of species in the ocean beyond national jurisdiction.[61] This information is important, among other reasons, to create models that can inform managers about the state of the marine environment. Ecosystem models (also known as mass-balance models) attempt to recreate the composition and predator-prey

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56 G. O. Crespo, D. C. Dunn, W. Appeltans and P. N. Halpin, "What do we know about taxonomic diversity beyond national jurisdiction?" (2018) *Nereus Programme*, available at <https://nereusprogram.org/wp-content/uploads/2018/09/BBNJ-Policy-Brief-TaxonomicDiversity_v5_FINAL.pdf> accessed 15 August 2024.

57 ibid.

58 It is noteworthy that the total number of IUCN Red List assessments is inferior to the total number of species documented in ABNJ alone, which according to the most recent estimates is of 28,365 species, see OBIS, "ABNJ", available at <https://obis.org/area/1> accessed 25 August 2024.

59 Crespo and Dunn (n 13).

60 Webb, Vanden Berghe and O'Dor (n 36).

61 G. O. Crespo et al, "High-seas fish biodiversity is slipping through the governance net" (2019) 3(8) *Nature Ecology & Evolution* 1273–1276.

relationships of species within an ecosystem and are necessary to implement an ecosystem-based approach to marine capture fisheries management.[62] For decades, scientists have understood that the depletion of species in an ecosystem can have knock-on effects in other parts of the food web and hence risks destabilising the composition and function of the ecosystem.[63] While mass-balance models represent some of the most practical research tools for understanding these knock-on effects, only a limited number of such models exist for open ocean ecosystems.[64] As it stands, we have built enough open ocean ecosystem models to understand that commercial fishing can alter the functioning and structure of an ecosystem, but have not managed to mainstream their use across the high seas to inform management efforts across regions.[65]

3.2 *Management Challenges and Gaps*

In addition to the important data and knowledge gaps presented here above, there are issues related to the actual management of species. First, in international fisheries management, while the populations of highest commercial interest are generally monitored and managed, most of the other species are ignored.[66] A telling example is that of non-target species under the International Commission for the Conservation of Atlantic Tunas (ICCAT). On top of the target species of tuna, ICCAT fisheries is known to interact with 289 species. This includes up to 109 shark and ray species[67] known to be caught within the convention area, as well as another 180 additional non-shark and ray species,[68] including a broad range of pelagic fish species, seabirds, marine mammals and sea turtles. Of the 109 shark and ray species, less than 20 were

62 J. S. Collie et al, "Ecosystem models for fisheries management: finding the sweet spot" (2016) 17(1) *Fish and Fisheries* 101–125.

63 J. K. Pinnegar et al, "Trophic cascades in benthic marine ecosystems: lessons for fisheries and protected-area management" (2000) 27(2) *Environmental conservation* 179–200.

64 A. Valls, M. Coll and V. Christensen, "Keystone species: toward an operational concept for marine biodiversity conservation" (2015) 85 *Ecological Monographs* 29–47; A. Audzijonyte et al, "Atlantis: A spatially explicit end-to-end marine ecosystem model with dynamically integrated physics, ecology and socio-economic modules" (2019) 10(1) *Methods in Ecology and Evolution* 1814–1819.

65 M. Colléter et al, "EcoBase: a repository solution to gather and communicate information from EwE models" (2013) Fisheries Center Research Report, University of British Columbia, Canada.

66 Crespo et al (n 61).

67 P. de Bruyn and C. Palma, "Updated Species List for Sharks Caught in ICCAT Fisheries (SCRS/2014/027)" (2015) 71(6) *ICCAT Collective Volume of Scientific Papers* 2557–2561.

68 P. de Bruyn and C. Palma, "Updated Species List for By-Catch Caught in ICCAT Fisheries (SCRS/2014/099)" (2015) 71(6) *ICCAT Collective Volume of Scientific Papers* 2887–2899.

included in ICCATs ecological risk assessment.[69] Similarly, the 2018 report on the intersessional meeting of the shark species group listed up to 75 species of shark and ray within ICCAT's convention area, of which approximately 30 are broadly considered as "ICCAT sharks" that are within their taxonomic mandate.[70] Only three of those are "major ICCAT sharks" with multiannual stock assessments: shortfin mako (*Isurus oxyrinchus*), porbeagle shark (*Lamna nasus*), and blue shark (*Prionace glauca*).[71] When one turns to non-shark and ray species, the situation is not better: overall, the populations of only a small portion of pelagic fish are being monitored and even fewer have total allowable catch limits, while no population-level assessments of the status of impacted seabirds, sea turtles or marine mammals are carried out by RFMOs.[72] Similarly, while there are data reporting obligations for 18 shark and ray species caught by the Indian Ocean Tuna Commission (IOTC) species,[73] only one (ie the blue shark – *Prionace glauca*) has a stock assessment. Hence, while the UNFSA calls for assessing the impacts of fishing on "species belonging to the same ecosystem or associated with or dependent upon the target stocks",[74] RFMOs have generally failed to monitor the population status and trajectories of the vast majority of species their fisheries interact with.

Second, due to the division of the ocean into areas under and beyond national jurisdiction that does not reflect ecosystems' boundaries, the consequences of anthropogenic actions on biodiversity in the high seas affects ecosystems in coastal nations' own waters and vice-versa. This ecological connectivity[75] complicates – and in some cases renders impossible – the sustainable management

69 E. Cortés et al, "Ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries" (2010) 23(1) *Aquatic Living Resources* 25–34.

70 ICCAT, Report of the 2018 ICCAT intersessional meeting of the Sharks Species Group (Madrid, Spain, 2–6 July 2018), available at <https://www.iccat.int/Documents/Meetings/Docs/2018/REPORTS/SHK_2018_ENG.pdf> accessed 31 August 2024.

71 ibid.

72 H. Murua et al, "Updated Ecological Risk Assessment (ERA) for shark species caught in fisheries managed by the Indian Ocean Tuna Commission (IOTC)" (2018) Indian Ocean Tuna Commission IOTC-2018-SC21-14.

73 IOTC Secretariat, "Guidelines for the reporting of fisheries statistics to the IOTC", available at <https://data.iotc.org/reference/latest/guidelines/> accessed 25 August 2024.

74 UNFSA, art 5(d).

75 D. C. Dunn et al, "Adjacency: how legal precedent, ecological connectivity, and traditional knowledge inform our understanding of proximity" (2017) *Nereus Scientific and Technical Briefs on ABNJ Series*, available at <https://nereusprogram.org/reports/policy-brief-adjacency-how-legal-precedent-ecological-connectivity-and-traditional-knowledge-inform-our-understanding-of-proximity/> accessed 25 August 2024; E. Popova et al, "Ecological connectivity between the areas beyond national jurisdiction and coastal waters: Safeguarding interests of coastal communities in developing countries" (2019) 104 *Marine Policy* 90–102.

of transboundary species. And this issue is not a marginal one since, of the 39 species of primary commercial interest caught in the high seas, all except for one are also caught in areas within national jurisdiction.[76]

Should a coastal State attempt to protect the biodiversity in its own maritime zones but other States cannot agree on proper conservation and management measures for the relevant species when they are located in the high seas, individual efforts are unlikely to succeed. This is the case for Costa Rica, a nation which has seen a hundred-fold decrease in the abundance of the iconic leatherback sea turtle (*Dermochelys coriacea*) population over the past 35 years (Figure 3.3) primarily due to bycatch in the open ocean, and which can no longer guarantee the survival of this species through domestic conservation actions. As reflected in Article 7 of the UNFSA, understanding the biological unity of a species throughout its range (which may include multiple jurisdictions) is imperative for its sustainable management, and many coastal States experience a high degree of powerlessness when attempting to manage transboundary species, many of which are threatened migratory predators that spend most of their life histories on the high seas.[77]

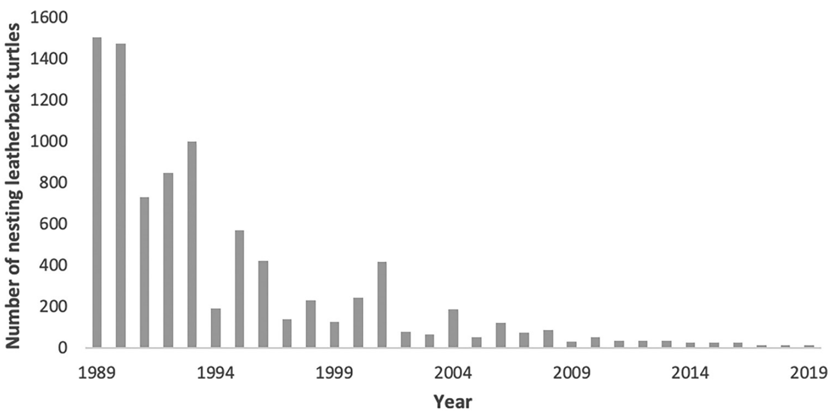

FIGURE 3.3 Decline in nesting leatherback sea turtles (*Dermochelys coriacea*) at one of Costa Rica's principal nesting beaches
FIGURE PREPARED BY THE AUTHOR BASED ON DATA OF THE EARTH WATCH INSTITUTE, AVAILABLE AT <HTTPS://EARTHWATCH.ORG/SITES/DEFAULT/FILES/2020-03/EARTHWATCH-FIELD-REPORT-COSTA-RICAN-SEA-TURTLES-2017-19.PDF> ACCESSED 31 AUGUST 2024

76 Schiller, Bailey, Jacquet and Sala (n 43).

77 A. L. Harrison et al, "The political biogeography of migratory marine predators" (2018) 2(10) *Nature Ecology & Evolution* 1571–1578.

Management gaps are further exacerbated by the lack of non-tuna RFMOs in vast areas of the high seas, including the southwest Atlantic Ocean, the eastern tropical Pacific or the northwest Indian Ocean, to name a few.

3.3 *Vessel Monitoring, Control and Surveillance*

Tracking the activities of the global high seas fishing fleet is crucial for the sustainable management of high seas fisheries, as it provides necessary information on when, where, and how high seas fishing impacts the environment. However, such tracking is also a challenging endeavour.[78] Historically, it has depended heavily on the cooperation of the flag States of vessels operating in these international waters, as they are expected to comply with existing regulations and best practices for collecting and sharing essential fisheries operational data. In reality, the information that was shared by fishing States with international bodies like RFMOs or the FAO about where, when and what species were caught has generally been vague and sparse. While monitoring, control and surveillance tools exist and progress has been made, as is presented here below, they have not been able to provide all the information necessary for the sustainable management of high seas fisheries.

First, until recently, the distribution of industrial fishing on the high seas could only be mapped through the data that each fishing State decided to disclose at coarse spatial and temporal resolutions.[79] Over the past decade however, there has been a conscious effort to leverage the information from, among other sources, automatic identification systems (AIS), a technology used in the maritime industry to prevent vessel-to-vessel collisions, in order not only to map the distribution of fishing vessels equipped with this technology, but also to calculate their relative fishing activity.[80] States and RFMOs are beginning to establish AIS requirements for fishing vessels operating within their jurisdiction or flying their flag; for example, all European fishing vessels larger than 15 meters are now required to be equipped with AIS. While fishing vessel tracking through AIS has revolutionised our understanding of the spatiotemporal footprint of fishing on the high seas,[81] AIS can nevertheless be turned off or its signal tampered with, thus interfering with efforts to map fisheries impacts.[82]

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78 D. C. Dunn et al (n 44).

79 D. A. Kroodsma et al, "Tracking the global footprint of fisheries" (2018) 359(6378) *Science* 904–908.

80 International Convention for the Safety of Life at Sea, 1974 (adopter 1 November 1974, entered into force 25 May 1980) 1184, 1185 UNTS 2; Automatic Identification System, 33 CRF 164.46 (2003), available at <https://www.ecfr.gov/current/title-33/chapter-I/subchapter-P/part-164/section-164.46> accessed 7 September 2024.

81 Kroodsma et al (n 79).

82 Park et al (n 15).

Second, observer and electronic monitoring programs are critical for accurately recording the composition of fisheries catch and bycatch on the high seas.[83] However, the degree of on-board observation of high seas fishing vessels, both in terms of human observers and electronic monitoring, varies significantly across the main fishing gears operating on the high seas.[84] These gaps are particular worrisome in the most geographically widespread form of fishing on the high seas, drifting pelagic longlines. This fishing method, which primarily targets large pelagic fishes, is known for having extremely low observer coverage rates, oftentimes inferior to 5% of the vessels or deployed longline sets across multiple RFMOs being observed.[85] Some of the earliest recommendations to increase observer coverage rates onboard longlines date back almost three decades.[86] While RFMO scientists have consistently requested their respective commissions for the observer coverage rates to be at least of 20% of all sets,[87] few States meet this threshold. By contrast, industrial purse seiners can have up to 100% coverage, oftentimes as a mix of human observers and electronic monitoring systems.[88] Nonetheless, perhaps with the exception of this form of fishing and certain longline fleets (eg the US Atlantic and Pacific pelagic longline fleets), most other high seas fisheries generate unreliable observational information.[89]

Third, a fishing-related at-sea activity for which observer coverage is important is transshipment. Transshipment is the process of transferring catches from a fishing vessel to another vessel, typically at sea, to facilitate the transport of fish to processing facilities or markets without the fishing vessel having to return to port.[90] This practice can improve efficiency and reduce costs but

83 Dunn et al (n 44).

84 C. Ewell et al, "An evaluation of Regional Fisheries Management Organization at-sea compliance monitoring and observer programs" (2020) 115 *Marine Policy* 103842.

85 ibid.

86 R. A. Skillman, J. A. Wetherall and G. T. DiNardo, "Recommendations for scoping the sea turtle observer program for the Hawaii-based longline fishery" (1996) Honolulu Laboratory, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA.

87 S. Griffiths, C. Lennert-Cody, B. Wiley and L. Fuller, "Update on operational longline observer data required under resolution C-19-08 and a preliminary assessment of data reliability for estimating total catch for bycatch species in the eastern Pacific Ocean (BYC-10 INF-D)" (2021) IATTC Scientific Advisory Committee, 12th Meeting, available at <https://www.iattc.org/getattachment/476948e6-a594-4bc7-a470-69303b6e14c2/BYC-10-INF-D_Update-on-operational-longline-observer-data.pdf> accessed 7 September 2024.

88 Ewell et al (n 84).

89 E. Gilman, M. Weijerman and P. Suuronen, "Ecological data from observer programmes underpin ecosystem-based fisheries management" (2017) 74(6) *ICES Journal of Marine Science* 1481–1495.

90 N. A. Miller et al, "Identifying global patterns of transshipment behavior" (2018) 5 *Frontiers in Marine Science* 240.

requires careful monitoring to prevent IUU fishing activities and discourage unsustainable fishing.[91] Some well-established unregulated fisheries, such as the squid fishing in parts of the high seas that are not covered by any RFMO (such as the Southwest Atlantic Ocean or the Northwest Indian Ocean), show persistent reliance on transshipment to extend their fishing operations for prolonged periods of time.[92] Over two decades after the 2001 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing called for a standardisation of transshipment reporting documentation,[93] oceanic fisheries transshipments remain opaque and heterogeneous in their reporting. For example, while the tuna fishery in the Western and Central Pacific stands as one of the best managed fisheries in the world, a recent study, which used different data streams to assess the nature of at-sea encounters between fishing vessels in this region and refrigerated cargo vessels (ie reefers), could only verify that no fish were transshipped illegally in 32% of the encounters.[94] While there is certainly precedent for well-monitored transshipment,[95] its current oversight on the high seas remains limited, making it a prominent vector for IUU fishing and overfishing in some regions.[96]

In conclusion, insufficient information on the composition of high seas biodiversity, the extinction risk status of these species, as well as their functional relationships within the ecosystem is available to enable sustainable management. Under such circumstances, and taking into account the precautionary principle, the option of closing such fisheries must seriously be considered. Additionally, while conservation and management measures for straddling and migratory biodiversity on the high seas should be designed to work in tandem with measures adopted within national jurisdiction, the existence of separate ocean zones leaves many coastal States powerless to protect species under their jurisdiction. By closing the high seas to fishing, the responsibility of sustainably managing migratory and straddling biodiversity would largely fall on the coastal and island States which share the species. While they would

91 C. Ewell et al, "Potential ecological and social benefits of a moratorium on transshipment on the high seas" (2017) 81 *Marine Policy* 293–300.

92 K. L. Seto et al, "Fishing through the cracks: The unregulated nature of global squid fisheries" (2023) 9(10) *Science advances*.

93 FAO, "International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing" (2 March 2001).

94 K. Seto, N. Miller, M. Young and Q. Hanich, "Toward transparent governance of transboundary fisheries: The case of Pacific tuna transshipment" (2022) 136 *Marine Policy* 104200.

95 K. Boerder, N. A. Miller and B. Worm, "Global hot spots of transshipment of fish catch at sea" (2018) 4(7) *Science advances*.

96 Ewell et al (n 91).

still have to understand transboundary connectivity and impacts and to cooperate, these efforts may be more manageable. Finally, decades after numerous monitoring, control, and surveillance challenges related to high seas fisheries have been identified, the situation has not sufficiently improved. The vastness of the high seas and practical difficulties to monitor vessels engaged in distant-water fishing argue in favour of closing the high seas to this extractive activity.

4 Socio-Economic and Equity Considerations

Other factors strongly call for a high seas fisheries closure. In particular, many fishing activities in ABNJ are not economically viable without subsidies – and such governmental support can contribute to unprofitable environmental degradation (4.1). Moreover, high seas fisheries appear to benefit only a few, while costing many; equity would therefore benefit from their closure (4.2). Finally, this sector seems rife with human rights abuse, which are in part enabled by the remoteness of the high seas and the lengthy isolation of crews (4.3).

4.1 *Questionable Profitability of High Seas Fishing and the Role of Subsidies*

As it currently stands, large sections of the high seas fishing fleets' activities are unprofitable. Indeed, they rely heavily on governmental subsidies. A 2018 study assessed the relative profitably of the high seas fishing fleet across fishing gears and regions with and without government subsidies.[97] Three quarters of the fishing effort could be attributed to six fishing nations (China, Taiwan, Japan, Indonesia, Spain and South Korea), whose vessels spent an average of 141 days annually fishing on the high seas. The authors found that without government subsidies, up to 54% of high seas commercial fishing grounds would be unprofitable. China, Taiwan and the Russian Federation, which currently account for 51% of high seas catch, were identified as the most unprofitable fleets without government subsidies. Deep-sea bottom trawling and squid jigging were unequivocally found to be the least profitable fishing methods with net losses in profit of US$230 million and US$345 million without government subsidies.[98]

While some subsidies can support fisheries and fishing communities in adapting to change or become more sustainable or capacity-enhancing, harmful fisheries subsidies – primarily in the form of fuel subsidies or investments

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97 E. Sala et al, "The economics of fishing the high seas" (2018) 4(6) *Science advances*.

98 ibid.

in new vessels – artificially distort the economic sustainability and viability of a fishery, which ends up impacting its environmental sustainability.[99] One can wonder about the length at which governments might be willing to go to keep a largely unprofitable industry on artificial life support, with the environmental degradation that such support might contribute to.

In light of this important issue, in 2022, after two decades of negotiations, members of the World Trade Organization adopted an agreement to end harmful fisheries subsidies, the Agreement on Fisheries Subsidies.[100] It remains to be seen what the Agreement will be able to achieve once it enters into force, but this commitment by the international community reiterates the seriousness of the problem created by subsidies and the necessity to limit their negative impact. Its entry into force would drastically shape the fishing seascape on the high seas, removing most of the unprofitable fisheries.

The potential of the Agreement on Fisheries Subsidies notwithstanding, the overall profitability of marine fisheries would benefit from stopping fishing on the high seas. A model on the potential bioeconomic effects of closing the high seas indeed predicted that such a non-use measure would not only increase stock abundance significantly – fourfold in the high seas and by 30% within EEZs – but also double the profits. In contrast, open high seas would reduce the abundance of target species to a third of their economically optimal size.[101]

4.2 *Unequitable Benefits*

High seas fisheries benefit a very limited number of States and closing them would have the potential for more equitable redistribution. While the global ocean beyond national jurisdiction is open to all States with fishing interests, only States with historically prominent fishing traditions or widespread government subsidies programs have been able to reap the benefits of the high seas freedoms enshrined in Article 87 of UNCLOS. Out in the high seas, 10 flag States account for 68% of the catch of migratory species: Indonesia, Ecuador, Spain, Japan, Taiwan, Mexico, Seychelles, South Korea, France, USA. Among these 10 flag States, six of them (Spain, Japan, USA, France, Taiwan, and South Korea) are also within the top 10 States responsible for 46.2% of the total catches in across all high seas species.[102]

99 U. R. Sumaila et al, "WTO must ban harmful fisheries subsidies" (2021) 374(6567) *Science* 544–544.

100 Agreement on Fisheries Subsidies, WTO Document WT/MIN(22)/33 (22 June 2022), available at <https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm> accessed 7 September 2024.

101 C. White and C. Costello, "Close the high seas to fishing?" (2014) 12(3) *PLOS Biology*.

102 Pauly, Zeller and Palomares (n 51); Sumaila et al (n 16).

The vast majority of fisheries landed catch and value across high seas regions has been accumulated not by adjacent coastal and island nations, but instead by DWFN. An assessment of the distribution of fisheries catch value across 14 non-polar FAO fishing areas demonstrates that, on average, 70.7% of the total value of high seas fisheries catch was fished by fishing States foreign to each FAO area. In regions such as the eastern (FAO 57) and western (FAO 51) Indian Ocean, those percentages climb to a shocking 95.3 and 98.5% respectively (Table 3.1).

TABLE 3.1 Global FAO fishing areas except for Arctic (FAO 18) and Antarctic (FAO 48, 58 and 88)

FAO fishing high seas areas	**Percent of catch value in FAO area by adjacent coastal nations**	**Percent of catch value in FAO area by DWFN**
21 – Atlantic, Northwest	13.3%	86.7%
27 – Atlantic, Northeast	99.1%	0.9%
31 – Atlantic, Western Central	22.0%	78.0%
34 – Atlantic, Eastern Central	4.8%	95.2%
41 – Atlantic, Southwest	25.4%	74.6%
47 – Atlantic, Southeast	4.8%	95.2%
51 – Indian Ocean, Western	1.5%	98.5%
57 – Indian Ocean, Eastern	4.7%	95.3%
61 – Pacific, Northwest	78.0%	22.0%
67 – Pacific, Northeast	50.0%	50.0%
71 – Pacific, Western Central	41.4%	58.6%
77 – Pacific, Eastern Central	30.0%	70.0%
81 – Pacific, Southwest	5.6%	94.4%
87 – Pacific, Southeast	29.0%	71.0%
Average	29.3%	70.7%

TABLE PREPARED BY THE AUTHOR ON THE BASIS OF DATA FOUND IN PAULY, ZELLER AND PALOMARES (N 51)

High seas fisheries do not represent a large proportion of total marine catches. They reached their peak in the late 2010s at 3.5 million annual tons,[103] and, historically, have only contributed 4.2% of the total global wild catches, which

103 Pauly, Zeller and Palomares (n 51).

translates to approximately 2.4% of the total global seafood production when accounting for aquaculture.[104] High seas fisheries may play an important role in supporting livelihoods of a small subset of commercial fishing fleets, but the majority of their landings are intended for premium food and supplement markets in affluent, food-secure nations.[105] Hence, they represent an almost negligible role in securing global seafood production.[106] While the historic contribution of high seas fisheries to global seafood production is rather minimal, a different pattern appears for the taxonomic group of highly-mobile tuna, billfish, sharks and rays: between 2010–2019, high seas catches of these species accounted for 20.6 million tons, out of a global total of 80.6, which equates to 25.6% of global catch.[107]

Coastal States without high seas fleets, which constitute most of the world's coastal States, would benefit economically from closing high seas fisheries. Such a measure could result in no net loss of global fisheries catch while reducing global fisheries catch inequality by 50%.[108] This measure could benefit over 120 States. It would have a particularly noticeable impact on the coastal and island States whose coastal communities and fisheries depend on highly-mobile tuna, billfish, sharks and rays.

4.3 *Human Rights Violations on the High Seas*

'Blue crimes' on the high seas, which include well-documented instances of human trafficking or forced labour onboard fishing vessels, frequently go unpunished.[109] Migrant workers on high seas DWFN have been subjected to various forms of physical and non-physical violence, including: (1) abuse of vulnerability, (2) deception, (3) restriction of movement, (4) isolation, (5) physical and sexual violence, (6) intimidation and threats, (7) retention of identity documents, (8) withholding of wages, (9) debt bondage, (10) abusive working and living conditions or (11) excessive overtime.[110] The remoteness of the high seas creates the perfect environment for such human rights

104 Schiller, Bailey, Jacquet and Sala (n 43).
105 ibid.
106 ibid.
107 Pauly, Zeller and Palomares (n 51).
108 Sumaila et al (n 16).
109 International Labour Organization, "Caught at sea – Forced labour and trafficking in fisheries" (2013), available at <https://www.ilo.org/publications/caught-sea-forced-labour-and-trafficking-fisheries> accessed 7 September 2024.
110 Greenpeace, "Seabound: the journey to modern slavery in the High Seas" (2019), available at <https://www.greenpeace.org/southeastasia/publication/3428/seabound-the-journey-to-modern-slavery-on-the-high-seas/> accessed 7 September 2024.

violations.[111] Transshipment at sea is a further risk factor, as crews stay on board fishing vessels for longer periods of time, which increases their vulnerability. A study by the Environmental Justice Foundation on human rights violations of Indonesian fishers found that distant water fishing vessels engaging in at-sea transshipment spent an average of 13.3 months at sea per trip, compared to 3 months for those that did not.[112] Up to 79% of these long-range vessels involved in at-sea transshipment reported human rights abuses, compared to 63% for those not transshipping.[113]

Closing the high seas to fishing would significantly reduce the risk of human rights violations. Fishing activities would be confined to areas with better regulatory oversight, reducing the opportunities for the prolonged exploitation of crews. Enhanced monitoring and control would ensure better compliance with human rights standards and significantly curb the abuse prevalent in high seas fishing operations.

In conclusion, even if the Agreement on Fisheries Subsidies enters into force and stops harmful fisheries subsidies, it has nonetheless been demonstrated that overall marine fisheries would be more profitable if the high seas were closed to fishing. Such a non-use measure would also combat the concentration of benefits into the hands of a few wealthy States which have had the means to develop high seas fleets. Closing high seas fisheries would mostly benefit coastal States, while having a minimal impact on overall seafood production or food security. Finally, it would mitigate some of the factors that make human rights violations at sea so prevalent, in particular the remoteness of the high seas and the prolonged isolation of fishing crews.

5 Conclusion

The debate over whether or not closing the high seas to commercial fishing is an appropriate non-use measure to combat some of the challenges in ocean conservation and sustainable use is multifaceted and complex. This chapter summarises several, hopefully compelling, arguments supporting this

111 ibid.

112 Environment Justice Foundation, "The Weakest Link: How at-sea trans-shipment fuels illegal fishing and human rights abuses in global fisheries" (2023), available at <https://ejfoundation.org/resources/downloads/Weakest-Link-Transshipment-report-Jan-2023.pdf> accessed 7 September 2024.

113 ibid.

approach, grounded in environmental, biodiversity, climate change, management, economic, equity, and human rights considerations.

First, from an ecological and environmental perspective, it is undeniable that marine biodiversity, in particular on the high seas, is in crisis and that the impacts of overfishing do not stop at the species-level, but also extend to the trophic chain, potentially destabilising the whole ecosystem. Closing the high seas would certainly decrease pressure on targeted species and the related degradation of marine ecosystems. Moreover, such a non-use measure would halt the current fishing practices on the high seas, which play a negative role in carbon sequestration. Second, as demonstrated by the environmental and ecological crisis, the legal regime and management measures in place are not adequate and/or sufficient. Data and knowledge gaps are only one of the major issues facing management of fish stocks and associated and dependent species. Some of these unmanaged, unregulated, or bycaught species are not even monitored, let alone properly managed. If one adds vessel monitoring, control and surveillance difficulties and the current state of transshipment practices, a high seas fishing closure appears strongly warranted. Third, harmful fisheries subsidies artificially make over half of high seas fisheries profitable, which impacts their environmental sustainability. Even if the Agreement on Fisheries Subsidies enters into force and reduces this issue, closing the high seas would lead to a substantial increase not only in fish stock conservation but also in fisheries yields and profits. These benefits would furthermore promote a more equitable distribution of resources, addressing the inequities faced by developing nations and smaller fishing communities that currently compete with large industrial fleets. Finally, human rights violations on the high seas present another critical cause for concern. They are in large part made possible by to the remoteness of the high seas and practices such as transshipment which increase workers' vulnerability. Bringing fishing activity back into areas with better regulatory control would reduce these risk factors.

To those arguing that a high seas closure cannot take place, I submit it actually can. Over the past four decades, there have indeed been a series of instances where the extraction of marine living resources from the high seas through fishing have been temporarily or permanently restricted, which shows that States can agree to massively curtain high seas freedoms vis-à-vis marine living resources. For example, the international moratorium on commercial whaling, addressed by Jeffries and Latos in chapter 7, represented a historical turning point in international efforts to conserve wide ranging migratory species in the face of overexploitation both within and beyond national jurisdiction. In addition, the temporary fishing abstention in the Central Artic Ocean, discussed by Molenaar in chapter 6, is one of the most recent and impactful examples of non-use measures in international waters and demonstrates that, in the face of threatened ecosystems and lack of knowledge, the precautionary principle can be effectively implemented through the adoption of non-use measures. Other more circumscribed examples include the UN General Assembly Resolution on high seas drift net ban,[114] which shows that it has been legally and diplomatically achievable to reach consensus on restricting the exploitation of living resources beyond national jurisdiction outside of the RFMO framework; provisions under UNCLOS on anadromous and catadromous fish stocks, which grant certain coastal States control over fishing for these species, precluding other States from fishing them;[115] and high seas pockets in the South Pacific, where the Parties to the Nauru Agreement agreed to leverage their collective power to prevent access to their national waters to any vessel that fished the high seas bordering their national waters (known as 'high seas pockets').[116]

While closing the high seas to commercial fishing could result in direct socioeconomic and environmental benefits for the majority of the world's coastal and island States, such a non-use measure would not become a 'silver bullet' against overfishing, as the unsustainable exploitation of target and non-target species also takes place within EEZs. Concerns might also exist about the displacement of fishing efforts into EEZs, but empirical evidence indicates that the majority of marine capture fisheries production already occurs within national jurisdictions and the relative increase in fishing effort within these areas would consequently be minimal. In conclusion, closing the high seas to commercial fishing as a non-use measure presents a viable path, if joined by improvements in the management of EEZs' marine living resources, toward sustainable fisheries management, enhanced biodiversity, more equitable benefit sharing, and improved respect for human rights. Addressing the gaps and inefficiencies in the current regulatory framework is crucial for ensuring the long-term health of our oceans and the communities that depend on them, and this might require 'radical' action rather than slow and insufficient reforms.

114 UNGA Res 44/225 (1989) GAOR 44th Session Supp 49; UNGA Res 45/197 (1990) GAOR 45th Session Supp 49; UNGA Res 46/215 (1991) GAOR 46th Session Supp 49.

115 UNCLOS arts 66(3)(a) and 67(2).

116 J. Vince, E. Brierley, S. Stevenson and P. Dunstan, "Ocean governance in the South Pacific region: progress and plans for action" (2017) 79 *Marine Policy* 40–45.